The experience of birth and early mothering after assisted conception

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ABSTRACT

There is emerging evidence that after infertility and assisted conception women are at increased risk of early parenting difficulties. The aims of this study were to characterize postpartum psychological functioning of women conceiving through assisted reproductive technology (ART) and to identify factors that may be associated with early parenting difficulties defined as: postpartum psychological distress, low maternal confidence and admission to residential early parenting services.

A prospective longitudinal study of the experiences of childbirth and early mothering was conducted in a consecutive cohort of women recruited in pregnancy from two large ART centres in Melbourne in the state of Victoria, Australia. All women who had a viable pregnancy verified by ultrasound at six weeks gestation between July and December 2001 and sufficient English to complete questionnaires were invited to participate. In early pregnancy they completed a structured telephone interview regarding their sociodemographic circumstances, reproductive history and infertility. The extent and outcome of their ART treatment was ascertained by scrutiny of medical records. Postal questionnaires including standardised self-report measures assessing mood, perception of quality of the relationship with the partner, personality, satisfaction with life, infant temperament, mother-infant attachment, maternal separation anxiety, and experience of motherhood were completed three, eight and eighteen months after the birth.

Of the 239 women eligible for participation 183 (77%) accepted. Of these, six miscarried and six withdrew from the study during pregnancy. Of the 171 remaining participants 152 (89%) returned all three postnatal questionnaires, exceptional recruitment and retention rates for studies of this kind.

The study sample was representative of all women who gave birth after ART in Australia and New Zealand at the time in terms of age, cause of infertility, parity, multiplicity, mode of delivery, length of gestation and babies weight at birth.
Data were compared, where possible, with population data and data from community based studies of parturient women. On available indicators, participants' socioeconomic circumstances were significantly better than those of comparison groups. Participants were significantly older when they gave birth, more likely to be delivered by caesarean section and to have twins, and to feel disappointed with the experience of the birth than comparison groups. At three months, the proportion of participants breastfeeding was lower than in comparison groups.

Participants in this study had a three-fold higher risk of early parenting difficulties necessitating admission to residential early parenting services in the first 18 months after the birth compared with other Victorian mothers (17% versus 6%, p<0.0001). Furthermore, the proportion with low self-reported maternal confidence in the early postpartum was significantly higher than among comparison groups. Although most known risk factors for postnatal mood disturbance were rare in the study population prevalence of mood disturbance was similar to that of comparison groups at all three assessment times.

This study of a systematically recruited consecutive cohort of women who had conceived with ART was large enough to test for the outcomes of interest and included multiparous women, women who had a multiple birth and those who used donor gametes. Contrary to studies, which have concluded that early adjustment to parenthood after assisted conception is unproblematic, this study made the original finding of much higher rates of early parenting difficulties requiring hospital admission after assisted than spontaneous conception. This study contributes substantially to better understanding of the effects of infertility and ART on the experience of childbirth and postnatal adjustment.
DECLARATION

This is to certify that

(i) the thesis comprises only my original work towards the PhD except where indicated in the Preface,

(ii) due acknowledgement has been made in the text to all other material used,

(iii) the thesis is less than 100,000 words in length, exclusive of tables, bibliographies and appendices.

________________________________________

Karin Hammarberg  Date
The study “Women’s experience of pregnancy, birth and mothering following assisted conception”, a prospective longitudinal study, funded by the Bertarelli Foundation, Melbourne IVF and the Fertility Society of Australia, was initiated in 2001. The chief investigator of this project was Dr Jane Fisher. Professor Gordon Baker, Ms Jenny Blood and Ms Karin Hammarberg were co-investigators. For this project participants were interviewed, medical records scrutinised and questionnaires were scheduled for the first and last trimesters of the pregnancy and three and eight months after the birth.

While employed as a Research Fellow, under the supervision of Dr Fisher, Karin Hammarberg contributed to the questionnaire design and selection of standardised measures for this study, and applications for the project to the Human Research Ethics Committees of the University of Melbourne, the Royal Women’s Hospital, Melbourne and the Freemasons Hospital, Melbourne. Following approval, Karin Hammarberg recruited and conducted telephone interviews with participants, set up a database for the information retrieved from medical records, and managed the mailing of the questionnaires.

The current project forms a part of this larger study and includes the information gathered from medical records, the telephone interviews and three postnatal questionnaires. The first and second postnatal questionnaires were part of the schedule for the original study and the third questionnaire was added to the schedule after commencement of candidature.

The mailing of the first postpartum questionnaire was completed prior to commencement of candidature. During the candidature Karin Hammarberg devised the third postpartum questionnaire, managed the distribution of the second and third postnatal questionnaires, entered all data collected during the postpartum phase of the study, sourced all comparison data and conducted the data analyses.
ACKNOWLEDGEMENTS

Many people have generously provided assistance through the course of this work. I wish to sincerely thank colleagues, friends and family whose expertise, advice, interest, encouragement and support have sustained me. In particular I wish to acknowledge people without whom this project could not have been completed.

First and foremost I am extremely grateful to all the women who so generously shared their personal experiences and who dedicated precious time to complete the questionnaires.

The guidance, encouragement, constructive criticism and belief in my ability to undertake this work from my two supervisors, Associate Professor Jane Fisher and Dr Heather Rowe, have been invaluable. I am indebted to you both for sharing your knowledge and your time and for your patience and warmth.

The support for the project given by Professor Gordon Baker and his valuable insights and useful comments on sections of this thesis have been most helpful.

I am very thankful for the patience and encouragement shown by Professor Ian Gordon at the Statistical Consulting Centre. My understanding of statistics has expanded greatly under his kind direction.

In addition to being a source of inspiration, my fellow student and good friend Mandi Cooklin took time to read in detail and offer editorial advice on earlier drafts of this manuscript. Thank you Mandi.

I thank Professor Doreen Rosenthal for allowing me the opportunity to undertake this study in the stimulating and supportive environment of the Key Centre for Women’s Health in Society. I am also grateful for the assistance of the staff at the Centre, particularly the postgraduate student administrator Ms Jennifer Sievers.
The student experience was greatly enhanced by the wonderful camaraderie among students at the Key Centre, there was always someone there with whom to share the ups and downs of student life.

The financial support from the Bertarelli Foundation, Melbourne IVF and the Fertility Society of Australia was crucial for the initiation of this project and the scholarship awarded to me by The University of Melbourne allowed its completion.

I am very thankful for the assistance in formatting the thesis provided by Dr Jonathan McQualter.

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# TABLE OF CONTENTS

Abstract ......................................................................................................... ii  
Declaration ................................................................................................... iv  
Preface ......................................................................................................... v  
Acknowledgements ...................................................................................... vi  
Table of contents ........................................................................................ viii  
List of tables ............................................................................................... xi  
List of abbreviations .................................................................................. xiv

1 **INFERTILITY AND INFERTILITY TREATMENT** ............................................................ 3  
   1.1 The desire for parenthood ............................................................................. 3  
   1.2 Infertility ....................................................................................................... 4  
   1.3 Psychosocial aspects of infertility ................................................................. 8  
   1.4 Assisted reproductive technology ............................................................... 20  
   1.5 Psychosocial aspects of assisted reproductive technology ...................... 28  
   1.6 Factors associated with infertility and treatment distress ....................... 50

2 **PERINATAL MENTAL HEALTH** ............................................................................. 58  
   2.1 Mental health and mental illness ................................................................. 59  
   2.2 Emotional well-being during pregnancy .................................................. 62  
   2.3 The childbirth experience ........................................................................ 77  
   2.4 Postnatal adjustment ................................................................................ 87

3 **THE CONTEXT OF CHILDBEARING IN AUSTRALIA** ............................................. 125  
   3.1 The Australian health system .................................................................... 125  
   3.2 Trends in childbearing in Australia ............................................................ 126  
   3.3 Maternity care ............................................................................................ 133  
   3.4 Needs of mothers after assisted conception ............................................ 142

4 **METHODS** ..................................................................................................... 146  
   4.1 Aims and hypothesis ................................................................................ 146
4.2 Study design ................................................................. 146
4.3 Sampling and recruitment ........................................... 147
4.4 Procedures ................................................................. 151
4.5 Materials ...................................................................... 154
4.6 Ethical considerations .................................................. 168
4.7 Methods of analysis ..................................................... 169

5 RESULTS ........................................................................ 186
5.1 Recruitment and retention rates .................................... 186
5.2 Representative adequacy and characteristics and of the study sample ........................................ 188
5.3 Physical and emotional well-being during pregnancy .... 195
5.4 Obstetric and perinatal outcomes ................................... 198
5.5 Postnatal adjustment ..................................................... 201
5.6 Infant health, temperament and behaviour ................... 230
5.7 Postnatal maternal mood ................................................. 240
5.8 Experience of motherhood ............................................ 247
5.9 Satisfaction with life ...................................................... 252
5.10 Mothering twins .......................................................... 252
5.11 Mothering after gamete donation ................................. 255
5.12 Reproductive events and decisions ............................... 256
5.13 Determinants of maternal mood, maternal confidence, and utilisation of postnatal residential services .... 257
5.14 Conclusion .................................................................. 272

6 DISCUSSION AND CONCLUSION .................................. 274
6.1 Strengths and limitations of the study ......................... 274
6.2 Implications of findings ................................................ 276
6.3 Strategies to improve the experience of childbirth and postnatal adjustment after assisted reproductive technology .......... 285
6.4 Future research .................................................................287

7 REFERENCES .............................................................................288

8 APPENDICES .................................................................335

8.1 Appendix I - Letter of invitation to participate in the study..............335
8.2 Appendix II - Plain language statement ........................................336
8.3 Appendix III - Consent form ....................................................337
8.4 Appendix IV - Coding sheet for structured telephone interview ..........338
8.5 Appendix V - First questionnaire ...............................................339
8.6 Appendix VI - Second questionnaire ............................................340
8.7 Appendix VII - Expression of interest to complete additional questionnaire .................................................................341
8.8 Appendix VIII - Third questionnaire ............................................342
8.9 Appendix IX - Questionnaire for mothers of twins .........................343
Table 1.3.1.2.1 Studies evaluating the psychological effects of infertility .................... 15
Table 1.5.2.1.1 Studies evaluating the psychological effects of ART............................ 31
Table 1.5.2.2.1 Studies exploring the relationship between psychological state and ART outcome ....................................................................................................... 37
Table 2.2.6.1 Psychological well-being in pregnancy after assisted conception ........... 71
Table 2.4.2.3.3.1 Studies using the EPDS to measure depression among parturient women .................................................................................................................. 96
Table 2.4.2.3.4.1 Risk factors for postnatal depression................................................. 97
Table 2.4.9.1 Maternal postnatal adjustment after assisted conception ..................... 115
Table 2.4.9.2 Maternal postnatal adjustment after ART and multiple birth................. 121
Table 3.3.4.1.1 Residential postnatal services in Victoria............................................. 140
Table 4.4.2.1 Socio-demographic and fertility history information obtained at telephone interview ............................................................................................................. 152
Table 4.4.3.1 Steps in the larger study with outlined areas indicating material included in this thesis ............................................................................................................. 153
Table 4.5.1.3.1 Schedule of administration of standardised self-report measures ...... 167
Table 4.7.3.1.1 Factors and their weighting for the BIT score ........................................ 173
Table 4.7.3.2.1 Items included and their weighting for the Infant Sleep, Cry and Feeding Patterns for infants aged three months (ISCFP1) ........................................ 175
Table 4.7.3.2.2 Items included and their weighting for the Infant Sleep, Cry and Feeding Patterns for infants aged eight months (ISCFP2) ........................................ 176
Table 4.7.3.2.3 Items included and their weighting for the composite Toddler Sleep Pattern (TSP) ........................................................................................................ 177
Table 4.7.3.4.1 Potential providers of support included in the “Emotional Support” and “Practical Support” scales ........................................................................ 178
Table 5.1.2.1 Return rates for the three postpartum questionnaires ............................... 187
Table 5.1.3.1 Numbers of singletons and twins for the three postpartum questionnaires 188
Table 5.2.1.1 Treatment information of participants and non-participants .................. 189
Table 5.2.2.2.1 Educational level of participants .......................................................... 191
Table 5.2.2.2.2 Occupational status of participants ..................................................... 191
Table 5.2.4.1 Socio economic characteristics of participants from MIVF and RS ... 193
Table 5.2.3.1.1 Outcomes of previous pregnancies ..................................................... 194
Table 5.2.3.2.1 Comparison between study participants and the 2000 cohort of Australian ART conceptions ................................................................. 194
Table 5.3.1 Comparison of EDS scores in study sample with relevant samples........ 197
Table 5.3.2 Comparison of AAQ scores ................................................................ 198
Table 5.4.1 Comparison of obstetric and perinatal outcomes with those of the general parturient population ......................................................... 199
Table 5.4.2 Comparison of obstetric and perinatal outcomes with all Australian and New Zealand ART births ................................................................. 200
Table 5.5.1.1 Experience of intra- and postpartum care, comparison with privately insured women who participated in the VSRM ........................................ 204
Table 5.5.3.1 Comparison of IBM subscale scores with female population norms.... 208
Table 5.5.4.1 Comparison of mean scores on items on the vulnerability sub-scale of the VPSQ ......................................................................................... 210
Table 5.5.6.2.1 Work and leisure time for participants and their partners at 8 months postpartum ..................................................................................... 212
Table 5.5.6.3.1 Frequency of fathers’ participation in childcare activities at 18 months (n=146) ......................................................................................... 215
Table 5.5.6.4.1 Participation in mothers groups ......................................................... 216
Table 5.5.7.1.1 Comparison of attachment subscale scores between participants and a comparison group of IVF mothers .................................................. 220
Table 5.5.7.1.2 Comparison of attachment scores between mothers of singletons and twins ........................................................................................................ 221
Table 5.5.7.2.1 Relationship between maternal confidence and MPA subscale scores at 8 and 18 months ........................................................................ 223
Table 5.5.7.2.2 Relationship between enjoyment of baby care and MPA scores at 8 months ................................................................................................. 224
Table 5.5.7.3.1 Comparison of means on the three MSAS subscales ....................... 225
Table 5.6.2.1.1 EITQ subscale scores and comparison with normative sample ....... 231
Table 5.6.2.1.2 Scores on the General Impression (GI) scale of EITQ ..................... 232
Table 5.6.2.1.3 Perception of infant manageability .................................................... 233
Table 5.6.2.3.1 STSI scores and comparison with normative sample ..................... 234
Table 5.6.2.5.1 STST scores and comparison with normative sample .................. 236
Table 5.6.3.1 Categories of infant and toddler manageability at 3, 8 and 18 months .. 237
Table 5.7.1.1.1 EPDS comparisons 3 months postpartum ........................................... 241
Table 5.7.1.2.1 POMS sub-scale comparisons 3 months postpartum ...................... 242
Table 5.7.1.2.2 POMS scores in the clinical range 3 months postpartum ............... 243
Table 5.7.2.1.1 EPDS comparisons 8 months postpartum ........................................... 243
Table 5.7.2.2.1 POMS sub-scale comparisons 8 months postpartum ...................... 244
Table 5.7.2.2 POMS scores in the clinical range 8 months postpartum................. 245
Table 5.7.4.1 EPDS, “Tension-Anxiety” and “Fatigue-Inertia” at 3, 8 and 18 months postpartum (n=151) ......................................................................................... 246
Table 5.8.1.1 EMQ scores for non-depressed and depressed mothers .................. 247
Table 5.8.1.2 Correlation coefficients for EMQ scores........................................... 248
Table 5.10.1.1 Antenatal utilisation of sources of information about multiple birth .. 253
Table 5.10.3. Degree of difficulty involved in caring for twins (n=27)...................... 253
Table 5.11.1 Comparison between participants with donor and non-donor conceived babies................................................................................................................. 255
Table 5.13.1.1.1 Variables associated with higher EPDS scores at 3, 8 and 18 months postpartum (p<0.05) ...................................................................................... 258
Table 5.13.1.2.1 Variables associated with lower maternal confidence 3, 8 and 18 months postpartum (p<0.05) ............................................................................... 259
Table 5.13.1.3.1 Variables associated with admission to a residential mother-baby service in the first 18 months (p<0.05) ................................................................. 260
Table 5.13.2.1.1 Parameter estimates for the potential explanatory variables for EPDS score at three months (n=148) ................................................................. 261
Table 5.13.2.1.2 Parameter estimates for the potential explanatory variables for EPDS score at eight months (n=139) ................................................................. 263
Table 5.13.2.1.3 Parameter estimates for the potential explanatory variables for EPDS score at 18 months (n=119) ................................................................. 265
Table 5.13.2.2.1 Odds ratio for potential explanatory variables for lower self-rated maternal confidence at three months (n=158) .............................................. 267
Table 5.13.2.2.2 Odds ratio for potential explanatory variables for lower self-rated maternal confidence at eight months (n=146) ............................................... 268
Table 5.13.2.2.3 Odds ratio for potential explanatory variables for lower self-rated maternal confidence at 18 months (n=129) ................................................. 269
Table 5.13.2.3.1 Odds ratio for potential explanatory variables for utilisation of residential postnatal services in the first 18 months postpartum (n=141)........... 271
### LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAQ</td>
<td>Antenatal Attachment Questionnaire (1993)</td>
</tr>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>ANZARD</td>
<td>Australian and New Zealand Assisted Reproduction Database</td>
</tr>
<tr>
<td>ART</td>
<td>Assisted Reproductive Technology</td>
</tr>
<tr>
<td>ASCO</td>
<td>Australian Standard Classification of Occupations</td>
</tr>
<tr>
<td>CESD</td>
<td>Centre for Epidemiological Studies Depression Scale (Radloff 1977)</td>
</tr>
<tr>
<td>COH</td>
<td>Controlled Ovarian Hyperstimulation</td>
</tr>
<tr>
<td>CVS</td>
<td>Chorion Villi Sampling</td>
</tr>
<tr>
<td>DAS</td>
<td>Dyadic Adjustment Scale (Spanier 1976)</td>
</tr>
<tr>
<td>DI</td>
<td>Donor Insemination</td>
</tr>
<tr>
<td>DIS</td>
<td>Diagnostic Interview Schedule (Robins et al. 1989)</td>
</tr>
<tr>
<td>DSM-IV</td>
<td>Diagnostic and Statistical Manual for Mental Disorders, Fourth edition (American Psychiatric Association 1994)</td>
</tr>
<tr>
<td>EITQ</td>
<td>Early Infancy Temperament Questionnaire (Medoff-Cooper et al. 1993)</td>
</tr>
<tr>
<td>EPDS</td>
<td>Edinburgh Postnatal Depression Scale (Cox et al. 1987)</td>
</tr>
<tr>
<td>EMQ</td>
<td>Experience of Motherhood Questionnaire (Astbury 1994)</td>
</tr>
<tr>
<td>ET</td>
<td>Embryo Transfer</td>
</tr>
<tr>
<td>FET</td>
<td>Frozen Embryo Transfer</td>
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<tr>
<td>FP</td>
<td>Fertility Problem (Stress Inventory) (Abbey et al. 1991)</td>
</tr>
<tr>
<td>FPI</td>
<td>Fertility Problem Inventory (Newton et al. 1999)</td>
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<tr>
<td>GHQ</td>
<td>General Health Questionnaire (Goldberg 1992)</td>
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<tr>
<td>GIFT</td>
<td>Gamete Intra Fallopian Transfer</td>
</tr>
<tr>
<td>GRIMS</td>
<td>Golombok Rust Inventory of Marital State (Rust et al. 1990)</td>
</tr>
<tr>
<td>SF-36</td>
<td>Health Survey Short Form (Ware et al. 1993)</td>
</tr>
<tr>
<td>IBM</td>
<td>Intimate Bonds Measure (Wilhelm and Parker 1988)</td>
</tr>
<tr>
<td>ICSI</td>
<td>Intra Cytoplasmic Sperm Injection</td>
</tr>
<tr>
<td>ISS</td>
<td>Index of Sexual Satisfaction (Hudson et al. 1981)</td>
</tr>
<tr>
<td>ITA</td>
<td>Infertility Treatment Authority</td>
</tr>
<tr>
<td>IVF</td>
<td>In-Vitro Fertilisation</td>
</tr>
<tr>
<td>MFAS</td>
<td>Maternal-Fetal Attachment Scale (Cranley 1981)</td>
</tr>
<tr>
<td>MFPR</td>
<td>Multi Fetal Pregnancy Reduction</td>
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<tr>
<td>MIVF</td>
<td>Melbourne IVF</td>
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<tr>
<td>MPAS</td>
<td>Maternal Postnatal Attachment Scale (Condon and Corkindale 1998)</td>
</tr>
<tr>
<td>MSAS</td>
<td>Maternal Separation Anxiety Scale (Hock et al. 1989b)</td>
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NHMRC    National Health and Medical Research Council
NPSU     National Perinatal Statistics Unit
OHSS     Ovarian Hyper Stimulation Syndrome
PAI      Prenatal Attachment Inventory (Müller 1993)
PDCU     Victorian Perinatal Data Collection Unit
PEQ      Pregnancy Experience Questionnaire (Kumar et al. 1984)
PES      Pregnancy Experience Scale (DiPietro et al. 2004)
PGD      Preimplantation Genetic Diagnosis
PND      Postnatal Depression
POMS     Profile of Mood States (McNair et al. 1971)
PTSD     Post Traumatic Stress Disorder
RCT      Randomised Controlled Trial
RDC      Research Diagnostic Criteria (Spitzer et al. 1978)
RITQ     Revised Infant Temperament Questionnaire (Carey and McDevitt 1978)
RS       Reproductive Services
RTAC     Reproductive Technology Accreditation Committee
SCL-90   Symptom Checklist 90 (Derogatis et al. 1974)
SES      Socio Economic Status
STAI     State Trait Anxiety Inventory (Spielberger et al. 1983)
STSI     Short Temperament Scale for Infants (Sanson et al. 1987)
STST     Short Temperament Scale for Toddlers (Prior et al. 1989)
SWLS     The Satisfaction With Life Scale (Diener et al. 1985)
TTQ      Toddler Temperament Questionnaire (Fullard et al. 1984)
VPS      Vulnerable Personality Scale (Boyce et al. 2001)
CHAPTER 1

1 INFERTILITY AND INFERTILITY TREATMENT ......................................................... 3

1.1 The desire for parenthood .................................................................................. 3

1.2 Infertility ............................................................................................................. 4

1.2.1 Prevalence of infertility ............................................................................. 5

1.2.2 Causes of infertility ...................................................................................... 6

1.2.2.1 Female causes of infertility ................................................................. 6

1.2.2.2 Male causes of infertility ..................................................................... 6

1.2.2.3 Unexplained infertility ......................................................................... 7

1.2.2.4 Age-related infertility .......................................................................... 7

1.3 Psychosocial aspects of infertility ................................................................. 8

1.3.1 Relationship between infertility and psychological functioning .............. 8

1.3.1.1 Does distress cause infertility? ............................................................ 9

1.3.1.2 Impact of infertility on emotional well-being .................................... 14

1.4 Assisted reproductive technology .................................................................... 20

1.4.1 Steps involved in treatment ....................................................................... 22

1.4.2 Donor gametes .......................................................................................... 23

1.4.3 Treatment outcome .................................................................................... 24

1.4.4 Multiple birth ............................................................................................. 25

1.4.5 Medical complications .............................................................................. 27

1.5 Psychosocial aspects of assisted reproductive technology ......................... 28

1.5.1 Physical demands ....................................................................................... 29

1.5.2 Emotional demands .................................................................................... 30

1.5.2.1 Impact of treatment on emotional well-being ................................. 30
1.5.2.2 Using donor gametes ................................................... 41
1.5.2.3 Chance of success ..................................................... 42
1.5.2.4 Stored embryos supernumerary to couples’ needs .................................................. 43
1.5.2.5 Counselling ............................................................... 44

1.5.3 Economic demands ...................................................... 45
1.5.4 Satisfaction with treatment ............................................ 46
1.5.5 Discontinuing treatment ............................................... 46
1.5.6 Gender differences in psychological responses to infertility and treatment ................................................. 47
1.5.7 Impact of infertility and treatment on intimate relationship ................................................. 48

1.6 Factors associated with infertility and treatment distress ........................................... 50
1.6.1 The woman’s age .......................................................... 51
1.6.2 Duration of infertility ................................................... 51
1.6.3 Duration of treatment .................................................. 52
1.6.4 Mediating effect of existing children .................................. 52
1.6.5 Pregnancy loss ............................................................ 53
1.6.6 Cause of infertility ....................................................... 54
1.6.7 Use of donor gametes .................................................. 55
1 INFERTILITY AND INFERTILITY TREATMENT

1.1 THE DESIRE FOR PARENTHOOD

Most adults have children or wish to have children in the future. In a recent Australian population based study approximately 2000 women and men aged between 20 and 39 years were surveyed. Less than half were childless and of those, over three-quarters “definitely” wanted to become parents in the future. Some of those who were childless at the time of the survey were unsure about whether they would want children in the future but only 10% reported with certainty that they did not want children (Weston et al. 2004).

There are many reasons for wishing to have children. In a survey of a representative sample of 897 white married couples in the UK who did not have children a range of reasons for wishing and not wishing to have children in the future were listed. “Biological drive”, “Raising a child would be fulfilling”, “My partner would be pleased if I had a child”, and ”I feel it would make us a family” were some of the reasons women commonly endorsed for their wish to have children (Langdridge et al. 2005).

Most women expect that if and when they want children they will be able to conceive and that the pregnancy will result in the birth of a healthy child. Therefore, when attempts to conceive are unsuccessful or a pregnancy is lost, it is unanticipated and challenges the personal resources of individuals. Involuntary childlessness can represent a major life crisis. Those affected may feel that their expected life course is disrupted, relationships with their partner and others are challenged, biological function threatened, social expectations thwarted and emotional well-being diminished. Infertile people often describe feelings of loss of control, uncertainty about the future, betrayal, and guilt. Medical treatment to overcome infertility is invasive, physically and emotionally demanding and financially costly.

There is extensive evidence that involuntary childlessness and its medical treatment are extremely distressing experiences, particularly for women. However, there is limited understanding of how these obstacles on the path to motherhood affect pregnancy and
postnatal adjustment and emotional well-being of women who become pregnant as a result of infertility treatment.

1.2 INFERTILITY

Infertility is medically defined as the failure to conceive after one year of regular sexual intercourse without the use of contraceptives (Johnson and Everitt 2000, p 265) and infecundity means that a woman, although she might have conceived, has not been able to sustain a pregnancy and give birth to a child. Infertility and infecundity are termed “primary” when no pregnancy or live birth has ever occurred and “secondary” when a subsequent pregnancy or live birth is not achieved.

Although views vary between cultures, childlessness is generally considered to be socially undesirable. In most societies childbearing is viewed as the norm and there is a social expectation that couples in long-term relationships will have children. In this context, women who do not have children may be stereotyped as either desperate or selfish (Letherby 2002). De Lacey (1992) describes how women without children may be viewed as “misfits” when having children is seen as a fundamental part of feminine identity and a normal life course. Whiteford and Gonzales (1995) discuss two “procreative norms” that prevail in North American society; “married couples should reproduce” and “married couples should want to reproduce”. They argue that these norms, coupled with government policies that encourage reproduction and promote parenthood, create a cultural pressure on women to have children. The social expectations on women in relation to childbearing are succinctly summarised by Woollett (2000).

“Women are free to chose how many children they have - as long as they do not opt for ‘no’ children, ‘only’ one child, or ‘too many’ children; and when to have children – but preferably when they are not ‘too young’ or ‘too old’ “ (page 313)

In this social and cultural context infertility may be stigmatised and those who have an infertility problem are often secretive about it and find it difficult to discuss (Hammarberg et al. 2001).
In addition to the social stigma of infertility, women who seek medical help for their inability to conceive may be scrutinised about their motives for parenthood. In a qualitative study Malin (2003) interviewed 14 Finnish doctors specialising in infertility about their attitudes. “Ideal” patients in the doctors’ view were women who were partnered, healthy, emotionally stable and less than 35 years old and who had an organic cause of infertility. A woman’s capacity for maternal love was questioned if she was from a higher socioeconomic class and “too wealthy” as this was thought to make her selfish and too career centered. It was also viewed as undesirable if she was from lower socioeconomic classes and “too poor” as she might then have social problems and too few material resources for a child (Malin 2003).

Although considered by some to be a social rather than a medical problem, it is generally accepted that infertility is a health problem, which is deserving of health care resources. The American Society for Reproductive Medicine (ASRM) states that infertility is a disease that should be investigated if it has lasted more than twelve months (Habbema et al. 2004). There is also apparent support for the provision of infertility treatment at public expense. In a survey of public perceptions of infertility and infertility treatment among 8,194 people from six European countries, the United Stated and Australia, the majority supported the availability of infertility treatment. Furthermore, although the general awareness of the definition of and incidence of infertility was relatively low, almost all those polled (90%) knew about in-vitro fertilisation (IVF) and 70% supported the availability of government subsidised IVF treatment for infertile couples (The Bertarelli Foundation Scientific Board 2000).

### 1.2.1 Prevalence of infertility

About 70% of couples who try actively to conceive will achieve a pregnancy within six months (Johnson and Everitt 2000, p 265). However, a sizable minority of couples experience difficulties conceiving and it is estimated that more than 80 million people worldwide are affected by infertility (Vayena et al. 2002, p xv). In industrialised countries some 10 to 15% of couples who wish to have a child experience difficulties conceiving. Over time about half of these conceive spontaneously or with medical help, while the remainder either never conceive, or are unable to have a second or subsequent child (Johnson and Everitt 2000, p 265). An indicator of the prevalence of infertility can
be defined as “percentage of women of reproductive age (15 to 49 years) at risk of pregnancy who report trying unsuccessfully for a pregnancy for one year or more” (Ford et al. 2003). No national survey of the prevalence of infertility has been undertaken in Australia but it is assumed that the rate is similar to that in other industrialised countries (Ford et al. 2003). In a survey of reproductive experiences in a large representative sample of 9,134 Australian women aged 16-59 years 15.5% reported having had difficulties conceiving and 33.4% to have had a miscarriage (Smith et al. 2003).

1.2.2 Causes of infertility

Causes of infertility may be related to the male, the female or attributable to both partners. In some cases no explanatory cause can be identified and the infertility is then termed unexplained or functional. The three major known causes of infertility are ovulatory problems, blocked or damaged Fallopian tubes, and poor quality or low quantity of sperm. These causes account for 75-80% of all explainable cases of infertility (Johnson and Everitt, p 265).

1.2.2.1 Female causes of infertility

The most common cause of female infertility is ovulatory problems of varying severity. Some women ovulate infrequently and irregularly or not at all. Fertilisation, the union between the oocyte and sperm, occurs naturally in the Fallopian tube. The second most common cause of female infertility is tubal disease where one or both Fallopian tubes have been damaged as a consequence of an infection or abdominal surgery. Other causes of female infertility include endometriosis where the tissue that lines the uterus (endometrium) grows inappropriately elsewhere in the pelvic area causing scarring and the formation of adhesions which can impair the function of the Fallopian tubes (Johnson and Everitt 2000, p 265-266).

1.2.2.2 Male causes of infertility

The most common cause of male infertility is sperm production problems and these may be due to chromosomal or genetic factors, infections, exposure to radiotherapy,
chemotherapy or certain drugs, or torsion of the testicle in the scrotum. A semen analysis is performed to assess sperm production and the potential reproductive capacity of a man. The main parameters assessed are the number of sperm per milliliter of ejaculate, and the proportions with progressive forward motility and normal morphology. A low sperm count, (oligospermia), high proportions without progressive forward motility (astenospermia) or with abnormal forms (teratospermia), or combinations of these, are associated with male infertility. The second most common cause of male infertility is blocked or absent vas deferens which prevents the transport of the sperm from the epididymis to the ejaculatory duct. Blocked vas deferens can be a result of a vasectomy, infections or prostate-related problems. Absence of vas deferens is a congenital malformation affecting a small proportion of men. Other causes of male infertility include erectile dysfunction, sperm antibodies and hormonal deficiencies (McLachlan et al. 2005).

1.2.2.3 Unexplained infertility

No apparent cause can be found using current diagnostic tools in 15% to 25% of infertile couples. The proportion of infertility cases categorised as unexplained has decreased in the last twenty years as a result of improvements in diagnostic techniques and the ability to identify subtle and complex organic explanations.

1.2.2.4 Age-related infertility

In any population the proportion of couples with no identifiable organic cause of infertility increases with increasing female age (Collins 1998). This higher rate of unexplained infertility reflects the decreasing chance of conception with increasing female age.

Many couples in industrialised countries, particularly those who are well educated, wish to delay childbearing until other life goals have been achieved (The Practice Committee of the American Society for Reproductive Medicine 2004). The trend to plan to have children later in life may in part be influenced by inadequate knowledge about the negative effect of increasing female age on fertility. Lampic et al. (2006) surveyed a randomly selected sample of female (n=222) and male (n=179) Swedish academics and
found that both women and men had an overly optimistic understanding of women’s chance of conceiving after the age of 35. Also, in an Australian survey of women (n=152) who were seeking assisted reproductive technology (ART) for their first planned pregnancy when they were over the age of 37 almost one in five reported being not fully aware of the inverse relationship between age and fertility (Hammarberg and Clarke 2005).

1.3 **Psychosocial Aspects of Infertility**

To be childless in a predominantly family-centered society and to spend long periods of time trying to conceive without success can be extremely emotionally distressing (Davisson 1995). It is generally agreed that a diagnosis of infertility for some represents a major life crisis (Menning 1982; Stanton et al. 2002). Menning (1980) describes reactions of surprise, denial, anger, isolation, guilt and grief commonly seen in individuals following a diagnosis of infertility. Arriving at a diagnosis may take months and there is a positive relationship between length of the infertility investigation and degree of psychological distress (Lalos et al. 1986). The infertility investigation itself is physically and emotionally demanding, particularly for women. Some of the investigative tests and procedures are invasive and may leave women feeling probed and scrutinised (Davisson 1995). Couples who seek treatment become patients, conception becomes medicalised and this medical focus may be anxiety-provoking for some (Mahlstedt 1985). Among 200 infertile women in America who were surveyed, nearly half rated infertility as the most upsetting experience of their life (Freeman et al. 1985).

1.3.1 **Relationship between infertility and psychological functioning**

Numerous studies have been conducted in order to establish if and how infertility is associated with psychological functioning. Two contrasting theoretical frameworks relating to cause and effect can be discerned and remain entangled in this literature; psychological factors cause infertility and infertility has psychological consequences.
1.3.1.1 Does distress cause infertility?

The theory that distress causes infertility, so called “psychogenic infertility”, presumes that in couples with unexplained or “functional” infertility psychological and emotional factors, especially in women, have prevented conception.

Early psychoanalytical theory suggested that ambivalence about pregnancy, an unconscious rejection of femininity and motherhood, and fear of sex could cause infertility (Deutsch 1945, pp 107-125; Benedek 1952). This psychogenic model, where impaired psychological functioning is thought to diminish a woman’s capacity to conceive, was the conceptual framework for much of the work published in the 1950’s about the relationship between infertility and psychological functioning. However, the assumption of psychogenesis was largely based on opinion (Benedek 1952), case studies (Deutsch 1945), exclusion of demonstrated organic factors (Fischer 1953) and occurrence of pregnancy following psychotherapy (Abarbanel and Bach 1959). To evaluate the strength of the evidence that psychological factors can cause infertility Noyes and Chapnick (1964) scrutinised 75 papers published between 1935-1963 for empirical evidence that psychological factors influence fertility. They concluded that “the evidence presented was scanty, poorly organized and poorly analysed” and that there was “no conclusive evidence that psychological factors can alter fertility”.

In spite of this, the notion of psychogenic infertility continues to be influential and some contemporary research still seeks to demonstrate a causative relationship between poor psychological functioning and infertility. Jeker et al. (1988) for example, interviewed 116 Swiss couples at their first visit to an infertility clinic. Based on their observation that ambivalence about parenthood was present in the majority of female patients, especially in those without clinically defined organic cause, they suggested that this might be the cause of their inability to conceive. However, no comparison was made with fertile women about their feelings of ambivalence towards parenthood and therefore the observation does not constitute evidence for a cause-effect relationship between ambivalence and infertility.

Wasser et al. (1993), in a study of 38 American women, grouped participants according to whether an organic cause of infertility had been identified or not. Participants in this
study completed questionnaires, which included standardised measures of social support, quality of relationships, self-esteem, depression and neurotic symptomatology. The authors found significantly more psychosocial distress in the seven women with unexplained infertility than in the other 31 women and concluded that “psychosocial distress contributes significantly to the etiology of some forms of infertility”. Alternative interpretations are that the small sample size led to a chance finding or that the seven women with unexplained infertility had been trying to conceive for longer and therefore were more distressed.

Others have used clinical case studies to demonstrate the role of the psyche in the aetiology of infertility. Christie (1994) for example who treated nine infertile women with analytical psychotherapy stated that

“For certain individuals and couples there appears to be an unconscious link between a lowering of the level of fertility, and psychosocial, interpersonal or intrapsychic situation rendering it an unsuitable time to allow a baby to come.” (page 378)

Furthermore, Cabau and de Senarclens (1986) propose that unexplained infertility can be “corrected” with psychological treatment and that

“…the doctor’s role is to help a real desire for pregnancy to come to fruition, and to clarify the origin of the refusal to have a child. If a woman is encouraged to speak freely, she will betray her true feelings, and so become aware of her underlying ambivalence.” (page 670)

Infertile women seeking psychotherapy constitute a minority and since no comparison is made with those who do not undergo psychotherapy the generalisation from a population in psychiatric treatment to the whole population is inappropriate. Without appropriate study designs, reproducible measures or any proposed mechanisms for the claimed benefits of psychotherapy, suggestions that it can resolve infertility remain highly contentious.

More methodologically rigorous studies support the assumption that infertility, irrespective of cause, precedes distress which is a consequence, rather than a cause of infertility. Wishman et al. (2001) assessed a consecutive cohort of 564 couples who
contacted a German university infertility outpatient clinic for the first time. Participants completed a questionnaire, which included standardised psychometric measures of motives for wanting a child, life satisfaction, couple relationship, anxiety and depression, physical complaints and personality traits. Comparisons were made between those with unexplained and organic infertility and also with community norms for these measures. Except for higher scores on measures of anxiety and depression among infertile women all scores were in the established normal range for these measures. Furthermore, no differences were observed between those with unexplained infertility and infertility due to an identified biological cause. The authors therefore concluded that there is no psychological profile characterising infertile individuals or specific to unexplained infertility.

Edelmann et al. (1991) made similar observations. They administered standardised measures of depression and anxiety to 116 British couples who presented at a specialist clinic with primary infertility and to three groups of couples (n=61) with children. These three groups were 13 couples where the woman was undergoing sterilisation, 25 where the man was presenting for vasectomy and 23 couples with preschool age children who were not planning any intervention to alter their fertility. Higher levels of anxiety were observed among the infertile women but there were no other differences between the infertile couples and the fertile controls. Further, there were no differences in psychological symptomatology between those with unexplained and organic infertility.

In a prospective study Vartiainen et al. (1994) assessed 180 healthy nulliparous Finnish women who were planning to have children using a semi-structured psychiatric interview, psychological personality testing, and a standardised measure of anxiety. Participants were then followed up six monthly for three years. In this study, one of the few prospective studies, no association between low fertility and personality factors was detected.

Apfel et al. (2002) argue that even if it is possible that psychological state can influence reproductive functioning, the relationship is immensely complex and poorly understood, and there is no empirical evidence of a simple, direct causal relationship between the two. Furthermore, Batstra et al. (2002) contend that although medical technology has
advanced and knowledge about how pregnancy is established has increased, there are still many aspects of fertility that are unknown. For example, there is limited knowledge to date about factors that may influence fertilisation, implantation of the embryo in the uterus and early embryonic development. Therefore they believe that some cases of unexplained infertility may well have an organic origin which future knowledge and technology will be able to identify.

A number of methodological problems in studies about the relationship between infertility and psychological adjustment have been identified. Brkovich et al. (1998) for example point out that most studies are not prospective and that study populations which include only couples who have already been diagnosed as infertile do not allow a cause-effect relationship to be established.

Most studies of infertile populations have used instruments designed to discriminate between normal and psychiatric populations and these may not be sensitive enough to detect moderate distress reactions that may be normal responses to infertility. Berg (1994) argues that it may therefore be more useful to try to characterise the psychological strain in these populations rather than to search for psychopathology. Another problem relating to the use of instruments measuring severe psychopathology is that these often include items that may inflate scores of infertile women who are undergoing infertility treatment. Symptoms such as nausea, headache, fatigue, hot flushes and irritability can be psychological symptoms but are also common side-effects of infertility drugs (Berg 1994). Further to this, Downey et al. (1990) suggest that depressive symptoms may be an appropriate response to a major adverse life situation, such as infertility, and that this should be distinguished from depression as a mental disorder.

Some have tried to demonstrate a cause-effect relationship between psychological functioning and the ability to conceive by implementing interventions aimed at improving mental well-being in order to improve fertility. Domar et al. (1990; 1992) conducted studies in the United States where infertile women participated in a cognitive-behavioral treatment program, including stress management and relaxation, over a number of weeks in order to reduce anxiety and depression. Attendance at the program was found to be associated with decreased negative psychological symptoms.
as measured by State Trait Anxiety Inventory (STAI, Spielberger et al. 1983) and Profile of Mood States (POMS, McNair et al. 1971). Based on these findings the authors subsequently randomly assigned 184 women with unexplained infertility of less than two years duration into one of two psychological interventions, a ten session cognitive-behavioral group or an infertility support group, or a routine care control group. These women were followed for one year when viable pregnancy rate was calculated for each group. There were no statistically significant group differences in the proportions that underwent some form of infertility treatment during this time, but women in the cognitive-behavioral therapy group and those who were assigned to the infertility support group had a significantly higher viable pregnancy rate than the women in the routine care group. This led the authors to conclude that group psychological interventions appear to increase pregnancy rates in women with unexplained infertility (Domar et al. 2000). However, a number of serious methodological flaws introduced bias, which make it more likely that this was a chance finding. Study participants were self-selected, and the randomisation process broke down through the course of recruitment so that participants were allocated to group membership rather than randomised into groups. Furthermore, overall only 60% of the women remained in the study for the duration of the project and, in the standard care group, the retention rate was as low as 40%.

Boivin (2003) in a systematic review of studies describing psychosocial interventions to improve well-being and pregnancy rates in infertile couples identified 380 studies. Of these, only 25 (7%) evaluated the effect of the intervention on at least one outcome measure. The author concluded that some interventions, in particular those that focused on education and skills training, for example relaxation, are able to produce improved psychological well-being for women and men, but pregnancy rates are unlikely to be affected by psychosocial interventions. Similarly, de Liz and Strauss (2005) who undertook a meta-analysis to evaluate the efficacy of psychological interventions, including psychotherapy, on improvements in levels of anxiety, depression and conception rates concluded that the available evidence suggest the therapies may positively influence emotional symptoms but not chance of pregnancy.

While methodological limitations preclude an unequivocal conclusion about the direction of the relationship between psychological functioning and infertility, it would
appear that empirical evidence favours the conceptual framework that emotional distress is a consequence rather than a cause of being unable to conceive. However, the notion that distress can cause infertility has the potential to add to the emotional burden associated with the experience of infertility. It is well known that feelings of shame and guilt are common reactions to infertility and that women often blame themselves for their inability to conceive (Menning 1982; Liebermann-Smith 1987, p 102; Oke 1999, p 5). These feelings may be intensified in women who assume that their own psychological flaws cause their infertility. Furthermore, when psychosocial interventions are presented as means of increasing the chance of pregnancy occurring, feelings of inadequacy may be exacerbated among those who participate in these interventions but remain childless.

1.3.1.2 Impact of infertility on emotional well-being

As with other life crises, individual responses to infertility vary. Some couples decide not to seek medical treatment and choose instead to live without children or to become adoptive or foster parents. For others the strain of the infertility causes the relationship to deteriorate and leads to separation or divorce. Participants in research investigating how infertility affects emotional well-being are almost exclusively recruited from infertility clinics and infertility support groups. Therefore, findings about the psychological consequences of infertility apply only to couples who seek medical assistance. Little is known about the psychological adjustment of infertile couples who do not pursue medical intervention or about individuals whose wish for parenthood is unfulfilled because they do not have a partner. It is possible that those who seek medical help are different in important respects from those who do not pursue treatment. The former may be more motivated for parenthood or only interested in genetic parenthood, have more traditional role expectations where parenthood is central, or have stronger relationships that can endure the stress of medical intervention. They may also be more likely to employ problem-focused coping strategies, such as pursuing treatment, and able to afford the financial costs associated with medical treatment (Callan 1987; Edelmann et al. 1994; van Balen and Trimbos-Kemper 1995).

A number of studies have attempted to measure the effect of infertility on emotional well-being. The methods employed and the main findings from studies evaluating the psychological effects of ART are summarised in Table 1.3.1.2.1.
Table 1.3.1.2.1 Studies evaluating the psychological effects of infertility

<table>
<thead>
<tr>
<th>Authors and country of study</th>
<th>Sample</th>
<th>Type of study and time of assessment</th>
<th>Method</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Callan and Hennessey (1988)</td>
<td>53 infertile childless women and 24 infertile mothers</td>
<td>Controlled cross-sectional study</td>
<td>Questionnaire including standardised measures of well-being and self-esteem</td>
<td>Infertile childless woman were less content and rated their life as less interesting, less rewarding, emptier, and more lonely than mothers who were trying to have a second or subsequent child</td>
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<tr>
<td>Australia</td>
<td>Recruited from doctors practices and support group Response rate not reported</td>
<td>Women had been infertile 5-6 years when assessed Childless women compared with mothers</td>
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<tr>
<td>Berg and Wilson (1990)</td>
<td>104 infertile couples with primary infertility</td>
<td>Cross-sectional study</td>
<td>Questionnaire including standardised measure of psychological symptomatology</td>
<td>44% of males and 52% of females met criteria of psychiatric caseness</td>
</tr>
<tr>
<td>USA</td>
<td>Recruited from an infertility support group and two University hospitals</td>
<td>Couples had pursued infertility treatment for on average 28 months when assessed Participants compared with norm for standardised measure</td>
<td></td>
<td>Argue that measures of psychopathology are inappropriate for infertile populations as some items related to the infertility experience spuriously inflate scores on these measures</td>
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<tr>
<td></td>
<td>Approximately 50% response rate</td>
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<td></td>
<td>Symptoms reported most frequently suggest a profile of infertility strain with high levels of feelings of sadness, tension, irritability, worry, frustration, alienation and interpersonal isolation</td>
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<tr>
<td>Andrews et al. (1991)</td>
<td>157 couples with primary infertility</td>
<td>Cross-sectional study</td>
<td>Interviews including measures of perceived fertility problem stress, marital and sexual adjustment, subjective well-being and satisfaction with life developed by the authors</td>
<td>Fertility problem stress had consistent and negative effects on marital and sexual satisfaction, subjective well-being, self-efficacy and evaluation of life-as-a-whole</td>
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<tr>
<td>USA</td>
<td>Recruited from various sources 80% response rate</td>
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</tr>
<tr>
<td>Authors</td>
<td>Study Design</td>
<td>Participants</td>
<td>Methods</td>
<td>Findings</td>
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<tr>
<td>Möller and Fällström</td>
<td>Sweden Prospective longitudinal</td>
<td>71 infertile couples</td>
<td>Interviews and questionnaires</td>
<td>Infertility causes great stress for individuals and relationships. Reactions that could be</td>
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<td></td>
<td>study</td>
<td>Recruited from infertility clinics 78% response</td>
<td></td>
<td>characterised as emotional disturbance found in &gt;50% of women and 30% of men among those</td>
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<tr>
<td></td>
<td></td>
<td>rate</td>
<td></td>
<td>who had not conceived at follow-up (T2)</td>
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<tr>
<td>Downey and McKinney</td>
<td>USA Controlled cross-sectional</td>
<td>118 infertile women and 83 presumed fertile women</td>
<td>Questionnaire including standardised measures of psychiatric symptomatology, depression, self-esteem and sexual functioning</td>
<td>No detectable group differences on standardised measures but 71% of infertile women reported</td>
</tr>
<tr>
<td>(1992)</td>
<td>study</td>
<td>Recruited from private gynaecologists</td>
<td></td>
<td>negative changes in mood and 41% in their feelings of self-worth since becoming concerned</td>
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<td></td>
<td></td>
<td>Approximately 77% response rate</td>
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<td>with infertility</td>
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<tr>
<td>Abbey et al. (1992)</td>
<td>USA Cross-sectional study</td>
<td>185 infertile couples with primary infertility</td>
<td>Interview</td>
<td>‘Fertility problem stress’ had indirect negative effects on life quality via mediating effects on</td>
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<td></td>
<td></td>
<td>Most recruited from infertility specialists 81%</td>
<td>Likert scale responses given to questions about ‘fertility problem stress’, self-esteem, perceived internal control, interpersonal conflict and life quality</td>
<td>self-esteem, internal control and interpersonal conflict</td>
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<td></td>
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<td>response rate</td>
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<tr>
<td>Connolly et al. (1992)</td>
<td>UK Prospective longitudinal cohort</td>
<td>116 infertile couples</td>
<td>Interview and standardised measures of personality, psychopathology, perceived social support, and marital satisfaction</td>
<td>Low prevalence of psychopathology and stable relationships at T1 and T2.</td>
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<td></td>
<td>study</td>
<td>Consecutive referrals to a hospital infertility clinic</td>
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<td>In men diagnosis of male infertility predicted higher anxiety, in women more support related to</td>
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<td></td>
<td></td>
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<td>lower anxiety and more trait anxiety to higher depression scores</td>
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<tr>
<td></td>
<td></td>
<td>Approximately 89% response rate</td>
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<td></td>
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<tr>
<td>Study</td>
<td>Sample Size</td>
<td>Recruitment</td>
<td>Methodology</td>
<td>Assessment</td>
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<tr>
<td>Domar et al. (1993) USA</td>
<td>149 infertile women and 339 women with other chronic medical conditions</td>
<td>Recruited when enrolling in a group behavioural treatment program</td>
<td>Controlled cross-sectional study</td>
<td>Standardised measure of psychological symptomatology</td>
</tr>
<tr>
<td>Whiteford and Gonzales (1995) USA</td>
<td>25 infertile women</td>
<td>Recruited when they sought medical treatment</td>
<td>Qualitative study</td>
<td>In-depth interviews</td>
</tr>
<tr>
<td>Morrow et al. (1995) USA</td>
<td>120 infertile women and 86 infertile men</td>
<td>Recruited from infertility clinics</td>
<td>Cross-sectional study</td>
<td>Questionnaire including standardised measures of psychological distress, coping and locus of control</td>
</tr>
<tr>
<td>Oddens et al. (1999) Holland</td>
<td>281 infertile women and 289 women of similar age who were mothers</td>
<td>Infertile women were a consecutive cohort consulting fertility clinics and mothers were recruited by a survey agency</td>
<td>Controlled cross-sectional cohort study</td>
<td>Questionnaire addressing recalled feelings during periods of attempting to conceive. Standardised measure of current well-being included</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Size</td>
<td>Recruitment Method</td>
<td>Study Design</td>
<td>Measures</td>
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<tr>
<td>Wischmann et al. (2001) Germany</td>
<td>545 couples</td>
<td>Consecutive referrals to a hospital infertility clinic</td>
<td>Cross-sectional cohort study</td>
<td>Questionnaire including standardised measures of motives for wanting a child, life satisfaction, marital adjustment, physical and emotional well-being, and personality</td>
</tr>
<tr>
<td>Anderson et al. (2003) Scotland</td>
<td>64 couples</td>
<td>Consecutive referrals to a hospital infertility clinic</td>
<td>Prospective longitudinal cohort study</td>
<td>Questionnaire including a standardised measure of emotional well-being and 9 items about infertility-related concerns, rated on Likert scales</td>
</tr>
<tr>
<td>Mindes et al. (2003) USA</td>
<td>127 women</td>
<td>Recruited from infertility clinic and support group</td>
<td>Prospective longitudinal study</td>
<td>Questionnaires including standardised measures of social support, threat appraisal, coping, psychological distress, and self-esteem</td>
</tr>
<tr>
<td>Benyamini et al. (2005) Israel</td>
<td>242 women</td>
<td>Recruited from a hospital infertility clinic</td>
<td>Cross-sectional study</td>
<td>Questionnaire including standardised measure of distress and well-being and 22 items measuring infertility-related difficulties</td>
</tr>
</tbody>
</table>
These studies vary in their methodological rigour. Cross-sectional studies without comparison groups only allow description of psychological characteristics of infertile populations (Andrews et al. 1991; Abbey et al. 1992; Benyamini et al. 2005). Those comparing infertile populations psychological well-being with that of fertile groups or with norms for standardised measures permit better understanding of the psychological effects of infertility (Callan and Hennessey 1988; Berg and Wilson 1990; Connolly et al. 1992; Downey and McKinney 1992; Domar et al. 1993; Morrow et al. 1995; Oddens et al. 1999; Wischmann et al. 2001; Anderson et al. 2003). Prospective longitudinal studies elicit how psychological functioning in response to the infertility changes over time (Gibson et al.). Weaknesses in some studies, which may reduce the validity and generalisability of the findings, include the non-disclosure of response rates (Callan and Hennessey 1988; Domar et al. 1993; Mindes et al. 2003), response rates of less than 50% (Morrow et al. 1995; Anderson et al. 2003), convenience sampling (Berg and Wilson 1990; Andrews et al. 1991; Mindes et al. 2003) and use of non-standardised measures (Andrews et al. 1991; Abbey et al. 1992; Gibson et al.). Methodological strengths evident in several studies include large, systematically recruited study populations (Connolly et al. 1992; Oddens et al. 1999; Wischmann et al. 2001; Benyamini et al. 2005) and response rates exceeding 75% (Andrews et al. 1991; Gibson et al.).

In spite of methodological differences between studies, findings consistently show that the mental health effects of infertility do not necessarily manifest in clinically significant depression and anxiety. However, infertile groups experience more non-specific or sub-clinical distress and report lower psychological well-being and satisfaction with life than comparison groups. Infertility also appears to compromise self-esteem and feelings of self-worth and self-efficacy, particularly among women (Andrews et al. 1991; Abbey et al. 1992; Downey and McKinney 1992; Anderson et al. 2003).
1.4 ASSISTED REPRODUCTIVE TECHNOLOGY

Assisted reproductive technology (ART), procedures where human sperm and oocytes or embryos are handled in–vitro for the purpose of establishing a pregnancy, have been used for approximately 25 years. Before the era of ART, there were few treatment options for couples with infertility and for some, no treatment was available. In couples where the infertility was due to a severe male factor problem, the use of sperm donated by an anonymous or known donor to inseminate the female partner, donor insemination (DI), was an option. In some women, surgery to open blocked Fallopian tubes or remove adhesions was attempted but, while this sometimes proved successful, most women with blocked or damaged Fallopian tubes remained unable to conceive after surgery. In cases of endometriosis and ovulatory problems, treatment in the form of oral or injectable hormonal compounds sometimes restored fertility but most couples were left with the choice of pursuing adoption, or living without children.

In 1978 the first child was born as a result of in-vitro fertilisation (IVF) (Steptoe and Edwards 1978). When first developed, this technique involved the removal of a mature oocyte from the ovary via laparoscopic surgery under general anaesthesia, just before ovulation. The oocyte was then placed in a dish together with sperm and kept in an incubator where fertilisation occurred. The resulting embryo was placed in the uterus to implant and continue to develop.

In vitro fertilisation was originally developed to overcome the problem of blocked Fallopian tubes and therefore, only couples where the infertility was caused by tubal obstruction were treated. Since the first IVF birth, new procedures have emanated and most causes of infertility can now be treated with one of these assisted reproductive technologies.

In the gamete intra Fallopian transfer procedure (GIFT), which is used predominantly in couples with unexplained infertility, sperm and oocytes are retrieved and then deposited simultaneously into the Fallopian tube where fertilisation occurs (Asch et al. 1984). This is done via laparoscopy, a surgical procedure performed under general anaesthesia. When it was first used, GIFT provided a greater chance of pregnancy for selected couples.
However, since laboratory techniques have improved over time, this is no longer the case and therefore the use of the GIFT procedure is declining worldwide.

In couples with severe male infertility, intracytoplasmic sperm injection (ICSI), where a single sperm is injected into the oocyte using technically sophisticated equipment, now offers the chance of having a child who is genetically related to both parents (Palermo et al. 1992). The use of ICSI is increasing as the procedure has proved effective in establishing pregnancy even in very severe cases of male infertility, for example where there are no sperm present in the ejaculate and immature sperm need to be retrieved surgically from the testis. Increasingly, ICSI is also used in couples where previous attempts with IVF have been unsuccessful.

For women who lack ovarian function, oocyte or embryo donation from an anonymous or a known donor became a treatment option in the mid 1980s’ (Lutjen et al. 1984).

Other developments have increased the success rates with ART. The use of hormones to stimulate the ovaries to produce multiple oocytes was introduced in the early 1980s’ and this dramatically improved the chance of pregnancy from ART (Trounson et al. 1981). If a number of oocytes mature simultaneously, these can all be inseminated and this increases the chance of one or more embryos being available for transfer. Some years later the addition of Gonadotropin Releasing Hormone (GnRH) to the ovarian hormone stimulation protocol further increased the likelihood of embryos being available for transfer in ART procedures (De Ziegler et al. 1987). GnRH acts by blocking the production of the Luteinising Hormone (LH) from the pituitary gland and this prevents ovulation, which ensures that oocytes are not released from the ovaries before the scheduled oocyte retrieval procedure.

Development of a technique to freeze embryos made it possible to store embryos for later use. This led to a reduction in the number of embryos transferred simultaneously which reduces the risk of multiple birth (Trounson and Mohr 1983).

More recently, the development of Preimplantation Genetic Diagnosis (PGD), where embryos are tested for chromosomal and genetic normality, allows the selection of chromosomally normal and disease free embryos for transfer in couples where one or both partners are carriers of a genetic condition (Handyside et al. 1990; Van de Velde et al. 2000). In the last few years it has become increasingly common also to use PGD
with the aim of improving pregnancy rates in patient populations with increased risk of chromosomal abnormality in their embryos or where there is a family history of genetic disorder. These include those who have experienced recurrent pregnancy loss or repeated ART failure or where the woman is older. However, the value of this is yet to be established (Shahine and Cedars 2006).

As a result of the development in the last three decades in medical technology to assist conception, the proportion of involuntarily childless couples in industrialised countries seeking medical assistance to conceive has increased considerably (Schmidt and Münster 1995). Since the birth of the first IVF baby, hundreds of IVF clinics have been established worldwide and it is estimated that to date over two million children have been born as a result of IVF and related technologies (Nygren 2002).

1.4.1 Steps involved in treatment

Irrespective of whether the cause of infertility is female or male, each ART attempt involves a woman receiving daily hormone injections to stimulate the growth of ovarian follicles and the development of multiple oocytes, controlled ovarian hyperstimulation (COH). These injections are administered over a period of approximately four weeks, during which the growth of follicles and the maturation of the oocytes are monitored with blood tests and vaginal ultrasound examinations. The final maturation of the oocytes is triggered by an injection of human chorionic gonadotrophin (hCG) approximately 37 hours before scheduled oocyte retrieval. This is performed under sedation or a general anaesthetic using a transvaginal ultrasound-guided technique. Typically some six to twelve oocytes are recovered after COH and these are placed in a dish together with sperm in a solution containing essential nutrients to allow fertilisation to occur. Alternatively, in the case of ICSI, a single sperm is injected into each oocyte. The dish with eggs and sperm is then placed in a controlled environment incubator. Embryos with two to eight cells are ready for transfer to the uterus 48 to 72 hours after the oocyte retrieval. At embryo transfer (ET) one or two developing embryos are placed in the uterus via a thin catheter that is passed through the cervix. If more embryos develop, these may be frozen and transferred in subsequent natural cycles, a procedure called frozen embryo transfer.
Two weeks after ET a blood test to determine if a pregnancy has occurred is performed. If the test is negative, the whole procedure has to be repeated unless frozen embryos are available. If the pregnancy test is positive, an ultrasound examination is carried out two weeks later to verify that the embryo or embryos have implanted in the uterus and whether one or more fetal heartbeats are present. Early pregnancy loss, including ectopic pregnancy, when the embryo has implanted outside the uterus, blighted ovum, where there is a gestational sack but no developing fetus, or missed abortion, when no fetal heartbeat is detected, may also be diagnosed at this ultrasound examination.

In every step of an ART cycle there is risk of treatment failure; oocytes may not develop or may not be recovered, oocytes may not fertilise and embryos may not implant. Even if all these steps are completed successfully, as with spontaneous pregnancy, pregnancy loss occurs in approximately 20% of ART pregnancies.

1.4.2 Donor gametes

Couples where either the male or the female partner is affected by conditions that preclude the use of their own sperm or oocytes may consider using donated gametes. The need for donor sperm may arise due to lack of sperm production caused by genetic or environmental factors such as chemotherapy or radiation therapy, and some use donor sperm to avoid transmission of a genetic disease. Donor insemination (DI), where the woman in couples with untreated male infertility is inseminated with donor sperm, has been a treatment option for several decades. Since the development of IVF, donor sperm can also be used in ART procedures other than DI, such as IVF and GIFT.

Donor oocytes may be used in women with ovarian failure or declining ovarian function, poor oocyte quality identified in previous ART cycles, or for those women who are carriers of an adverse genetic condition (Sauer and Paulson 1995). Some couples who experience repeated treatment failure may be advised that their chance of becoming parents is higher if they use donor oocytes. For couples where both the woman and the man have problems relating to gamete production, donor embryos may be a treatment option. When donor oocytes or embryos are used, the recipient needs to take hormonal compounds for several weeks in order for the endometrium, the lining in the uterus, to develop and allow embryos to implant.
The use of donor oocytes and embryos to conceive has become increasingly common since this became technically possible 20 years ago. Donors may be recruited by the clinic and remain anonymous to the recipient, or by couples themselves in which case they are known and sometimes related to the recipient.

1.4.3 Treatment outcome

The chance of pregnancy and live birth per treatment cycle depends on a range of factors relating to the individual couple and the standard of the clinic. Many couples have multiple attempts before either conceiving or deciding to discontinue treatment. It is estimated that after three stimulated treatment cycles, about half the couples who persist with treatment have achieved a viable pregnancy and that the number of pregnancies increases with each attempt, but at a lower rate after the first three attempts (Kovacs et al. 2001).

The main factor that influences the chance of ART success is the woman’s age. This was demonstrated in an American study of 249 consecutive couples where the cause of infertility was severe male factor and ICSI was used. The severity of the male problem did not affect the chance of a live birth in this cohort. However, the chance of delivering a baby per treatment cycle fell from 46% for women aged less than 30 to 13% for women aged 37 to 39 and to 4% when the woman was more than 39 years old (Silber et al. 1997). More recently Jansen (2003), in a retrospective analysis of treatment outcomes at an Australian clinic, demonstrated that women aged up to 34 years had a 52% chance of a live birth from one stimulated cycle (including the use of any frozen embryos). This chance declined in a linear fashion for women aged between 35 and 44 and no babies were born to women who were 45 years or older. Klipstein et al. (2005) reviewed the outcome of 2,705 cycles of IVF initiated in women aged 40 and above who were using their own gametes. The found that the cumulative live birth rate ranged from 28% for women starting ART at age 40 to 0% for those aged 46. Interestingly, the authors concluded that up until age 43 ART offers a “reasonable chance for success (>5%)”.

In addition to a lower chance of achieving a pregnancy, older women also have an increased risk of miscarriage if they do conceive. Australian data show that of the
women who become pregnant following ART, 79% of those aged between 30 and 34 have a live birth compared with only 59% of women aged between 40 and 44 (Bryant et al. 2004).

As research into the effect of increasing age on ART outcomes has exclusively focused on women, the effect of increasing male age has been overlooked until recently. However, it is now clear that increasing paternal age also is associated with lowered success of ART. Klonoff-Cohen and Natarajan (2004) investigated 221 couples undergoing ART and estimated that for each additional year of paternal age the odds of not having a live birth increased by 12%. In a retrospective study of 1,938 men whose partners were totally sterile and treated by IVF, de La Rochebrochard et al. (2006) demonstrated that paternal age over 40 is an important risk factor for failure to conceive with IVF.

Furthermore, female and male lifestyle habits may affect the chance of pregnancy with ART. Klonoff-Cohen (2005) reviewed the literature and found strong evidence that smoking reduces chance of conception while the evidence for the effects of alcohol and caffeine consumption was inconclusive.

1.4.4 Multiple birth

The practice of transferring more than one embryo simultaneously increases the risk of multiple birth. There are many obstetric and neonatal risks associated with multiple birth. Compared with singleton pregnancies, twin pregnancies have higher incidences of obstetric and perinatal complications for both mother and babies including a two to three times greater risk of maternal hypertension, abruption of the placenta and postpartum hemorrhage. Also, twin babies are significantly more likely to be born prematurely, before 37 weeks gestation, as they are born on average 3.4 weeks earlier than singletons and they weigh on average 900 grams less at birth. The smaller size at birth is not due to premature birth alone. At each gestational age twins are lighter than singletons which implies higher rates of intrauterine growth restriction among twins. Depending on the length of the gestation, twins also have perinatal mortality rates five to tenfold higher than singletons (Kinzler et al. 2000).
From the early 1990s when improved laboratory techniques resulted in more viable embryos being available for transfer, a marked rise in the multiple birth rate after ART was observed. The medical, social, psychological and financial consequences of the growing number of higher-order multiple births after ART prompted calls for changing practice to restrict the number of embryos transferred (Collins 1994) and increasingly, single-embryo transfer is being advocated (Pennings 2000; Adamson and Baker 2004; Pinborg 2005). Several studies have demonstrated that this can be implemented without compromising the chance of pregnancy in selected groups. In a retrospective study Kovacs et al. (2003) showed that in patients who have four or more good quality embryos, the transfer of one of these rather than two yields a similar pregnancy rate without the risk of multiple pregnancy. Similarly, Strandell et al. (2000) identified younger maternal age and a larger number of good quality embryos as risk factors for multiple birth after ART. They then calculated that the multiple birth rate could be reduced from 26% to 13% without compromising the chance of pregnancy if one-embryo transfer was performed in selected cases. In the last few years regulatory bodies in many Northern European countries and in Australia prohibit the simultaneous transfer of more than two embryos and this has lowered the incidence of higher order multiple births in these countries. In other areas however, such as the USA, Latin America, and Southern and Eastern Europe no such regulations exist or are enforced and consequently the multiple birth rates in these areas are considerably higher (Nygren 2002).

In spite of the risks associated with multiple births, surveys of American and Swedish women who undergo ART show that many have romantic fantasies about multiple pregnancies and express a preference for a multiple birth as a way of achieving an ‘instant family’ (Gleicher et al. 1995; Goldfarb et al. 1996; Blennborn et al. 2005). Two recent studies identified a positive relationship between the desire for a multiple birth and lack of knowledge about the risks associated with multiple birth. Ryan and Van Voorhis (2004) surveyed 464 American women attending an infertility clinic about their desire for a multiple birth and their knowledge of risks of multiple births. Over 20% stated that they had a preference for a multiple pregnancy. Nulliparity, lower family income, younger age, prior infertility investigation, longer duration of infertility and lack of knowledge about risks were associated with a desire for a multiple pregnancy.
The proportion of women who desired a multiple birth in a Canadian survey of 801 women and men was 41% (Child et al. 2004). In this sample, being well informed about the increased fetal risks of multiple birth significantly reduced the wish for a multiple birth. This suggests that improving couples’ awareness by provision of more explicit information about the risks of multiple birth may be a strategy to reduce the multiple birth rate (D’Alton 2004).

1.4.5 Medical complications

Common side effects of the drugs used in COH include headaches, nausea, mood changes, hot flushes, breast tenderness, and abdominal discomfort. The most serious complication of COH is ovarian hyperstimulation syndrome (OHSS), an iatrogenic condition characterised by multicystic ovarian enlargement, and a dramatic increase in vascular permeability, which results in extravascular fluid accumulation and intravascular fluid depletion. In its severe form OHSS can be life threatening. The risk of OHSS increases with the number of follicles that develop in response to the ovarian hormone stimulation. It is estimated that moderate OHSS occurs in 1% to 6% and severe OHSS, which requires hospitalisation, in 0.1% to 4% of COH cycles (Bassil et al. 1995; Papanikolaou et al. 2006). Other risks of ART include those associated with sedation and general anaesthesia, and bleeding and infection, which may occur as a result of the oocyte retrieval (Amso 1995).

Almost one in four ART pregnancies result in pregnancy loss before 20 weeks gestation. In pregnancies that continue beyond 20 weeks gestation the obstetric and neonatal risks after ART conception are higher than after spontaneous conception. The main hazards associated with pregnancy and birth after ART are increased risk of bleeding throughout the pregnancy, multiple birth, premature birth, perinatal morbidity and mortality, low or very low birth weight, and higher rates of caesarean section delivery (Wang et al. 1994; Tallo et al. 1995; Bergh et al. 1999; Dhont et al. 1999; Koivurova et al. 2002; Oliviennes et al. 2002). It has been suggested that these adverse perinatal outcomes may be related to the infertility, higher maternal age or to the technology itself (Ludwig 2002).
The increased perinatal risks are partly explained by the higher rate of multiple birth in the ART population. However, Jackson et al. (2004) undertook a meta-analysis of 15 studies comprising over 12,000 ART conceived and almost 2 million spontaneously conceived singletons and demonstrated that ART is associated with higher rates of perinatal mortality, preterm delivery, and low and very low birth weight even when multiple births are excluded. Helmerhorst et al. (2004), in a systematic review of 25 controlled studies published 1985-2002, also found that singletons from ART have significantly worse perinatal outcomes than spontaneously conceived singletons. Differences in perinatal outcomes between ART and spontaneously conceived twins are less pronounced. In a complete national twin cohort study of 3,483 ART conceived and 10,362 spontaneously conceived twins Pinborg et al. (2004) identified higher proportions of birth weight discordance and admission to neonatal intensive care unit among the ART conceived twins but on other outcome measures the groups were similar. However, in a follow-up study of all ART conceived (n=472) and spontaneously conceived twin children (n=1132) and all ART conceived singleton children (n=634) born in Denmark in 1997, the physical health of ART-conceived twins was similar to that of spontaneously conceived twins but poorer than the health of ART conceived singletons (Pinborg et al. 2003). Smithers et al. (2003) compared 514 ART conceived and 2,147 spontaneously conceived dizygotic (mixed-sex) twins and found that antepartum hemorrhage, placenta previa, caesarean section delivery and preterm delivery were significantly more common in the ART group. There were no between-group differences in the prevalence of birth defects or rate of perinatal mortality.

1.5 PSYCHOSOCIAL ASPECTS OF ASSISTED REPRODUCTIVE TECHNOLOGY

Some of those who are diagnosed with infertility decide to pursue ART. Treatment seekers may be different in some respects to those who choose not to undergo ART. Studies that have investigated psychological functioning in couples who enter ART programs have found that the prevalence of psychopathology and marital problems are similar to or lower than the general population at the time of starting ART (Mazure and Greenfeld 1989; Edelmann et al. 1994; Bringhenti et al. 1997; Fekkes et al. 2003). However, studies that have measured distress rather than severe
psychopathology in couples before starting ART have found that the women are more anxious than comparison groups and that mild depression is more common than among the general population of women (Mazure et al. 1988; Visser et al. 1994; Slade et al. 1997).

In addition to the distress caused by the infertility the physical, emotional and financial repercussions of ART impact on the psychological well-being of women who undergo treatment.

1.5.1 Physical demands

The physical demands of ART include daily injections of hormones, monitoring of the development of follicles and maturation of the oocytes with blood tests and vaginal ultrasound examinations, hospital admission for retrieval of the oocytes and the transfer of the embryos. The common side effects of the hormones can interfere with daily functioning and some women are concerned about the potential long-term health effects of fertility drugs on themselves and the baby. The invasive nature of vaginal ultrasound examinations, oocyte retrieval and embryo transfer transgress bodily integrity and may cause significant discomfort.

Hammarberg et al (2001) investigated 116 women’s recalled experience of ART two to three years after they had completed treatment. Almost 40% of participants recalled having had concerns about possible adverse health effects of ART. Participants also rated the degree of distress involved in the physical aspects of ART. About one third rated injections and embryo transfer as “extremely stressful” or “very stressful” and oocyte retrieval, was recalled as “extremely stressful” or “very stressful” by over half of the participants. Furthermore, almost 40% of the women stated that the physical demands of ART was a reason for discontinuing treatment.

The need to attend the clinic for monitoring and procedures is tiring and time consuming and may impinge on work commitments and other daily life activities. Laffont and Edelmann (1994) asked 101 couples questions about the impact of ART on everyday life. Women in this study were more likely than men to report that ART impacted adversely on work and leisure activities.
1.5.2 Emotional demands

1.5.2.1 Impact of treatment on emotional well-being

Although the physical demands of ART are significant, several surveys of women’s views about the impact of ART have found that the emotional aspects of treatment, particularly when it fails, are considered more onerous than the physical aspects (Callan and Hennessey 1988; Laffont and Edelmann 1994; Franco et al. 2002; Hammarberg 2003). The oscillation between high hopes of achieving a pregnancy and deep disappointment when the treatment is unsuccessful is often likened to an emotional ‘roller-coaster ride’ (Alesi 2005). The psychosocial impact of ART has been the focus of several studies. Some have used a prospective longitudinal design in order to evaluate changes that occur throughout the course of treatment. Others have retrospectively assessed the short and longer-term impact of ART. Studies published from 1990 onwards and their main findings are described in Table 1.5.2.1.1.
### Table 1.5.2.1.1 Studies evaluating the psychological effects of ART

<table>
<thead>
<tr>
<th>Authors and country of study</th>
<th>Sample</th>
<th>Type of study and assessment interval</th>
<th>Method</th>
<th>Main findings</th>
</tr>
</thead>
</table>
| Newton et al. (1990) Canada | 947 infertile women and 899 infertile men  
Consecutive cohort recruited from a hospital ART program  
213 women (23%) and 184 men (21%) returned follow-up questionnaire | Prospective longitudinal cohort study  
Participants assessed before their first ART cycle (T1) and after the cycle if they were not pregnant (T2) | Questionnaires including standardised measures of anxiety, depression and satisfaction with life | Group means for anxiety and depression not clinically elevated but prevalence of mild and moderate depression increased substantially between T1 and T2, particularly among women  
Significantly lower life satisfaction at T2 than T1  
Women without children more distressed by ART failure than those with children  
Main predictors of emotional response at T2 were symptoms of anxiety and depression at T1 and fertility history |
| Litt et al. (1992) USA | 41 couples  
Recruited from a University Hospital ART clinic  
Response rate not reported | Prospective longitudinal study  
Couples assessed before (T1) and two weeks after (T2) their first IVF cycle | Interviews and questionnaires including standardised measures of physical and emotional well-being, marital satisfaction, locus of control, and ways of coping | 6/36 (17%) of women who did not achieve pregnancy had clinical depression at T2. Those women were more likely to have reported depressive symptoms at T1 and reported having felt some responsibility for the IVF failure |
| Hynes et al. (1992) Australia | 100 infertile women (IVF-group) and 73 matched controls (controls)  
Infertile women recruited from private ART clinic and controls through word-of-mouth  
75% response rate | Controlled prospective longitudinal study  
Infertile women assessed before (T1) and after a failed IVF attempt (T2) and controls assessed 4-6 weeks apart  
IVF-group and controls compared | Questionnaire with standardised measures of psychological well-being, self-confidence and self-esteem | IVF-group were more depressed and had lower self-esteem than controls at T1  
IVF-group were less self-confident than controls and both T1 and T2  
IVF-group were more depressed and had lower self-esteem at T2 than at T1 |
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Sample Size</th>
<th>Recruitment</th>
<th>Response Rate</th>
<th>Study Design</th>
<th>Outcome Measures</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laffont and Edelmann (1994)</td>
<td>France</td>
<td>117 infertile women and 101 male partners</td>
<td>Consecutive cohort recruited from hospital ART clinic</td>
<td>87%</td>
<td>Retrospective cohort study</td>
<td>Questionnaire about the experience of ART treatment including standardised measure of psychological well-being</td>
<td>Both women and men agreed that the most stressful aspects of ART were waiting for results and a negative outcome. Women experienced more distress than men throughout treatment.</td>
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<td>Visser et al. (1994)</td>
<td>Holland</td>
<td>150 infertile women</td>
<td>Consecutive cohort recruited from hospital ART clinics</td>
<td>59%</td>
<td>Prospective longitudinal cohort study</td>
<td>Questionnaires including standardised measures of marital adjustment, anxiety and depression</td>
<td>Participants more anxious than female population norms at T1 but no difference on measure of depression. Depressive symptoms increased after failed treatment. Quality of relationship improved after successful treatment.</td>
</tr>
<tr>
<td>Weaver et al. (1997)</td>
<td>UK</td>
<td>Couples who had had ART, 20 unsuccessful (U-group) and 20 successful (S-group)</td>
<td>Recruited from a hospital ART clinic</td>
<td>87% response rate for women and 70% for men in unsuccessful group and 95% for couples in successful group</td>
<td>Retrospective study</td>
<td>Interviews and questionnaire including standardised measures of mental health, marital adjustment and quality of life</td>
<td>Scores on standardised measures within population norms for both groups. More emotional distress and lower quality of life in U-group than in S-group.</td>
</tr>
<tr>
<td>Slade et al. (1997)</td>
<td>UK</td>
<td>144 infertile couples</td>
<td>Consecutive cohort recruited from hospital ART clinic</td>
<td>98% response rate but only 39% of those who agreed to participate completed follow-up assessment</td>
<td>Prospective longitudinal cohort study</td>
<td>Questionnaires including standardised measures of anxiety, depression, marital and sexual satisfaction and self-esteem</td>
<td>Before starting women were more anxious than men and population norms and less positive about marital and sexual relationship than men. Those who were pregnant at follow-up were less depressed and more positive about their relationship than those who had not achieved a pregnancy.</td>
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<tr>
<td>Study</td>
<td>Country</td>
<td>Participants</td>
<td>Recruit Site</td>
<td>Response Rate</td>
<td>Study Design</td>
<td>Assessment Time</td>
<td>Measures</td>
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<td>Leiblum et al. (1998)</td>
<td>USA</td>
<td>Women who had had at least 3 IVF cycles, 41 who had a baby with IVF, 16 who were unsuccessful but subsequently adopted a child and 18 who remained childless</td>
<td>Recruited from a private ART centre</td>
<td>31%</td>
<td>Retrospective cohort study</td>
<td>Assessment 2-13 years after the last IVF cycle</td>
<td>Questionnaires including a non-standardised measure of life satisfaction and standardised measures of marital and sexual satisfaction, self-esteem and emotional well-being</td>
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<tr>
<td>Boivin et al. (1998)</td>
<td>Sweden</td>
<td>40 infertile couples</td>
<td>Recruited from private ART clinic</td>
<td>45%</td>
<td>Prospective longitudinal study</td>
<td>Assessment before ART cycle and then daily during the treatment cycle</td>
<td>Pre treatment questionnaire and daily record keeping chart assessing emotional, physical and social reactions to ART</td>
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<td>Beutel et al. (1999)</td>
<td>Germany</td>
<td>281 infertile couples</td>
<td>One year cohort of couples who had had ART at a hospital ART clinic</td>
<td>61%</td>
<td>Retrospective cohort study</td>
<td>Participants compared with norms on standardised measures.</td>
<td>Questionnaire about infertility and recalled treatment-related distress including standardised measure of depression</td>
</tr>
<tr>
<td>Ardenti et al. (1999)</td>
<td>Italy</td>
<td>200 infertile women</td>
<td>Consecutive cohort recruited from a hospital ART clinic</td>
<td>Response rate not reported</td>
<td>Prospective longitudinal cohort study</td>
<td>Assessment on day of oocyte retrieval (T1), the day after (T2) and on the day of embryo transfer (T3)</td>
<td>Comparisons between outcome groups and norms on standardised measures.</td>
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<tr>
<td>Study</td>
<td>Country</td>
<td>Participants</td>
<td>Study Design</td>
<td>Measures</td>
<td>Findings</td>
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<tr>
<td>Hammarberg et al. (2001)</td>
<td>Australia</td>
<td>116 women who had completed ART 55 had been successful (S-group) and 61 unsuccessful (U-group)</td>
<td>Retrospective cohort study</td>
<td>Questionnaire about the experience of ART including standardised measures of marital satisfaction, psychological well-being, and life satisfaction.</td>
<td>Having a baby as a result of ART positively influenced the recall of the ART experience. Both groups recalled the most difficult aspects of ART the waiting for results and unsuccessful outcome. All standardised measures in the normal range for both groups. Those who were unsuccessful had lower scores on the measure of life satisfaction than those who were successful.</td>
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<td>Verhaak et al. (2005)</td>
<td>Holland</td>
<td>148 infertile women and 71 partners</td>
<td>Prospective longitudinal study</td>
<td>Questionnaires including standardised measures of anxiety, depression, personality factors, coping, marital adjustment, and social support.</td>
<td>In women anxiety and depression increased after unsuccessful and decreased after successful treatment. No change in anxiety and depression scores in men. At T3 &gt;20% of women who had had unsuccessful treatment showed subclinical forms of anxiety and/or depression.</td>
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</table>
The findings from these studies indicate that in the short term ART treatment is associated with considerable distress, particularly for women. More depressive symptoms, more anxiety and less self-confidence among ART participants than in comparison groups have been observed (Hynes et al. 1992; Visser et al. 1994; Slade et al. 1997; Ardenti et al. 1999; Beutel et al. 1999). There is unanimous agreement between studies that the most difficult aspect of treatment is the wait for results about fertilisation and implantation (Laffont and Edelmann 1994; Boivin et al. 1998; Ardenti et al. 1999; Hammarberg et al. 2001). Also, it is clear that when treatment does not result in pregnancy, this has a profound negative effect on women’s emotional well-being, marital adjustment, and self-esteem (Hynes et al. 1992; Visser et al. 1994; Slade et al. 1997; Beutel et al. 1999; Verhaak et al. 2005). Most couples who pursue ART undergo more than one treatment cycle before either conceiving or deciding to discontinue treatment. Couples on ART programs therefore have commonly experienced one or more failed treatments.

Follow-up studies suggest that in the longer term, those who do not conceive with ART are more depressed (Weaver et al. 1997; Beutel et al. 1999) and have lower life satisfaction (Weaver et al. 1997; Leiblum et al. 1998; Hammarberg et al. 2001) than those who have a child as a result of treatment.

Even when ART treatment is successful it seems that the experience of infertility continues to affect some people. Mahlstedt et al. (1987) surveyed 94 individuals who had undergone ART. Of those who had become pregnant as a result of treatment one third stated that the ‘infertility still hurt’ and 22% that infertility was “still a festering problem”. Hjelmstedt et al. (2004) conducted a qualitative study about the perception of infertility among 53 Swedish couples who had had a child as a result of ART and also found that negative feelings related to the infertility experience persisted after the birth. Similarly, Frances-Fischer and Lightsey (2003) surveyed 181 American couples who had become parents after primary infertility, in most cases as a result of ART, and reported that 39% agreed that infertility ‘had left a permanent scar in their lives’ and 16% disagreed that ‘having a child eased the pain of infertility’.
1.5.2.2  Effect of psychological state on treatment outcome

There is an ongoing debate about whether psychological symptomatology in women who undergo ART exerts a negative effect on the chance of the treatment resulting in pregnancy. The methodologies used and the main findings of large studies that have explored the relationship between emotional distress at the time of undergoing ART and the outcome of ART are summarised in table 1.5.2.2.1. In all these studies those who became pregnant as a result of treatment were compared with those who did not.
<table>
<thead>
<tr>
<th>Authors and country of study</th>
<th>Sample</th>
<th>Type of study and assessment interval</th>
<th>Method</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visser at al. (1994) Holland</td>
<td>150 women</td>
<td>Consecutive cohort recruited from hospital ART clinics 59% response rate</td>
<td>Prospective cohort study Assessment before (T1) and after (T2) first ART cycle</td>
<td>Questionnaire including standardised measures of marital adjustment, anxiety and depression at T1 Treatment outcome verified at T2</td>
</tr>
<tr>
<td>Slade et al. (1997) UK</td>
<td>144 couples</td>
<td>Consecutive cohort recruited from a hospital ART clinic 98% response rate</td>
<td>Prospective cohort study Assessment before first ART cycle (T1) and 6 months later (T2)</td>
<td>Questionnaires including standardised measures of anxiety, depression, self-esteem and marital adjustment at T1 Treatment outcome verified at T2</td>
</tr>
<tr>
<td>Ardenti at al. (1999) Italy</td>
<td>200 women</td>
<td>Consecutive cohort recruited from a hospital ART clinic Response rate not reported</td>
<td>Prospective longitudinal cohort study Assessment on the day of oocyte retrieval (T1), the day after (T2) and the day of embryo transfer (T3) and at completion of cycle (T4)</td>
<td>Standardised measures of state and trait anxiety administered at T1, T2 and T3 Treatment outcome verified at T4</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Size</td>
<td>Recruitment Method</td>
<td>Follow-up</td>
<td>Assessment Points</td>
</tr>
<tr>
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</tr>
<tr>
<td>Smeenk et al. (2001) and Verhaak et al. (2001) Holland</td>
<td>291 women</td>
<td>Consecutive cohort recruited from two hospital ART clinics</td>
<td>81% response rate</td>
<td>Prospective cohort study</td>
</tr>
<tr>
<td>Boivin and Schmidt (2005) Denmark</td>
<td>818 couples</td>
<td>Recruited from five ART clinics</td>
<td>Approximately 83% response rate</td>
<td>Prospective cohort study</td>
</tr>
<tr>
<td>Smeenk et al. (2005) Holland</td>
<td>166 women</td>
<td>Consecutive cohort recruited from hospital ART clinics</td>
<td>85% response rate</td>
<td>Prospective cohort study</td>
</tr>
<tr>
<td>Anderheim et al. (2005) Sweden</td>
<td>166 women</td>
<td>Recruited from a hospital ART clinic</td>
<td>83% response rate</td>
<td>Prospective longitudinal study</td>
</tr>
</tbody>
</table>
Most of these studies have not detected a relationship between psychological distress and ART outcome. However, two studies identified higher levels of distress before treatment among women who subsequently had unsuccessful treatment than in those who conceived, but in both cases there are reasons to question the validity of the finding (Smeenk et al. 2001; Boivin and Schmidt 2005).

Boivin and Schmidt (2005) measured infertility-related stress using the Fertility Problem (FP) Stress Inventory, (a modified version of a questionnaire designed by Abbey et al. 1991) in a large cohort of couples (n=818) before ART treatment. They then compared the FP scores obtained with the ART outcome 12 months later and found that higher FP scores in both women and men significantly reduced the odds of pregnancy, with a greater effect for female infertility-related stress than male. However, flaws in the statistical representation of the data may have biased the results of this study. Firstly, two factors that are likely to be associated with infertility-related stress and with prognosis for achieving a pregnancy with ART, namely previous infertility treatment and previous children, were not controlled for in the analyses. The chance of success with ART is lower for those with longer duration of infertility (Templeton et al. 1996), and who have had previous failed treatment (Kovacs et al. 2001) and higher for those who already have children (Templeton et al. 1996; Stolwijk et al. 2000). Almost 60% of participants had undergone other infertility treatment, including ART, before enrolling in the study and 25% already had at least one child. It is plausible that those who had longer duration of infertility and previous failed treatment had higher FP scores because they were less optimistic and may have been aware, from previous biological response to treatment, that their prognosis for achieving a pregnancy was poor. It is also possible that those who had a child or children had lower FP scores because, even if the treatment did not succeed, they were already parenting. The higher FP scores observed in the unsuccessful group may therefore be a proxy for a poorer likelihood of achieving a pregnancy and may have confounded the stated cause-effect relationship between higher infertility-related stress and a negative outcome of ART treatment. Secondly, those who became pregnant as a result of treatment but experienced pregnancy loss were grouped together with those who did not become pregnant in the “no success” group. This presumes that higher FP score, apart from reducing the chance of pregnancy occurring, also increased the risk of miscarriage and
ectopic pregnancy. This contradicts findings from a study by Milad et al. (1998) where 40 women who had conceived with ART were assessed with psychological and hormonal testing 13, 20 and 27 days after embryo transfer. In this study there were no differences in stress hormone concentrations or in measures of anxiety and stress between those who subsequently experienced adverse pregnancy outcome and those where the pregnancy continued.

Similar statistical flaws exist in the study by Smeenk et al. (2001) referred to above. While the statistical model used to demonstrate the effect of biomedical and psychological variables on ART outcome did include previous pregnancies, it did not include previous live births. Twenty six percent of women in this study reported a previous live birth. Since their chance of achieving pregnancy again was higher than for those who did not have children (Templeton et al. 1996; Stolwijk et al. 2000) and their levels of anxiety and depression therefore may have been lower, this may have confounded the findings. The authors further reported that there was no association between levels of anxiety and depression and the number of follicles that developed in response to the hormone stimulation, the number of oocytes retrieved or the number of embryos that resulted. They therefore concluded that anxiety and depression scores did not influence the stimulation and fertilisation phases of the treatment, but did affect pregnancy rate but conceded that the mechanisms for this putative effect remain unknown.

It would therefore that there is no substantive evidence that negative emotional state reduces the chance of pregnancy with ART. As already noted, women often blame themselves when treatment is unsuccessful. The thought that their own distress lessens their chance of having a baby is likely to add to the adverse psychological sequelae of ART failure. Therefore, as suggested by Anderheim et al. (2005), who did not find a relationship between pre-treatment psychological functioning and ART outcome, a strategy to reduce the negative psychological effects of infertility and ART may be to emphasise to women that their emotional state will not influence their chance of having a baby from ART. Whether this is part of usual care in Australia or elsewhere is not known.
1.5.2.3 Using donor gametes

The use of donor gametes to conceive adds to the emotional adversity of infertility and ART. There is universal agreement that the psychological, social, emotional and ethical complexities of this mode of conception warrant thorough exploration by both those donating and those receiving gametes (Appleton 2002; Baetens 2002; Daniels 2002; The American Society for Reproductive Medicine 2004). In most clinics a mental health professional such as a counsellor, a psychologist, a social worker or a psychiatrist will meet with prospective donors and recipients before they proceed. It is argued that the assistance of a mental health professional is essential to explore fully the many and complex issues confronting those who donate or receive gametes (Covington 1995; Greenfeld 1997; Boivin et al. 2001). The main purpose of counselling is to ensure that those considering donor procedures are fully aware of what the procedures entail. Both donors and recipients must carefully consider the issues pertaining to so-called third-party reproduction. These include secrecy versus openness towards a future child and members of the social network, the role of a known donor in the recipient’s family, the effect of the donation on the donor’s family, and the risk that the donation will not result in the birth of a child (Boivin et al. 2001). In spite of the widespread view that counselling before proceeding with a donor procedure is essential, to date no studies have systematically investigated either donors’ or recipients’ views on the ways in which counselling is helpful, or indeed whether it is helpful at all.

The most debated question in relation to donor conception is whether a child born as a result of a donor procedure should be informed, or indeed has the right to know, that donor gametes were used to conceive her or him. There is also controversy about whether or not a donor-conceived child should be able to access identifying information about the donor and be allowed to contact the donor at an agreed age. Since the early days of DI when anonymity was mandated and secrecy about using donated sperm was promoted there has been a shift, and openness and disclosure about donor origin is now advocated (Daniels 2002). Some argue that donor-conceived children have an absolute right to information about their biological origin and that withholding this information is a transgression of that right (Landau 1998; Daniels and Thorn 2001; McGee et al. 2001; McWhinnie 2001). Others believe that due to the limited available evidence about the risks and benefits of disclosure versus openness, neither view should be imposed on
couples using donor gametes (Broderick and Walker 1995; Klock 1997; Shenfield 1997; Shenfield and Steele 1997).

The responses of legislators to this debate vary. In some countries, such as France, Denmark and Spain, gamete donation only occurs with reciprocal anonymity between donors and recipients. In others, such as the United Kingdom (Human Fertilisation and Embryology Act 1990; HFEA 2004), Sweden (SFS 1984; SOSFS 1987), New Zealand (New Zealand 2004 Human Assisted Reproductive Technology Act 2004) and some states in Australia, including Victoria (Infertility Treatment Act Victoria 1995), irrespective of whether the donor is anonymous or known, it is a legal requirement that identifying information about the donor is recorded to enable a child born as a result of a donor procedure to access this in the future. However, in order to access information about a donor, a child needs to have been informed that a donor was used to conceive him or her. Most studies to date investigating patterns of disclosure show that the majority of parents of donor conceived children have not told and do not intend to tell their children about the way they were conceived (Brewaeys et al. 1997; Gottlieb et al. 2000; Tough et al.).

1.5.2.4 Chance of success

There is a lack of standards for information regarding chance of treatment success. “Success rates” quoted by clinics are therefore not always comparable (Alper et al. 2002). Some clinics define treatment success as the rate of positive early pregnancy tests per cycles with embryo transfer. However, this way of calculating “success rate” does not account for the approximately 20% of initiated treatment cycles that do not reach the stage of embryo transfer or the 20% of early pregnancies that are lost and is therefore misleading for consumers. Other clinics report the rate of pregnancies, where viability is confirmed with ultrasound, per initiated stimulated treatment cycle, which is a more informative way of calculating chance of treatment success. Reported “success rates” also vary depending on whether or not they includes pregnancies from frozen embryos generated in the stimulated cycle and subsequently transferred. It has been suggested that the most appropriate way of reporting outcome with ART is the singleton, term gestation (37 weeks or more), live birth rate of one healthy baby per stimulated ART cycle, the BESST (birth emphasising successful singleton at term)
outcome (Min et al. 2004). For couples to be fully informed they need information about a clinic’s average chance of success and their own chance of achieving a live birth in relation to their individual circumstances, such as age, duration and cause of infertility, number and outcome of previous pregnancies and number of previous treatment cycles.

Several studies have shown that couples commonly over-estimate the chance of ART resulting in the birth of a child (Collins et al. 1992; Visser et al. 1994; Slade et al. 1997; Hammarberg et al. 2001). This may in part be due to the way treatment success is presented by clinics. Media reports about ART, which frequently focus solely on success stories, may also contribute to inflated estimations of the chance of having a baby from ART. It can be surmised that for those who over-estimate their chance, treatment failure may be more devastating than for those who have more realistic expectations.

Women who undergo ART often feel personally responsible when the treatment is unsuccessful (Litt et al. 1992). The language used to describe treatment outcomes may contribute to this, as it does not clearly distinguish personal failure from treatment failure. For example, a woman who develops fewer than expected oocytes in response to the hormone stimulation is termed a ‘poor responder’ and a common explanation for why oocytes do not fertilize or embryos do not implant is that they are of ‘poor quality’. Also, while an unsuccessful cycle is classified as a ‘failed’ cycle, the chance of pregnancy is referred to as ‘success rate’, a birth as a ‘successful outcome’ and those who have a baby as a result of ART are ‘successful couples’.

1.5.2.5 Stored embryos supernumerary to couples’ needs

Some couples achieve their desired family size but still have frozen embryos remaining in storage. These couples eventually need to make a decision about the fate of their excess embryos as in most countries, government regulations stipulate storage time limits for embryos. For some, deciding what to do with excess frozen embryos is intensely difficult as they feel ambivalent about the choices available (Oke et al. 1998). In Victoria, Australia, couples can store their embryos for up to five years after which time they are required either to use the embryos themselves, donate them to another
infertile couple, or allow the embryos to be thawed and subsequently discarded or donated to approved research (Infertility Treatment Act Victoria 1995). Hammarberg and Tinney (2006) investigated the motivation for the choices made by 123 couples who had decided what to do with their supernumerary embryos. Altruistic motives and a desire not to waste embryos were determinants of embryo donation, both to research and to another couple. Determinants of disposal were a desire that a full sibling to existing children not be born into another family, and opposition to embryo research. Almost half the sample reported that they found making the decision distressing, a factor that for some may increase the emotional burden of participation in ART programs.

1.5.2.6 Counselling

It is widely accepted that infertility and ART are intensely emotionally arousing experiences that potentially challenge the personal resources of individuals and the relationship between partners. It is therefore argued that mental health professionals should be an integral part of an ART program and that counselling services should be readily available for patients before, during and after treatment (Boivin et al. 2001; Boivin and Kenterich 2002; Bagshawe and Taylor 2003). In some places, including the state of Victoria in Australia, couples are required by law to consult a qualified infertility counsellor before starting ART (Infertility Treatment Act Victoria 1995). The types of counselling used in ART vary depending on the needs of the individual or the couple. The three types of counselling commonly used in ART are information provision and analysis, implications and decision making counselling, and support counselling (Strauss and Boivin 2002).

Research findings suggest that couples have a favourable view of the provision of counselling as part of ART treatment. Several studies have found that although only a minority (15% to 21%) of couples utilise counselling services if they are not required to do so by law, they are reassured to know that counselling is available (Mazure et al. 1992; Laffont and Edelmann 1994; Souter et al. 1998; Hammarberg et al. 2001). For those with elevated infertility-related distress, the availability of counselling is particularly salient. This was demonstrated by Schmidt et al. (2003) in a prospective study of over 1000 couples who were surveyed before starting ART treatment and asked
their view about the importance of the availability of a psychologist in an ART program. Overall, only a minority (21% of women and 8% of men) rated the availability of a psychologist as “important” but higher scores on a measure of fertility problem stress was a significant predictor of higher importance ratings. Counselling also appears to be perceived as useful by most of those who attend. Emery et al. (2003) conducted a prospective, randomised controlled trial among 100 couples who were assigned to receiving or not receiving counselling before starting ART. Participants also completed standardised self-report measures of depression and anxiety before and after their first ART cycle. Although there were no measurable differences between counselled and non-counselled groups in levels of anxiety or depression, 88% of those who had counselling reported that this had been helpful.

1.5.3 Economic demands

The financial cost of ART varies considerably between countries but is highest in the United States. Collins (2002) conducted an international survey of the health economics of ART and estimated the cost of an ART cycle in different countries. He calculated that the average cost per ART cycle in the USA in 2002 was US $9,547 compared with an average cost of US $3,518 in 25 other countries. In the few developing countries where ART is available, the cost of treatment is prohibitive for most couples (Nachtigall 2006).

Depending on the level of subsidy provided by government and private health insurers for ART, the cost borne by consumers varies from 0 to 100% of the cost charged by the ART clinic. In the United States for example, where there is no government funding and only limited subsidies provided for ART by some private health insurance companies, the high cost per treatment cycle limits the availability of ART to those who are financially advantaged (White et al. 2006). In countries where ART treatment is subsidised, treatment is more affordable for couples and this leads to a higher proportion of the population using ART (Granberg et al. 1998; Collins 2002; Chambers et al. 2006). However, even when it is subsidised, the financial cost of ART, particularly if multiple attempts are required, may be beyond the means of those with limited financial resources. Others may need to balance the cost of ART against other desired life goals such as home purchasing, travel and study.
1.5.4 Satisfaction with treatment

Most studies that have evaluated satisfaction with the care provided at ART clinics have found that overall satisfaction ratings of medical care are high. However, satisfaction with the emotional component of care is often lower. The areas identified by patients as needing improvement include the need for more written information, more involvement of the male partner, more emotional support, advice about when to stop treatment and about alternative ways of forming a family (Halman et al. 1993; Schmidt 1998; Souter et al. 1998; Hammarberg et al. 2001). Increased awareness of the importance of psychological care for ART participants appears to have resulted in better provision of emotional care and more satisfaction among couples. In a survey of 231 Finnish women who had sought medical help for infertility prior to 1995, less than half were satisfied with the care they received during their infertility treatment (Malin et al. 2001). More recently, Schmidt et al. (2003) conducted a large prospective multi-centre study of 1934 women and men who completed questionnaires 12 months after starting ART. When asked to rate their degree of satisfaction with medical and psychosocial aspects of care most participants rated both aspects of care as four or five on a five-point scale where higher scores indicated greater satisfaction. The recalled satisfaction with care during ART is clearly related to the outcome of the treatment. Those who have a baby as a result of treatment rate their satisfaction higher than those for whom treatment is unsuccessful (Hammarberg et al. 2001; Malin et al. 2001).

1.5.5 Discontinuing treatment

Further evidence of the emotional impact of ART comes from recent studies which have shown that many couples withdraw from treatment without having had a baby even when treatment is provided free of charge or is subsidised. Hammarberg et al. (2001) found that the most common reasons cited for discontinuing treatment among women who had not had a baby was “I had had enough” (66%), “Emotional cost” (64%) and “Could not cope with more treatment” (42%). The mean number of initiated treatment cycles per patient in this study was 3.1, well below the six subsidised cycles for which couples were eligible. Olivius et al. (2004) surveyed 242 Swedish couples who did not achieve a live birth and who withdrew from treatment before they had completed the three subsidised cycles they were allowed. The main reason for cessation of treatment
reported by these couples was the psychological burden of treatment (26%). Others have found that higher depression and anxiety levels before the first ART cycle is associated with a greater likelihood of discontinuing treatment. In a prospective study Smeenk et al. (2004) administered standardised measures of anxiety and depression to 380 Dutch couples two weeks before they started treatment and four weeks after each treatment cycle. These couples were followed until they became pregnant or discontinued treatment. Those who discontinued treatment while they were still eligible for more subsidised cycles had higher pre treatment anxiety and depression scores than those who completed their allotment of treatment cycles.

Even after numerous unsuccessful attempts, a decision to discontinue ART can be difficult. Peddie at al. (2004; 2005) investigated women’s perception of decision-making at the end of ART treatment. They found that although women had ceased treatment more than two years earlier they still reported having difficulty accepting that they would remain childless, and felt vulnerable to perceived pressure from media and society to keep trying new treatment options.

1.5.6 Gender differences in psychological responses to infertility and treatment

There is widespread agreement that the psychological impact of infertility and infertility treatment is greater for women than men. This may in part be explained by general gender differences in levels of anxiety and depression (Edelmann and Connolly 2000) but a stronger desire for children among women, perceived greater societal pressure on women to reproduce and women’s greater exposure to the intrusiveness of infertility investigation and infertility treatment may also contribute to this. In a study of 108 long-term infertile couples, one in three women compared with one in five men had significantly compromised well-being as measured by the depression, anxiety and hostility subscales of the Symptom Checklist 90 (SCL-90) (Derogatis et al. 1974) and a Dutch instrument measuring perceived health (van Balen and Trimbos-Kemper 1993). One third of women also reported that their self-esteem as a woman was negatively affected by their infertility. Others have found higher scores (indicating more symptoms) on measures of anxiety, depression, and infertility-related distress and lower
scores (indicating lower self-esteem) on measures of self-esteem in infertile women than men (Wright et al. 1991; Hjelmstedt et al. 1999; Boivin and Schmidt 2005). Several studies using non-validated instruments and interviews have also identified more pronounced effects of fertility related distress in women than men (Andrews et al. 1991; Gibson et al.). Hardy and Makuch (2002), based on a review of the literature, concluded that both infertile women and men are more distressed than general population groups and that women in infertile couples are more distressed than men.

1.5.7 Impact of infertility and treatment on intimate relationship

The factors that determine the quality of a relationship between two partners are complex and multifaceted, whether or not infertility is present. Some of the factors that influence the quality of an intimate relationship are the degree to which partners are able to confide in each other, the amount and quality of reciprocal emotional care and support, and the degree of cohesiveness between partners. The impact of infertility on marital and sexual relationship has been investigated and research findings are contradictory and inconclusive. This may partly be due to differences in the timing of measurement of the perceived quality of the marital and sexual relationships. Findings may also vary depending on study design, the representativeness of the study samples, the number of participants included, whether or not validated instruments were used and cultural differences between study participants. Wright et al. (1991) argue that as intensity of infertility-related distress varies over time it should be expected that the effect of this distress on the relationship also varies.

Some evidence suggests more similarities than differences between infertile and fertile couples in the factors that determine the quality of the relationship between partners. Abbey et al. (1994) interviewed 174 childless infertile couples recruited from infertility specialists and 90 presumed fertile childless couples three times, at one-year intervals. By the third interview 42% of the infertile couples and 36% of the controls had become parents. For both infertile and fertile couples becoming a parent diminished marital well-being and for all, initial marital quality was a positive predictor of marital quality two years later. Furthermore, there was a positive association between support from partner and marital quality and a negative relationship between conflict with spouse and marital quality. Wright et al. (1991) administered standardised measures of marital
adjustment (Dyadic Adjustment Scale, DAS, Spanier 1976) and sexual satisfaction (Index of Sexual Satisfaction, ISS, Hudson et al. 1981) to a consecutive cohort of 449 Canadian couples who came for their first visit to an infertility clinic. Scores obtained on these two measures were within normal ranges and there was no evidence of heightened marital or sexual distress compared with population norms.

Others have found that an infertility diagnosis negatively affects the intimate relationship. Using interviews and non-standardised self-report measures Andrews et al. (1991) investigated 157 childless infertile couples who had not yet had ART treatment. They found that fertility-problem stress increased marital conflict and reduced satisfaction with own sexual performance and frequency of intercourse. In addition, when compared with a control group of 82 presumed fertile couples, the negative effect of fertility-problem stress on the marital relationship was greater than other difficult problems experienced by couples (Andrews et al. 1992).

Partner agreement about the desire for parenthood appears to reduce the negative effects of infertility. Newton et al. (1999) investigated the relationship between the congruence between partners in their perceived infertility-related distress and marital adjustment in a cohort of consecutive couples with primary infertility referred to an infertility clinic (n=525). Three months before treatment, questionnaires including standardised measures of infertility stress, depression and marital adjustment were mailed to participants. Better marital adjustment was observed in couples where partners had equal levels of infertility distress. Women in couples where partners felt a similar need for parenthood had greater marital satisfaction than women in couples where the male reported greater need for parenthood. Peterson et al. (2003) in a survey of 525 infertile couples found that incongruence between partners over relationship concerns and the need for parenthood was associated with higher levels of depression in women.

Infertile couples who undergo ART generally report a high degree of satisfaction with their partners and the outcome of the treatment does not appear to alter this. Schmidt et al. (2005) assessed perceived marital benefit of childlessness among 2250 women and men, when they were starting ART treatment and 12 months later. At the beginning of treatment 66% of women and 57% of men agreed that childlessness had brought them closer together and a similar proportion agreed that it had strengthened their
relationship. Twelve months later, the rating of the marital benefits of infertility was similar and there were no differences between those who became pregnant as a result of treatment and those who did not. Hammarberg et al (2001) in a follow-up study of 116 women two to three years after completion of ART, assessed marital satisfaction using the Golombok Rust Inventory of Marital State (GRIMS, Rust et al. 1990). Most women rated their marital satisfaction as “Good” or “Above average” and there were no differences between those who had a live birth as a result of treatment and those who did not. Sydsjö et al. used the ENRICH inventory (Fournier et al. 1983) to assess the quality of the relationship among 45 childless couples six and eighteen months after failed ART treatment. These couples were satisfied with their relationship at the start of ART and there were no detectable negative effects of ART over time on their appreciation of each other. Two other studies which followed couples prospectively from initial contact with an infertility clinic to 3-9 months later also found generally stable relationships that did not deteriorate over time (Daniluk 1988; Connolly et al. 1992).

Reading et al. (1982) suggest that the infertility experience may strengthen the relationship between partners who are close, but may harm those who have a less trusting and affectionate relationship. As a possible explanation for the high levels of marital adjustment observed among ART participants Edelmann et al. (1994) propose that this may reflect self-selection whereby only couples in well adjusted relationships with both partners equally committed to parenthood proceed to ART treatment. It is also possible that those in well-adjusted relationships are more likely than those who are not, to participate in studies about their relationship, or persist with ART treatment.

1.6 FACTORS ASSOCIATED WITH INFERTILITY AND TREATMENT DISTRESS

Stanton and Dunkel-Schetter (1991) describe infertility as a significant and ongoing source of tension that affects different people in different ways. According to Pasch and Dunkel-Schetter (1997) the extent of infertility related strain experienced by infertile individuals is determined by a number of factors. These include the characteristics of the stressor, the individual’s appraisal of the infertility, and the social environment. For
example, the length of infertility, the extent of treatment, with whom the infertility problem lies, how important parenthood is for self-fulfillment, feelings of guilt about being infertile and a sense of loss of control, the kind of coping strategies used, the extent of spouse and other support will influence the effect of infertility on couples and individuals. Others describe infertility strain as the cumulative effect of the changes that occur in daily life during infertility investigation and treatment, the social pressure, the sense that time is running out, and the feeling of lack of control over the situation (Henning and Strauss 2002).

A number of specific factors that may influence the degree of infertility and treatment-related distress that women experience have been identified.

1.6.1 The woman’s age

The chance of having a baby, whether from spontaneous or assisted conception, is inversely related to the woman’s age (Nugent and Balen 2001; Jansen 2003). Some argue that more advanced maternal age therefore may lead to more infertility-related distress in those who know that the chance of conception and a live birth decreases with increasing age (Finiello Zervas 2003). This is supported by a Canadian study of 43 women with primary infertility, which found a strong positive correlation between increasing age and more negative self-image and heightened feelings of anxiety (Koropatnick et al. 1993). Boivin et al. (2005) in a Danish study of 818 couples also found a positive relationship between women’s age and their infertility-related distress, as measured by the Fertility Problem Stress Inventory (Abbey et al. 1991).

1.6.2 Duration of infertility

Infertility differs from most other distressing life events as it often spans a long time and the psychological reactions therefore unfold in stages over years (Brockington 1996, p 4). The evidence about the effect of duration of infertility suggests that the longer couples try unsuccessfully to conceive, the greater the psychological burden.

Connolly et al. (1987) surveyed 843 infertile couples who attended an infertility clinic in the UK between 1975 and 1985, and showed that longer duration of infertility
investigation was associated with more distress. Similarly, Amir et al. (1999) in their study of 109 women who were attending an infertility clinic in Israel, found that longer duration of infertility was associated with a higher score on the ‘psychological distress’ subscale of the Mental Health Inventory, a standardised measure of psychological adjustment (Veit and Ware 1983). Ragni et al. (2005) administered the Health Survey Short Form (SF-36, Ware et al. 1993) to 1,936 couples before starting their first ART treatment cycle. Overall the scores recorded for participants were in the normal range but longer duration of infertility (more than five years) was associated with lower health-related quality of life. Boivin and Schmidt (2005), in a survey of 818 Danish couples, also found a positive association between duration of infertility and infertility-related stress as measured by the Fertility Problem Stress Inventory (Abbey et al. 1991).

1.6.3 Duration of treatment

Length of time in infertility treatment and number of failed ART attempts may also influence well-being. Griel (1997) proposes that while couples who discontinue infertility treatment may experience less infertility-related distress because they have come to accept infertility, those who pursue treatment and remain hopeful of becoming parents are likely to be more distressed. Findings from several studies appear to support this. Beaurepaire et al. (1994) surveyed 330 Australian couples who were undergoing ART of whom 113 were first time participants and 217 were repeat-cycle couples. All participants completed measures of anxiety and depression before the start of their first or subsequent cycle. Depression scores for women who had had one or more treatment cycles were significantly higher than those of women who were starting their first cycle. Furthermore, a significantly higher proportion of repeat-cycle than first-cycle women (25% versus 15%) had significantly elevated depression scores. Chiba et al. (1997) also observed increasing levels of depressive symptomatology the longer treatment persisted among 107 Japanese women. Apfel and Keylor (2002) suggest that the experiences of long-term infertility and repeated treatment failure may have a cumulative eroding effect on infertile couples’ psychological well-being.

1.6.4 Mediating effect of existing children

Some evidence suggests that having a child or children may have a mediating effect on infertility distress where those who have children and are trying to have a second or
subsequent child are less distressed than those who are trying to have their first child. Callan and Hennessey (1988) compared 53 infertile women who had not had a child with 24 mothers who were seeking treatment to conceive a second or subsequent child and found that those who did not have a child reported less satisfaction with their life as a whole than those who were mothers. Two longitudinal studies by Newton et al. (1990; 1999) conducted in Canada also support the contention that existing children reduce infertility distress. To assess the immediate psychological effect of a failed first IVF cycle 150 women completed standardised measures of anxiety and depression before and soon after their first unsuccessful IVF cycle. When those who already had children were compared with those who were trying to have their first child, there were no between-group differences on levels of anxiety and depression before treatment started. However, childless women were significantly more distressed when the cycle failed than those women who already had a child (Newton et al. 1990). In another study which included over one thousand infertile couples, Newton et al. (1999) also found significantly more infertility-related distress among women without a biological child from the current or a previous relationship compared with those women with at least one child.

1.6.5 Pregnancy loss

Evidence suggests that spontaneous pregnancy loss is associated with increased levels of anxiety and depression, and feelings of self-blame and guilt, particularly in the first year after the loss (Janssen et al. 1996; Stitzinger et al. 1999; Brier 2004). No study has been identified that specifically investigates the effect of pregnancy loss on infertility distress among women who conceive with ART. However, there are some known risk factors for increased dysphoria and anxiety after pregnancy loss, which are common in infertile populations. In a sample of 174 women who had experienced miscarriage, more distress was observed among women who attributed high personal significance to the miscarriage and who had not conceived by one year after the loss (Swanson 2000). Not having living children, strongly desiring the pregnancy, and having waited a long time to conceive have also been identified as risk factors for more intense and longer lasting distress after spontaneous pregnancy loss (Brier 1999; Athey and Spielvogel 2000). Women who become pregnant again following pregnancy loss often express concerns about the outcome of the pregnancy and the well-being of the fetus. Statham and Green
(1994) studied the effects of previous unsuccessful pregnancy in a cohort of women (n=1496) in the first trimester of a subsequent pregnancy. Those who had experienced pregnancy loss before the current pregnancy were more anxious about the possibility of something being wrong with the baby and about the possibility of miscarriage than those who had not.

Therefore, although there is no direct evidence that previous pregnancy loss is associated with more negative emotions among infertile women who have conceived with ART, such a relationship is plausible. It is also likely that the heightened levels of anxiety during a subsequent pregnancy after a previous pregnancy loss observed among women who have conceived spontaneously (Statham and Green 1994), may also be observed in those who conceive with ART.

1.6.6 Cause of infertility

Infertility-related distress appears to be more pronounced when the cause of infertility is identified as male factor than when a female factor is the cause. Connolly et al. (1987) surveyed over 800 couples attending an infertility clinic about their emotional adjustment and marital difficulties. Emotional and marital difficulties were greater for both women and men when the infertility was related to the man. Similarly, in a study of 80 couples who attended an infertility clinic, Mikulincer et al. (1998) reported that diagnosis of male infertility was more distressing than diagnosis of female infertility for both women and men. This was confirmed by Newton et al. (1999) who found that both partners in couples with male infertility reported more infertility-related distress than partners in couples with female cause of infertility. For women who themselves are fertile this may in part be because they are required to undergo invasive and demanding treatment due to the fertility problem of their partner. It is also possible that women avoid discussing male related infertility with family and friends in order to protect the partner from embarrassment and thereby deprive themselves of social support (Newton et al. 1999).
1.6.7 Use of donor gametes

For those who need donor gametes or embryos in order to conceive, a number of concerns relating to the availability of gametes, the origin of the genetic material and disclosure of mode of conception have been identified. Although there are no studies comparing those who use their own with those who use donor gametes it may be presumed that these concerns add to the level of infertility and treatment-related distress experienced by couples who need donor gametes. The limited availability of donor gametes commonly leads to long waiting lists for those wishing to use anonymously donated gametes, and couples who prefer to use a known donor may have difficulty finding someone who is willing to donate (Lindheim et al. 1998; Kovacs et al. 2003; Fuscaldo 2005). Some couples express fears about the unknown origin of anonymously donated gametes (Brewaey et al. 1997; Baetens et al. 2000) and when gametes from a known donor are used there may be apprehension about the future relationship between the child and the donor (Baetens et al. 2000; Greenfeld and Klock 2004). However, Shenfield (1997) argues the most significant difficulty for couples may be the tension between the strong advocacy by health care professionals for disclosure to the child and others of the use of donor gametes and their own preference for secrecy about the mode of conception.

There is substantial and compelling evidence that infertility and ART are emotionally extremely demanding experiences, particularly for women. The cumulative effect of trying unsuccessfully to become pregnant, undergoing the scrutiny of an infertility investigation, being subjected to the physical, emotional and financial demands of ART, sometimes repeatedly, may erode individual’s sense of self-efficacy, self-esteem and self-confidence. However, there is a paucity of studies that have systematically investigated the relationship between infertility and treatment experiences and women’s psychological functioning and adjustment when treatment results in pregnancy and they become mothers after ART.
CHAPTER 2

2 PERINATAL MENTAL HEALTH...............................................................58

2.1 Mental health and mental illness .......................................................59
  2.1.1 Depression .................................................................................60
  2.1.2 Anxiety ......................................................................................61

2.2 Emotional well-being during pregnancy .............................................62
  2.2.1 Adjustment to pregnancy ..............................................................62
  2.2.2 Ambivalence and anxiety in pregnancy .......................................63
  2.2.3 Depression in pregnancy .............................................................65
  2.2.4 Maternal-fetal antenatal attachment .........................................66
  2.2.5 Multiple pregnancy .................................................................68
  2.2.6 Pregnancy after assisted conception ...........................................69
    2.2.6.1 Multiple pregnancy and fetal reduction ................................76

2.3 The childbirth experience .....................................................................77
  2.3.1 Satisfaction with the childbirth experience ................................77
  2.3.2 Psychological consequences of caesarean section delivery ..........81
  2.3.3 Traumatic childbirth ....................................................................83
  2.3.4 Length of stay in hospital after childbirth ..................................84
  2.3.5 Multiple birth .............................................................................86
  2.3.6 Childbirth after assisted conception ...........................................86

2.4 Postnatal adjustment ....................................................................87
  2.4.1 Maternal role attainment ............................................................88
  2.4.2 Postnatal mood .........................................................................90
    2.4.2.1 Postpartum blues ...............................................................90
    2.4.2.2 Puerperal psychosis ..........................................................91
2.4.2.3 Postnatal depression ......................................................... 92

2.4.2.4 Postnatal anxiety........................................................ 106

2.4.3 Mother-infant attachment .................................................... 107

2.4.4 Changes in the relationship with the partner ......................... 109

2.4.5 Breastfeeding ...................................................................... 110

2.4.6 Maternal postpartum physical health.................................... 110

2.4.7 The experience of motherhood............................................ 111

2.4.8 Mothering twins................................................................. 113

2.4.9 Postnatal adjustment after assisted conception....................... 114
2 Perinatal Mental Health

The impact of pregnancy, childbirth and transition to motherhood on women’s health has been widely investigated and it is clear that these life events have significant effects on women’s physical and mental health. Transition to parenthood involves numerous potential challenges such as loss of identity, loss of autonomy and personal freedom, loss of employment and financial independence, changes in the marital relationship, the need to gain knowledge and skill to care for an infant, responsibility for the life of the baby, sleep deprivation and social isolation (Leifer 1977; Mercer 1985; Maloni 1994). Therefore, pregnancy and the birth of a child require unique adaptation, particularly for first time mothers and these life events have the potential to have a destabilising effect on women’s mental health and emotional well-being.

Pregnancy has been described as a “normal crisis” that “.precipitates an acute disequilibrium that nevertheless, under favourable conditions, may lead to a new level of psychological maturity and integration” (Dragonas and Christodoulou 1998). Brockington (1996, p 138) argues that considering the complex and rapid biological, social and emotional transitions that need to occur in pregnancy and after a birth, it is not surprising that these can provoke a range of psychological symptoms and diminish emotional well-being. Woollett et al. (1997) identified four psychological tasks necessary for successful transition to parenthood: recovery from and making sense of childbirth, feelings about and relations with the child, feelings about self, and changing relationships. The mental health outcomes of these major transitions are influenced by a range of protective and risk factors, both within the individual and stemming from relationships with others, and contextual factors such as social and economic circumstances and available support, and their complex interactions (Dulude et al. 2002).

There is a copious literature about the factors that influence pregnancy and postnatal psychological functioning and numerous biological, social and psychological determinants of better or worse emotional well-being during these transitions have been described. A small number of studies have specifically investigated adjustment in pregnancy and postnatally among women who have experienced infertility and
conceived with assisted reproductive technology (ART). Very few other studies exploring the putative explanatory factors for pregnancy and postnatal psychological adjustment have considered the possible impact of infertility and infertility treatment. Questions about time taken to conceive and mode of conception rarely feature in studies of women’s mental health in pregnancy and after childbirth. Understanding of if and how infertility and infertility treatment influence women’s emotional well-being during pregnancy, their experience of childbirth and postnatal adjustment is therefore limited.

2.1 MENTAL HEALTH AND MENTAL ILLNESS

The concepts of mental health and mental illness are often used to describe psychological state. This categorisation presumes that mental health or mental illness is either present or absent. However, dichotomising mental health into normal and abnormal limits understanding of the normal variations in emotional well-being that occur through life and fails to take into account the life context and circumstances of those who experience depressed mood and the range of points between health and sickness (Sheridan and Radmacher 1992, p 8).

According to the World Health Organisation mental health is “a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (World Health Organization 2001). Throughout life the degree of emotional well-being experienced by individuals varies in response to positive and adverse life events and challenging circumstances in the life course. Therefore, mental health and emotional well-being is not a static state but fluctuates in a reflection of the changing circumstances of individuals. A range of factors relating to individuals’ cultural, social and financial circumstances, physical health, relationships and personality influence mental health and the contribution of these to emotional well-being may vary over time.

When an individual experiences severe disturbances in mood, this is classified as a mood or affective disorder. The most common non-psychotic mood disorders are depression and anxiety.
2.1.1 Depression

According to the commonly used American Medical Association’s Diagnostic and Statistical Manual (currently Diagnostic and Statistical Manual for Mental Disorders, Fourth edition, DSM-IV) Major Depression is characterized by at least five of the following symptoms being present during the same two-week period: depressed mood, loss of interest in pleasurable activities, appetite disturbance, sleep disturbance, excessive fatigue, excessive guilt, difficulties in thinking and concentration, thoughts of suicide and psychomotor disturbance. If between two and four of these symptoms are present for at least two weeks this is classified as Minor Depression (American Psychiatric Association 1994).

This psychiatric conceptualisation of depression based on a set of diagnostic premises creates an artificial divide between mental health and mental illness. Stoppard (2000) contends that when the word ‘depression’ is used in a diagnostic sense, this presumes that the disorder is either present or absent while, in reality, depression can be present in mild to severe forms. In a further critique of the psychiatric discourse of depression Dowrick (2004, p 11) argues that many of the criteria for depression overlap either with common symptoms of a number of physical disorders, or with medically unexplained symptoms or with symptoms caused by social adversity.

Using psychiatric nosology such as DSM-IV, it is estimated that one woman in three becomes clinically depressed during her lifetime compared with one man in nine (Carlson et al. 1997, p 10). The proportion of people diagnosed as clinically depressed is increasing in the industrialized world and some argue that this may reflect changes in the interpretation, perception and understanding of the human condition rather than a change in the mental health of the population (Dowrick 2004, p 5). Nevertheless, the experience of profound feelings of hopelessness, personal worthlessness, lack of interest in daily activities and the inability to experience pleasure is currently classified as depression.

Various models for explaining depression in women have been proposed. Historically, psychoanalytical theory proposed that women were predisposed to mental disorders due to their biological weakness (Astbury 1996, p 2). Other models include the psycho-
social, social determinants, and biological models (Stoppard 2000). The psycho-social model explains depression as resulting from exposure to stressful life-events. According to the social determinants model, gender-specific social factors such as gender inequities in the workplace and in the amount of unpaid house and childcare work, and exposure to domestic abuse from partner and others explain why women are more likely than men to become depressed. The biological model places emphasis on genetics and biochemistry and women’s fluctuating hormone levels as causal factors.

In recent years the prevailing view is increasingly that depression is caused by the complex interactions between biological and psychosocial factors. Biological factors include abnormal brain structure or function, fluctuating levels of neurotransmitters and predisposing genetic factors. A large number of psychosocial and environmental factors have been implicated as risk factors for depression, for example, a family or personal history of depression or anxiety disorder, a history of sexual or physical abuse, relationship difficulties, having children under the age of five at home, low socio-economic status and low self-esteem (Carlson et al. 1997, p 85; Lewis Alexander et al. 2001, pp 52-53). It is also understood that cultural differences in the interpretation of affect and mood disorders exist and that depressed mood as conceptualised in the industrialised world may not be considered pathological in other cultures (Dowrick 2004, p 129).

2.1.2 Anxiety

Symptoms of anxiety include feelings of apprehension and uncertainty, nervousness, irritability, muscle tension, difficulty concentrating, headaches, nausea, rapid heart beat, difficulty breathing, and sweating. Universally people occasionally experience some anxiety, but extreme anxiety in response to real or perceived dangers can be debilitating. Anxiety disorders, the term used for severe and crippling anxiety, include Generalised Anxiety Disorder (GAD), phobias, panic disorder, obsessive-compulsive disorder and post-traumatic stress disorder (PTSD). Generalised Anxiety Disorder is characterised by long-lasting (at least six months) exaggerated worry and tension. Phobia refers to extreme and irrational fear of particular objects or situations and panic disorder is the experience of short (lasting five to twenty minutes) attacks of intense fear accompanied by physical and emotional distress. Those who suffer obsessive-compulsive disorder
need to carry out certain rituals to overcome distressing and anxiety provoking thoughts. Post-traumatic stress disorder can occur some time after exposure to a terrifying or threatening event such as a personal assault, a serious accident or a natural disaster (Lewis Alexander et al. 2001). Anxiety, like depression, is more common among women than men and it is estimated that 30% of women experience an anxiety disorder at some time in their life (Lewis Alexander et al. 2001).

Although depression and anxiety are described as different entities there is a significant overlap in the symptoms of these conditions such as fear, apprehension, worry, agitation, concentration and sleeping difficulties. Anxiety and depression often coexist (Dowrick 2004, p 61).

2.2 EMOTIONAL WELL-BEING DURING PREGNANCY

The psychological work of pregnancy includes adjusting to the change in body image, ambivalence about expected life changes resulting from having a baby, anxiety about the well-being of the growing baby and worry about the pain associated with childbirth. In a review of the literature, Dragonas et al. (1998) conclude that serious psychiatric illness is rare during pregnancy but that tension, ambivalence, anxiety and depressive symptoms are common.

2.2.1 Adjustment to pregnancy

A range of factors have been found to contribute to adjustment during pregnancy. For example, Da Costa et al. (1999) in their study of 161 pregnant women who completed the Hassles Scale (Delongis et al. 1988) on a monthly basis identified more negative perception of pregnancy among women with poorer marital adjustment and those who believed that the pregnancy would have a negative impact on their career.

Windridge and Berryman (1996) investigated the experience of pregnancy comparing women aged over 35 (n=48) with women in their twenties (n=45) adjusting for parity and occupational and educational status. Using the Maternal Adjustment and Maternal Attitudes scale (Kumar et al. 1984) at mid- and late pregnancy, they found that in late pregnancy, the older women had fewer somatic symptoms and more positive perceptions of their bodies than the younger women.
DiPietro et al. (2004) developed the Pregnancy Experience Scale, a measure of negative and positive aspects of pregnancy. They administered this scale repeatedly to 189 healthy women with low-risk pregnancies. The negative aspects of pregnancy reported by participants in this study were mainly related to changes in body image, somatic symptoms, concerns about delivery, the baby’s well-being, and changes in relationships. Therefore it was stated that failure to measure pregnancy-specific distress might underestimate the degree of distress women experience during pregnancy. However, most women perceived pregnancy as positive and uplifting and it was concluded that measurement of only negative aspects of pregnancy does not allow appraisal of the degree to which pregnancy is perceived as fulfilling.

2.2.2 Ambivalence and anxiety in pregnancy

Pregnancy signals numerous future lifestyle and role changes, especially for women expecting their first child. Normally, the anticipated changes give rise to both positive and negative emotions as they may be expected to bring gains as well as losses. For example, women may experience feelings of fulfillment about being pregnant and look forward to the new role of being a mother while feeling ambivalent about giving up personal autonomy and their role in the workforce (Matlin 2004, pp 324-325).

Anxiety as an emotion carries negative connotations but may be a protective positive response to a stressor. In pregnancy a degree of anxiety is thought to represent a normal response and a healthy reaction to a major life event (Leifer 1977; Sherr 1995, p 137). Huizink et al. (2004) hypothesized that pregnancy-related anxiety is distinct from general anxiety and that measuring general anxiety during pregnancy may underestimate anxiety specifically related to pregnancy. To test this hypothesis 230 nulliparous women who were recruited in early pregnancy completed questionnaires about pregnancy-related anxiety, general anxiety and depression in each trimester of the pregnancy. Three dimensions of pregnancy-related anxiety were distinguished; “fear of giving birth”, “fear of bearing a handicapped child” and “concerns about one’s appearance” and only a small part of the variance in these factors was explained by general anxiety and depression. This suggests that measures of general anxiety in pregnancy may not truly reflect the nature of anxiety women experience. Several studies have concluded that levels of pregnancy-related distress and anxiety are not static but
fluctuate through pregnancy with more anxiety occurring in the first and last trimesters compared with the second trimester (Stamp et al. 1996; Da Costa et al. 1999; Kermode et al. 2000).

Factors that have been linked to increased anxiety during pregnancy include distressing life events, marital problems, lack of social support, personality factors, and a previous history of miscarriage and infertility (Mercer and Ferketich 1988; Niven 1992; Cecil and Slade 1996; Canals et al. 2002; Dulude et al. 2002). Also, women who experience complications during the pregnancy or who carry a high-risk pregnancy are more likely to be anxious than are women where the pregnancy proceeds normally. This has been demonstrated in several studies. Da Costa et al. (1999) in a sample of 161 women who completed a questionnaire in the third trimester, found that gestational complications predicted worse outcomes on the Hassles Scale (Delongis et al. 1988), the Pregnancy Experience Questionnaire (PEQ, Kumar et al. 1984) and the State-Anxiety Inventory (SAI, Spielberger et al. 1983). Mercer and Ferketich (1988) assessed 153 women who were hospitalized due to pregnancy complications and 218 women attending a low-risk antenatal clinic during the 24th to 34th weeks of the pregnancy. Women who were identified as having a high-risk pregnancy exhibited greater anxiety and more depressive symptoms during the pregnancy than women with a low-risk pregnancy.

The impact of age on anxiety in pregnancy is unclear. Robb et al. (2005) in a case-control study of 60 pregnant women compared women aged over 35 with those aged between 20 and 30. They found that a small number in both groups were very anxious and in response to an open-ended question, approximately half the sample disclosed pregnancy-related anxiety. However, no group difference was detected on a standardised measure of distress. In contrast, Carolan (2005) in a qualitative study of 22 women aged over 35 years who were expecting their first baby found that most perceived that their age increased the risk of the baby being damaged or dying and their pregnancy experience was dominated by these concerns.

It would appear that after adverse reproductive events such as still birth, miscarriage or ectopic pregnancy women are at increased risk of experiencing anxiety. Brier (2004) in a review of seven studies concluded that elevated levels of anxiety after miscarriage up until 6 months after the event are common and that lack of support from the partner is
strongly associated with anxiety after pregnancy loss. Janssen et al. (1996) conducted a controlled prospective study of the mental health of 2,140 women who were assessed during their first trimester of pregnancy. Subsequently, 227 of these women who lost their pregnancies and 213 women who gave birth were followed over 18 months and their mental health was reassessed four times. Six months after the miscarriage women who had lost the pregnancy had more depression and anxiety than women who gave birth six months after the birth. By one year their mental health was comparable to that of women who gave birth and to that of women in general.

There is some evidence that anxiety due to previous pregnancy loss can be more persistent and compromise emotional well-being in a subsequent pregnancy (Geller et al. 2004). Franche and Mikail (1999) in a study about the impact of a previous pregnancy loss in a subsequent pregnancy assessed 31 pregnant women with previous pregnancy loss and 31 women who had not experienced pregnancy loss between the 10th and 24th weeks of pregnancy. Women with a history of loss reported significantly more pregnancy-specific anxiety and depressive symptomatology than the controls. The anxiety was significantly associated with the belief that a woman’s own behaviour affects fetal health, and the depressive symptomatology was associated with self-criticism and number of previous losses. This may indicate feelings of guilt about the pregnancy loss and lack of confidence in the body to be able to carry a pregnancy to term. Similarly, Theut et al. (1988) found higher pregnancy-related anxiety measured in late pregnancy among 25 couples with a history of perinatal loss within the previous two years than in 31 couples who had not experienced perinatal loss. In a qualitative study of 73 pregnant women who had previously experienced pregnancy loss the most frequently reported emotions were ‘anxious’, ‘nervous’ and ‘scared’ (Cote-Arsenault and Bidlack 2001). However, the women in this study were recruited from two pregnancy-after-loss support groups and may therefore not be representative of pregnant women in general who have experienced pregnancy loss.

### 2.2.3 Depression in pregnancy

Recent longitudinal studies have demonstrated that although it has received less attention in the literature, antenatal depression is more common than postnatal depression (Green 1998; Johanson et al. 2000; Thompson et al. 2000; Evans et al. 2001;
Josefsson et al. 2001; Eberhard-Gran et al. 2004; Buist et al. 2005). It may be that depression in pregnancy is overlooked because many of the symptoms of depression such as changes in appetite, sleep disturbance and fatigue also occur and are considered normal in pregnancy (Llewellen et al. 1997). Some factors may increase the risk of depressive symptoms in pregnancy. The physical discomforts that often accompany pregnancy, worry about the outcome of the pregnancy, feelings of ambivalence, and changes in the relationship have been shown to contribute to increased levels of anxiety and depression (Condon 1987). Marital disharmony and conflict, perceived lack of support from partner and others, being single, lower education levels and socioeconomic status, unplanned pregnancy and severe doubts about having the baby, younger age, a history of depression, somatic complaints such as sleeping difficulties and fatigue, obstetric complications and recent stressful life events have also been found to be correlates of antenatal depressive symptomatology (Kumar and Robson 1984; O'Hara 1995; Kearns et al. 1997; Llewellen et al. 1997; Berthiaume et al. 1998; Johanson et al. 2000; Field et al. 2006). Conversely employment, higher self-esteem, and satisfaction with social support are associated with lower levels of antenatal depressive symptoms (Berthiaume et al. 1998).

### 2.2.4 Maternal-fetal antenatal attachment

Over the course of pregnancy, women imagine and spend time thinking about the growing fetus and form a mental image of the baby’s appearance and personality. These thoughts are the basis for the concept of maternal-fetal emotional attachment. Condon (1993) described a mother’s attachment to the fetus as an “emotional tie” or “psychological bond” and Cranley (1981) defined maternal–fetal attachment as “the extent to which women engage in behaviors that represent an affiliation and interaction with their unborn child”. Maternal-fetal attachment includes thoughts and feelings about the unborn baby, actively preparing for the baby’s needs, actively preparing for changes in lifestyle after the baby’s birth, envisioning oneself as a mother, and engaging in good health practices (Ohye et al. 2003). The two most commonly used standardized measures of maternal-fetal attachment are the Antenatal Attachment Questionnaire (AAQ, Condon 1993) and the Maternal-Fetal Attachment Scale (MFAS, Cranley 1981). In the development of the AAQ Condon (1993) used indicators of attachment such as desire for knowledge about the fetus, pleasure in interaction with the fetus, and
desire to protect the unborn baby and meet its needs. The AAQ measures two dimensions of attachment, the quality of the involvement and the intensity of preoccupation. The MFAS includes subscales representing tasks involved in the transition to parenthood: “differentiation of self from fetus”, “attributing characteristics and intentions to the fetus”, “giving of self”, and “role taking”.

The development of maternal-fetal emotional attachment has been studied. Grace (1989) conducted a prospective longitudinal study of 69 women who completed the MFAS monthly throughout the pregnancy. This study demonstrated that maternal-fetal attachment increases through the course of pregnancy and that this linear increase is more pronounced in primigravida than in multiparous women. Similarly, Condon et al. (1997) found that maternal attachment to the fetus increases significantly after quickening, when the woman is able to feel the fetus move inside her. The experience of feeling movements early also appears to affect the intensity of attachment. Women who experienced fetal movements before 16 weeks of pregnancy displayed greater attachment to the fetus at 32 weeks gestation than women who felt movements after 16 weeks (Reading et al. 1984).

Maternal emotional attachment to the growing fetus is linked to women’s emotional well being during pregnancy. In a study of 238 women in the third trimester of pregnancy, low antenatal attachment as measured by the AAQ was found in a group of women with high levels of anxiety and depression, little social support and high levels of control, domination and criticism within the partner relationship (Condon and Corkindale 1997). Similarly, in a study of 252 pregnant women who completed MFAS and the Centre for Epidemiological Studies Depression Scale (CESD, Radloff 1977) between weeks 20 and 40 of the pregnancy, depression was a significant predictor of low maternal-fetal attachment (Lindgren 2001).

Some studies have measured antenatal attachment and compared younger and older women. Berryman and Windridge (1996) compared maternal-fetal attachment in pregnant women aged over 35 (n=49) with maternal-fetal attachment reported by women in their twenties (n=47). Attachment was measured with MFAS in mid and late pregnancy. After controlling for parity, educational and occupational status, increased age was found to be associated with decreased levels of attachment at mid pregnancy.
but this age effect was not noted in late pregnancy. The authors’ interpretation of this finding was that older women are more tentative about the pregnancy in early pregnancy due to the known risks of fetal abnormalities associated with raised maternal age and the potential consequences if fetal abnormalities are detected during genetic and other testing.

It has been hypothesized that ultrasound examinations in pregnancy may enhance maternal-fetal attachment (Royal College of Obstetricians and Gynaecologists 1997). It is clear from the literature that women and their partners find ultrasound very attractive and appreciate the visual confirmation of the pregnancy (Garcia et al. 2002) and in one study women reported that the early ultrasound examination increased their awareness of bearing a child (Dykes and Stjernqvist 2001). However, in a review of the literature Baillie and Hewison (1999) conclude that this hypothesis is only supported by anecdotal evidence and evidence from small qualitative studies. Experimental studies where maternal-fetal attachment in pregnant women who have an ultrasound examination in early pregnancy is compared to that of women who do not have ultrasound show that attachment increases linearly through the course of pregnancy, irrespective of the ultrasound (Baillie and Hewison 1999).

2.2.5 Multiple pregnancy

A marked increase in the rate of multiple pregnancy has occurred in the 1990s in Australia and other industrialised countries. The most significant cause for this increase is the use of ART. For women with multiple gestations there are added pregnancy-related concerns. The physical burden of multiple gestation is greater and the maternal risks of having twins include a between two to six fold increased risk of anaemia, pre-eclampsia, eclampsia, antepartum and postpartum haemorrhage, preterm delivery and caesarean section. There is also a range of potential complications for the babies that mothers may worry about such as prematurity, low birth weight and increased risk of morbidity and mortality (Elster 2000; Umstad and Gronow 2003). Furthermore, prolonged bed rest is often needed to avoid premature birth and this may be particularly distressing and difficult for women with older children.
Colpin et al. (1998) investigated the relationship between self-reported health as measured by the General Health Questionnaire (Goldberg 1992) and maternal-fetal antenatal attachment using the AAQ (Condon 1993) among 61 mothers expecting twins. They found that better self-reported health correlated with higher quality of the mother’s emotional attachment to the twins.

2.2.6 Pregnancy after assisted conception

The evidence about psychological adjustment and emotional well being during pregnancy and antenatal attachment to the unborn baby following infertility and assisted conception is limited. Anecdotal evidence, clinical reports and findings from qualitative studies suggest that after a period of infertility followed by conception with the use of ART, women’s emotional well-being may be compromised in a number of ways.

Findings from several qualitative studies (Olshansky 1987; Sandelowski et al. 1992; Tjørnhøj-Thomsen 2004) suggest that the shift in identity from infertile to pregnant may be problematic for some women as they may feel that through the experiences of infertility and ART they are different from other pregnant women. This is consistent with findings from another qualitative study by Sandelowski (1993, p 138) who compared infertile and fertile couples' experience of pregnancy. This study found that the main group difference was difficulties associated with relinquishing infertility for previously infertile couples. It was also shown that some previously infertile couples at the end of the pregnancy still had not relinquished feelings of failure or impending loss developed during the struggle to conceive.

Anecdotal evidence (Shapiro 1986) and findings from a small study comparing six previously infertile pregnant women and five who had not experienced infertility (Dunnington and Glazer 1991) propose that in early pregnancy after infertility, women may have difficulty believing that the pregnancy is real and that denial may be used as an emotional protection against potential disappointment. Furthermore, a discussion paper (Bernstein 1990) and findings from a qualitative study (Tjørnhøj-Thomsen 2004) suggest that after ART, women experience high levels of fear and anxiety about losing the pregnancy due to the poor biologic outcomes and repeated failures that precede the
pregnancy. Olshansky (1990) in a discussion paper also argues that previous pregnancy loss may lead to apprehension and anxiety that the pregnancy may be endangered. Anxiety about the outcome of the pregnancy may explain the postponement of preparing the home environment for the baby until the last few weeks before the birth or even until after the birth, which has been observed among pregnant previously infertile women (Dunnington and Glazer 1991; Bernstein et al. 1994; McMahon et al. 1999). A similar observation was made in a qualitative study of the experience of pregnancy among 22 women aged over 35 years of whom almost half had undergone infertility treatment. Women in this study were extremely reluctant to buy items or prepare a room for the baby due to fear that the baby might be stillborn (Carolan 2005).

Obstetric risks are higher after ART than after spontaneous conception and therefore ART pregnancies are highly scrutinised. This is thought to undermine women’s confidence in their own body and decrease trust in the body’s ability to sustain the pregnancy (Olshansky 1990; Covington and Hammer Burns 1999; Baetens 2002). Due to the difficulties associated with ART conception and the relatively low chance of success, those who conceive are considered fortunate, particularly by the treatment team and those who have provided support during the period of infertility. This may inhibit the expression of any negative feelings about the pregnancy and women may not feel entitled to anything but feelings of joy and gratitude (Shapiro 1986; Hammer Burns 1996; Baetens 2002). It has also been theorised that idealisation of the pregnancy state and fantasies of a perfect baby render women unprepared for the reality of caring for a new baby (Bernstein 1990; Olshansky 1990; Hammer Burns 1996).

Results from empirical studies about the psychological well-being of women during pregnancy after assisted conception are summarised in Table 2.2.6.1.
Table 2.2.6.1 Psychological well-being in pregnancy after assisted conception

<table>
<thead>
<tr>
<th>Authors and country of study</th>
<th>Sample</th>
<th>Type of study and time of assessment</th>
<th>Method</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandelowski et al. (1990) USA</td>
<td>Pregnant couples, 24 previously infertile and 6 with no previous infertility</td>
<td>Qualitative longitudinal study Assessment at 12, 22 and 36 weeks’ gestation</td>
<td>In-depth interviews</td>
<td>Three components specific to the experience of conception after infertility were identified and labelled “forcing conception”, “resolving conceptual ambiguity” and “reconciling conception as an idea and as an event”</td>
</tr>
<tr>
<td>Stanton and Golombok (1993) UK</td>
<td>Pregnant women (&gt;20 weeks gestation), 15 who had conceived with IVF (IVF group) and 20 who had conceived spontaneously (SC group) Recruited from hospital fertility clinic and antenatal clinic All previously infertile women agreed to participate. Response rate for spontaneous conception group not reported</td>
<td>Cross-sectional study IVF group on average 31 weeks and SC group 34 weeks’ gestation at assessment IVF and SC groups compared</td>
<td>Standardised measures of anxiety, maternal-fetal attachment, and childbearing attitudes administered</td>
<td>Scores on all measures within normal ranges and no differences between groups detected</td>
</tr>
<tr>
<td>Bernstein et al. (1994) USA</td>
<td>10 pregnant women who had conceived with infertility treatment other than ART, 10 who had conceived with ART and 5 with no history of infertility Excluded multiparous women Recruited from private obstetric and infertility practices Response rate not reported</td>
<td>Longitudinal study Assessments at the end of the first, second, and third trimesters Conception groups compared</td>
<td>Interviews and standardised measures of maternal-fetal attachment, self-esteem and coping</td>
<td>Only minor differences in the scores recorded for the three groups on the standardised measures. Interview data indicated that the previously infertile groups were more disbelieving about being pregnant and about the pregnancy resulting in the birth of a healthy child than those who had conceived without difficulty. They also exhibited higher levels of anxiety, particularly in the first and third trimesters and described themselves in more negative terms. Most did not prepare the baby’s room until after the birth</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Study Design</td>
<td>Outcome Measures</td>
<td>Findings</td>
</tr>
<tr>
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<tr>
<td>Greenfeld et al. (1996)</td>
<td>62 mothers and 41 fathers of ART conceived children</td>
<td>Retrospective study</td>
<td>Questionnaire about the recalled experience of pregnancy.</td>
<td>52% of mothers wished that they had had contact with other couples who had conceived with ART during the pregnancy.</td>
</tr>
<tr>
<td>USA</td>
<td>Consecutive cohort of ART couples who had a live birth from ART between 1982 and 1992</td>
<td>Children aged 0-10 years at time of study</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Response rate 31%</td>
<td></td>
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<tr>
<td>Van Balen et al. (1996)</td>
<td>115 pregnant women of whom 45 had conceived with ART (ART group), 35 had conceived spontaneously after at least 4 years of infertility (Inf group) and 35 had conceived spontaneously without difficulty (SC group)</td>
<td>Retrospective study</td>
<td>Questionnaire with Likert scale questions about the perceived physical and psychological burden of the infertility investigation and treatment and the development of the pregnancy.</td>
<td>Psychological burden of infertility and treatment considered greater than physical burden by both infertile groups. Pregnancy complications were more common among the two infertile groups (42% for ART and 38% for Inf group) than the SC group (23%). The difference not significant when controlled for age. ART and Inf groups evaluated pregnancy as more stressful than the SC group.</td>
</tr>
<tr>
<td>Holland</td>
<td>Excluded multiparous women and women with multiple pregnancy</td>
<td>Assessment after birth Groups compared</td>
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<td></td>
<td>Recruited from hospital infertility clinic and midwife practices</td>
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<tr>
<td></td>
<td>Response rates: ART group 69%, Inf group 52% and SC group 35%</td>
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<tr>
<td>Study Authors</td>
<td>Country</td>
<td>Participants</td>
<td>Data Type</td>
<td>Assessment Period</td>
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<tr>
<td>McMahon et al. (1997)</td>
<td>Australia</td>
<td>70 couples who had conceived with ART (ART group) and 63 matched controls who had conceived spontaneously (SC group)</td>
<td>Cross-sectional</td>
<td>From a longitudinal study</td>
</tr>
<tr>
<td>Mechanick Braverman et al. (1998)</td>
<td>USA</td>
<td>246 women and 127 men who had had a child after ART</td>
<td>Retrospective</td>
<td>Assessment when the children were on average almost 5 years old</td>
</tr>
<tr>
<td>Klock and Greenfeld (2000)</td>
<td>USA</td>
<td>74 pregnant women who had conceived with ART (ART group) and 40 who had conceived spontaneously (SC group)</td>
<td>Longitudinal</td>
<td>Assessments at 12 (T1) and 28 (T2) weeks’ gestation</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Design</td>
<td>Assessment Points</td>
<td>Measures</td>
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<tr>
<td>Hjelmstedt et al. (2003a)</td>
<td>Sweden</td>
<td>Cross-sectional</td>
<td>14 weeks’ gestation</td>
<td>Interview including questions about pregnancy-specific anxiety and standardised measures of recalled distress related to infertility, quality of relationship, personality traits, and global anxiety</td>
</tr>
<tr>
<td>Hjelmstedt et al. (2003b)</td>
<td>Sweden</td>
<td>Longitudinal</td>
<td>13, 26, and 36 weeks’ gestation</td>
<td>Questionnaires including standardised measures of pregnancy-specific anxiety, attitudes towards pregnancy, parenthood and children</td>
</tr>
<tr>
<td>Study</td>
<td>Participants</td>
<td>Design and Methods</td>
<td>Findings</td>
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<tr>
<td>Ulrich et al. (2004) Germany</td>
<td>47 couples who had conceived with ART and 45 control couples who had conceived spontaneously (SC group), matched for maternal age and number of expected children. Recruited from hospital ART and antenatal clinics. 100% response rate for ART group and 50% for control group.</td>
<td>Cross-sectional data from a longitudinal study. Assessments in the last trimester ART and SC groups compared. Standardised measures of partner satisfaction and general health. Semi-structured interviews with psychoanalytical orientation. Scrutiny of medical records.</td>
<td>No differences between groups on partner satisfaction or attitude towards pregnancy. The ART group had more complications during pregnancy than the controls resulting in more frequent and longer hospital stays. Despite this they described the progress of pregnancy as very satisfying and free of complaints and scored lower, indicating less symptoms, than the controls on a measures of exhaustion and limbic pains.</td>
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<tr>
<td>Cox et al. (2006) UK</td>
<td>Pregnant women, 70 who had conceived with ART (ART group) and 111 who had conceived spontaneously (SC group). Excluded multiparous women. Recruited from hospital ART and antenatal clinics. Response rates: 225/500 (45%) of ART group and 166/395 (42%) of spontaneous group. 17% of eligible ART and 29% of the control group participants retained in the study.</td>
<td>Longitudinal study. Assessment at 18 and 28 weeks’ gestation ART and SC groups compared. Postal questionnaires in pregnancy including standardised measures of self-esteem and anxiety.</td>
<td>Self-esteem scores significantly increased between 18 and 28 weeks gestation for both groups. Scores of self-esteem and anxiety measures in pregnancy within normal ranges and no difference between groups.</td>
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</tbody>
</table>
Small sample sizes (Stanton and Golombok 1993; Bernstein et al. 1994), low response and retention rates (Cox et al. 2006), the exclusion of multiparous women (Bernstein et al. 1994; van Balen et al. 1996; McMahon et al. 1997; Klock and Greenfeld 2000; Hjelmstedt et al. 2003; Ulrich et al. 2004; Cox et al. 2006), women with multiple pregnancy (van Balen et al. 1996; McMahon et al. 1997; Hjelmstedt et al. 2003) and women older than 36 years (Hjelmstedt et al. 2003) limit the validity and generalisibility of the findings in these studies. Nevertheless, the picture that emerges from this research suggest that on measures of marital satisfaction, depression and general anxiety, women who conceive with ART do not differ from those who conceive spontaneously. However, pregnancy-related anxiety appears to be more pronounced after ART (Bernstein et al. 1994; McMahon et al. 1997; Hjelmstedt et al. 2003; Hjelmstedt et al. 2003), particularly for those who have experienced ART failure (McMahon et al. 1997) and who are more distressed about infertility (Hjelmstedt et al. 2003). The positive attitudes to pregnancy among women after assisted conception identified in some studies (McMahon et al. 1999; Klock and Greenfeld 2000; Hjelmstedt et al. 2003; Ulrich et al. 2004) may represent relief that the challenges of ART are in the past and gratitude that the treatment was successful or inhibition about expressing negative views.

Having experienced infertility and infertility treatment does not appear to alter maternal-fetal attachment (Stanton and Golombok 1993; Bernstein et al. 1994; McMahon et al. 1997). This is consistent with a report by Honjo et al. (2003) who measured maternal-fetal attachment among 216 women in early pregnancy. In that sample 22% had conceived with some form of infertility treatment and their scores on a standardised measure of maternal-fetal attachment were not different from those recorded among women who had conceived spontaneously. This phenomenon is discussed by Laxton-Kane et al. (2002) who suggest that greater antenatal attachment resulting from higher investment in the pregnancy may be cancelled out by less attachment as a guard against possible distress in case of pregnancy loss.

### 2.2.6.1 Multiple pregnancy and fetal reduction

At least 20% of women who become pregnant as a result of ART have a multiple pregnancy. Apart from the physical risks of multiple pregnancy, multiple gestations also
present great emotional, practical and financial challenges for parents, particularly mothers (Bryan and Denton 2001; Beck 2002; Denton and Bryan 2002; Fisher and Stocky 2003). The emotional difficulties in pregnancy may include worry and anxiety about the physical welfare of the babies, bereavement if one fetus is lost during pregnancy, and, for those who have older children, concerns about how these children will be affected by the birth of the twins (Hay et al. 1990; Denton and Bryan 2002).

A proportion of women with a multiple pregnancy after ART carry more than two fetuses. In these cases multifetal pregnancy reduction (MFPR) is sometimes carried out to reduce the risks of prematurity and neonatal morbidity and mortality in the remaining fetus or fetuses. In this procedure one or more fetuses is killed by injection with potassium chloride using an ultrasound guided technique (ESHRE 2000). The perinatal outcomes after MFPR of triplet or higher order pregnancies to twins are comparable to those seen in spontaneous or ART conceived twins (Dodd and Crowther 2004). However, interviews with women who have undergone the procedure have found that the decision to proceed with MFPR is extremely difficult and that it can leave lasting feelings of guilt and grief, even if most do not regret the decision (Schreiner-Engel et al. 1995; McKinney et al. 1996; Garel et al. 1997; Bergh et al. 1999). Furthermore, although the risk of losing the pregnancy before 24 weeks gestation as a result of the MPFR procedure has decreased over the years it is still estimated to be 7.5% (ESHRE 2000).

2.3 THE CHILDBIRTH EXPERIENCE

The way in which a woman experiences childbirth is likely to affect her own well-being, her adjustment to motherhood, and her relationship with the baby (Quine and Rutter 1996; DiMatteo and Kahn 1997).

2.3.1 Satisfaction with the childbirth experience

Qualitative and quantitative measures of satisfaction with childbirth are fraught with difficulty as the notion of ‘satisfaction’ is multidimensional and determined by numerous factors such as the availability and quality of support, feelings of personal control, the perceived pain, and the interventions the woman is subjected to. The
concept of 'satisfaction with childbirth' is variously used; in some studies it is used as an indicator of quality of care while in other studies it refers to the feelings that result from a woman’s evaluation of the experience of childbirth as a whole (Branmadat and Drieger 1993). Furthermore, although there is evidence of a positive association between depressive symptomatology and dissatisfaction with perinatal care (Saisto et al. 2001), most studies have not assessed the potential influence of current mood state on satisfaction with the childbirth experience. However, more support in pregnancy and during the birth, feeling involved in decision making during the birth, less pain and less obstetric intervention appear to be associated with more satisfaction with the birth event.

In a Cochrane review about intrapartum support including 15 trials involving 12,791 women, it was shown that continuous intrapartum support reduces the risk of operative birth, need for analgesia and dissatisfaction with the birth experience (Hodnett et al. 2003). Furthermore, Quine and Rutter (1996), in a prospective study of 59 first time mothers, found that better support during the end of pregnancy was related to less pain and more satisfaction with the birth, fewer symptoms of stress after the birth and a more positive description of the infant’s behaviour.

Several studies have demonstrated that satisfaction with the birth experience, whether assessed soon after the birth or months later, is associated with supportive and sensitive caregivers, and perception of control and involvement in decisions during the birth. Green et al. (1990) investigated the experience of childbirth in a cohort of 825 women who completed questionnaires in pregnancy and after the birth. Being well informed and feeling in control were associated with greater fulfillment, satisfaction and emotional well-being. Although the measures used in this study were not standardised, the large sample, the high response (over 70%) and retention rates (92%), the broad cover of dimensions of satisfaction in the questionnaires, and the unambiguous direction of the findings are clear strengths in this study. Waldenström et al. (1996) in a study of a consecutive cohort of 295 women who completed a questionnaire about their birth experience within one day of the birth found that negative and positive feelings about the birth can coexist. In this sample most women reported experiencing severe pain and variable degrees of anxiety but in spite of this rated the overall birth experience as positive. The six factors that were identified as contributing to a more positive experience were more support and sensitive care from the midwife, shorter duration of
labour, less pain, positive expectations of the birth, more involvement and participation in the birth process, and not having surgical procedures such as emergency caesarean section, instrumental delivery and episiotomy. In another survey 1111 women recalled their experience of labour and birth two months after the birth. This revealed that perceived control of how the birth was managed and midwife support correlated with a positive experience and anxiety, pain and having a first baby with a negative experience (Waldenström 1999). Brown and Lumley (1994) surveyed a cohort of Victorian women (n=790) 8 months after they had given birth and examined the recalled experience of care during labour. After adjusting for parity, it was found that dissatisfaction with the intrapartum care was related to lack of involvement in decision making, insufficient information, obstetric intervention and the perception that the caregivers were unhelpful. Others have found that perception of choice, feeling in control, involvement in decision making (Weaver 1998) and having expectations for labour and delivery met (Goodman 2004) are linked to positive birth experience.

Evidence suggests that the concept of ‘control’ during childbirth is multidimensional. Green and Baston (2003) in a prospective longitudinal study of 1146 women identified three types of control during labour: “feeling in control of what staff do to you”, “feeling in control of your own behaviour” and “feeling in control during contractions” and found that all three dimensions of control contributed independently to satisfaction with the birth experience. A continuum of degrees of feeling in control was noted with approximately one-fifth of the sample feeling in control on all dimensions and an equal proportion not feeling in control on any of them.

In Australia, women give birth in the public or private care sector. The universal government funded public care system is accessible to all Australians free of charge. Private care, which offers better hospital accommodation and care by the doctor of choice, is available to those who are self-funded or covered by private health insurance. In a large population based study of Victorian women who gave birth in 2000 (n=1,609), Bruinsma et al. (2003) investigated mothers’ perception of specific aspects of intrapartum care five to eight months after the birth. This survey revealed that a considerable proportion of women was dissatisfied with several aspects of care. Twenty-seven percent of women reported that they would have liked more information, 16% did not feel that they had had an active say during labour, and 24% and 42% respectively felt that the midwife and doctor had not always been helpful. This
study also demonstrated an association between care sector and satisfaction rating of care during childbirth. Women who gave birth in public care were more likely than those in private care to describe the intrapartum care as less than “very good” (35% versus 17%, OR 2.69, 95% CI 2.1 to 3.5). This may be a reflection of higher staff-patient ratio, more personalised care and better facilities in private than public care.

Older age appears to be associated with more concerns about the baby’s survival during labour. In a study of 107 women, obstetric risk among those aged over 35 was similar to that of those aged between 20 and 29. In spite of this, health care professionals were more likely to categorise older women as “high-risk” and, perhaps as a consequence of this, the women themselves believed that their age made their infants more vulnerable during labour (Windridge and Berryman 1999).

Several studies have shown that pain and pain relief are associated with satisfaction with the birth experience. Waldenström et al. (1999) in their study of 1111 women identified pain as one of the five variables explaining a negative birth experience. Similarly, in a prospective longitudinal study of 211 women, labour pain was the strongest predictor of disappointment with delivery (Saisto et al. 2001). However, effective pain relief does not ensure a positive birth experience. In a study of 1000 women who delivered vaginally there were more dissatisfied women among those who received epidural analgesia than among those who did not. Dissatisfaction with the birth was related to forceps delivery and long labour, both of which were more common in the epidural group (Morgan et al. 1982). This study was conducted over two decades ago and at that time epidural analgesia was not as readily available as it is today. Therefore, those who received an epidural may have experienced considerable pain for a prolonged period of time before the epidural was administered and this might have influenced their perception of the birth. A more recent study suggests that effective pain relief may, at least in the short term, positively influence women’s postnatal mood. Hiltunen et al. (2004) assessed mood in 162 women using the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al. 1987) one week and four months postpartum. Although the cause-effect relationship remains speculative, women who had received an epidural or paracervical block during labour were less likely to have scores in the clinical range than women with no analgesia at one week, but this difference was not seen at 4 months postpartum.
2.3.2 Psychological consequences of caesarean section delivery

The great variations in rates of caesarean section depending on individual obstetricians, geographical location and care sector suggest that non-medical factors such as fear of litigation, obstetrician preference and financial incentives may influence the mode of delivery in favour of caesarean section (DiMatteo and Kahn 1997). Bailit et al. (2004) investigated changes in patient risk factors for caesarean delivery in the United States by estimating the probability of primary caesarean delivery for four years of deliveries (n=397,793). The perplexing finding was that in spite of more women being classified as having low obstetric risk over the four years, the incidence of primary caesarean delivery rose from 16.6% to 18.4%. The authors proposed that rather than medical factors determining the caesarean section rate changes in physician behaviour, institutional factors and increasing patient demand for elective caesarean delivery explained the increase.

The argument that women’s demand for caesarean section is an explanatory factor for increasing caesarean section rates is challenged by some authors who maintain that few women request caesarean section in the absence of an obstetric complication (Gamble et al. 2000; Goer 2001). This is supported by the findings from a prospective study of 443 pregnant women who were recruited in late pregnancy. In this study the relationship between fear of labour assessed in pregnancy and mode of delivery was investigated. There were no differences in fear of labour in pregnancy between women who subsequently had a spontaneous vaginal or assisted vaginal birth or emergency or elective caesarean delivery (Johnson and Slade 2002). Also, in an audit of 9,138 records at a public Australian teaching hospital Quinlivan et al. (1999) found that the caesarean section rate was 17.8% and that 39% of the 1624 caesarean sections performed were elective. Of these elective caesarean births, 27% (n=170) were performed solely on the mother’s request. However, only five of these women presented no obstetric reason for their request while the remainder wished to have a surgical delivery because they had either previously had a caesarean delivery or the baby was in breech presentation.

There is some evidence that women may not be adequately informed or involved in the decision to have a caesarean section delivery. In a survey of a consecutive cohort of Australian women who had had a caesarean birth 7 weeks earlier, over a third stated that
they had not been involved in the decision and only 29% “strongly agreed” that they had been given good information to prepare for the possibility of caesarean section (Turnbull et al. 1999).

The increasing rates of caesarean section deliveries in Australia and elsewhere may explain why this mode of delivery is being viewed by some as ‘an easier way of giving birth’ (Walker et al. 2004). However, members of the community may be unaware that caesarean section births, in addition to a number of physical risks to the mother and the baby, are associated with a more negative birth experience and worse psychosocial outcomes than spontaneous vaginal births. In a review of the research into the psychosocial consequences of caesarean delivery it was concluded that the existing evidence suggested that the childbirth experience is negatively affected by caesarean delivery. The evidence also indicated that caesarean section, at least in the short term, can have deleterious effects on maternal mood and self-esteem and the mother-infant interaction (Fisher et al. 1990). Similarly, in a meta-analysis DiMatteo et al. (1996) explored the differences between vaginal and caesarean delivery on 23 psychosocial outcomes of childbirth. They found strong evidence that women experiencing caesarean delivery were less satisfied with the birth experience, less likely to breastfeed, and had less positive mother-infant interaction than women who had a vaginal birth. Furthermore, prospective longitudinal studies where large samples of women were surveyed in pregnancy and postpartum have shown that caesarean delivery is associated with lower emotional well-being and a more negative description of the baby (Green et al. 1990). Women who experience emergency caesarean delivery have more than six times the risk of developing postnatal depression at three months postpartum than women who have a vaginal birth (Boyce and Todd 1992). Also, delayed first mother-baby contact after instrumental and surgical delivery correlates with worse scores on maternal mood measures at 8 months postpartum (Rowe-Murray 2001) and women delivered by caesarean section are more likely to experience deterioration in mood after the birth than women delivered vaginally (Fisher et al. 1997).

Some of the negative feelings reported by women after caesarean surgery include guilt, failure, disappointment and anger and these feelings may be stronger if the birth experience fails to match the woman’s expectations of her delivery (Hillan 1996). Specific psychological and educational preparation, adequate support in the operating
theatre, not having a general anesthesia and not being separated from the baby can reduce the negative psychological effects of caesarean delivery (Fisher et al. 1990).

2.3.3 Traumatic childbirth

Women who experience prolonged labour or have a complicated birth necessitating emergency procedures, or those women who have extreme pain without adequate pain relief may become highly distressed. Sometimes this distress continues after the birth and in severe cases post-traumatic stress disorder (PTSD) may ensue. This refers to an extreme psychological distress reaction following exposure to a traumatic or threatening experience (Lyons 1998). Symptoms of PTSD include re-experiencing the event through intrusive thoughts, nightmares, or flashbacks, avoidance of factors associated with the traumatic event and increased arousal. For a diagnosis of PTSD the symptoms must be severe and last for more than one month (Ayers and Pickering 2001).

Risk factors for PTSD after childbirth include having experienced fear of death or permanent damage to self or baby, extreme pain, feelings of not being in control, and emergency caesarean section or instrumental delivery (Lyons 1998; Bailham and Joseph 2003). Reports of the proportion of women who develop PTSD as a result of experiencing difficult childbirth vary between 1.5 and 5.6% (Lyons 1998; Creedy et al. 2000; Ayers and Pickering 2001). However, the proportion of women who suffer symptoms of trauma after childbirth is considerably higher. In a prospective study 499 women were recruited in late pregnancy and then interviewed four to six weeks postpartum to explore how the birth was managed, how women perceived the care they received during the birth, and whether they reported symptoms of trauma (Creedy et al. 2000). One third of participants reported at least three trauma symptoms such as feeling emotionally upset, having intrusive thoughts about the birth, and actively trying to avoid thoughts and feelings, and 5.6% met DSM-IV criteria for acute posttraumatic stress disorder. There was a statistically significant association between the development of trauma symptoms and more obstetric intervention and the perception of inadequate intrapartum care in this study. Similarly, in a study of 264 women whose birth was classified as ‘normal’ and who were assessed 6 weeks postpartum 27% reported clinically significant levels on at least one of the three dimensions of post-traumatic stress; intrusions, avoidance and hyperarousal (Czarnocka and Slade 2000).
A number of studies have described various psychological interventions to reduce distress after traumatic childbirth. Some authors advocate debriefing, a structured opportunity to discuss the events during the birth within a few days of delivery, to reduce the incidence of PTSD (Lyons 1998). However, Gamble et al. (2004), when reviewing the literature about counselling interventions to relieve trauma symptoms after childbirth, found that the methods of counselling and debriefing described were non-specific and often based on opinion rather than empirical evidence. Furthermore, evidence from large studies and randomized controlled trials do not support the hypothesis that debriefing reduces postpartum psychological morbidity (Boyce and Condon 2000; Small et al. 2000; Priest et al. 2003).

2.3.4 Length of stay in hospital after childbirth

In Australia and other industrialised countries the length of stay in hospital after childbirth has decreased in the last two decades (Thompson et al. 2000; Brown et al. 2002). In 1999 18% of Victorian women who took part in a population based survey were discharged within 48 hours of the birth compared with 5% in 1989 (Brown et al. 2002). To investigate concerns that this changing practice may negatively influence postnatal outcomes Brown and Lumley (1997) conducted a population based survey of a cohort of women six to seven months after they had given birth. Of the 1336 women who responded (62.5% response rate) two thirds had stayed in hospital for five days or more while one quarter had stayed 3 or 4 days and close to 10% had left hospital within 48 hours of the birth. The women who were discharged within 48 hours were more likely to be multiparous, have a lower income, not have private health insurance and have been cared for in the public sector, and have had lower levels of obstetric intervention compared with women who stayed longer. Adverse outcomes such as breastfeeding problems, low confidence about caring for the baby and depression were not more common among women with short stays than among those who stayed for five days or more. Furthermore, data from three Victorian population based surveys of women 6-8 months postpartum conducted in 1989, 1994 and 2000 did not support any links between shorter length of hospital stay and adverse impact on breastfeeding or risk of postnatal depression (PND) as measured by a score of more than 12 on the Edinburgh Postnatal Depression Scale (EPDS) (Brown et al. 2004).
Two Australian prospective longitudinal studies about the relationship between early discharge from hospital and risk of developing PND have had contradictory findings (Hickey et al. 1997; Thompson et al. 2000). The earlier study conducted by Hickey et al. (1997) found that early discharge from hospital after childbirth constituted a risk factor for PND. In this study all women who delivered over a three-and-a-half month period at a New South Wales public hospital were invited to participate and women discharged early, defined as within 72 hours, were compared with those who stayed longer than 72 hours. The EPDS was used to measure mood and a score over 12 was defined as probable depression. Women were assessed in the first few days after the birth and at 6, 12, 18 and 24 weeks postpartum. Complete data was available for 425 of the 749 women who gave birth (57%). Women discharged early were more likely to have a score over 12 than women who stayed longer (14.4% versus 7.4%). Thompson et al. (2000) however in a more recent study did not make this observation. In their population-based prospective cohort study, 1193 of 1856 eligible new mothers (64%) completed questionnaires 4, 8, 16 and 24 weeks after the birth. The outcome measure in this study was also a score of more than 12 on the EPDS. Over one third of women (37%) were discharged early (less than 72 hours) but this was not associated with a greater risk of a score over 12 on the EPDS. However, women who were discharged early were significantly less likely than those who stayed longer to agree that the length of their stay was “about right” (72% versus 82%) and more likely to feel that the stay was “too short” (23% versus 8%).

The different findings in these two large studies, conducted in the same country may be explained by differences in the study populations and in postnatal support experienced by the women. Lower socioeconomic status is a known risk factor for PND and it is likely that the women in the study by Hickey et al. (1997) were less socioeconomically advantaged than those in the study by Thompson et al. (2000). In the study by Hickey et al. (1997) all women had given birth in a public hospital whereas in the study by Thompson et al. (2000) 32% had attended a private hospital for the birth and therefore had higher SES. Also, the SES of people who live in the Australian Capital Territory (ACT), where the study by Thompson et al. (2000) was carried out, is more homogenously middle class than that of those who live in New South Wales (NSW) where the study by Hickey et al. (1997) was conducted. Hickey et al. (1997) did not
include information about postnatal support but, it is possible that home visits from midwives in the first week after discharge described in the study by Thompson et al. (2000) may have also contributed to better postnatal outcome for the women in the ACT than for those in NSW. Of the women who were discharged early 94% received at least one home visit. In addition, 96% reported that they had someone to help in practical ways in the first eight weeks postpartum and 90% perceived the help they received as satisfactory.

2.3.5 Multiple birth

The average gestation of a twin pregnancy is 37 weeks but one in ten sets of twins are born before 32 weeks. Due to prematurity and breech presentation of one or the other of the twins, caesarean section is commonly performed in women with multiple gestations (Bryan et al. 1997; Colon et al. 2001; Fisher and Stocky 2003). Women who give birth to twins after caesarean section are more likely than those who experience a vaginal birth of twins to find the postnatal period difficult and to describe their postnatal health as “unwell” or “very unwell” (Spillman 1999). Mothers of twins are likely to be separated from their babies after the birth, as the babies often require neonatal intensive care. When this occurs, mothers may be anxious about the welfare of their infants and may experience difficulties establishing and maintaining breastfeeding under such circumstances (Bryan and Denton 2001).

2.3.6 Childbirth after assisted conception

There is a paucity of information about how women who have conceived with ART perceive the event of the birth and whether mode of delivery affects the experience. Systematic literature searches revealed that only one study has investigated the experience of childbirth among women who have conceived after infertility and infertility treatment. Van Balen et al. (1996) in Holland compared the experience of birth among 45 women who had conceived with ART, 35 who had conceived spontaneously after a long period (more than four years) of infertility and 35 who had conceived without difficulty. All women were first time mothers having one baby. They evaluated their experience of the birth on three dimensions: enjoyment, exceptionality, and stress on three-point Likert scales. The two previously infertile groups rated the birth as a more exceptional event than mothers who conceived without
difficulty did but there were no differences on reported enjoyment or stress. Mode of delivery was not reported in this study.

In Australia, women who conceive with ART are almost twice as likely to be delivered by caesarean section compared with all Australian women who give birth (48% versus 25%) (Bryant et al. 2004). This difference is observed among both younger and older women. Of those who conceived with ART in 2001 and who were younger than 38 years 46% experienced a caesarean section compared with 24% of all Australian mothers in this age group. For women aged 38 years or older the proportions were 56% versus 38% respectively (Bryant et al. 2004). Most women who undergo ART are covered by private health insurance and therefore give birth in the private sector. Caesarean section rates are higher in private than in public care (Fisher et al. 1995; Roberts et al. 2000) and this in part may explain the difference in caesarean section rates between women who give birth after ART and other women.

In some other countries the difference in caesarean section rate between those who conceive with ART and other women is less pronounced (Koudstaal et al. 2000; Ochsenkühn et al. 2003) and in the Scandinavian countries, where private obstetric care is not available, similar rates of caesarean section for women who have conceived with ART and other women are reported (Koivurova et al. 2002; Sydsjö et al. 2002; Hjelmstedt et al. 2003). McMahon et al. (1997) in their longitudinal study of Australian women who had conceived with ART did not find a difference in the rate of caesarean section between the study population (n=65) and age-matched controls (n=62). This is likely to be due to the fact that the controls were recruited from a private obstetrical practice and therefore did not represent the Australian parturient population.

### 2.4 POSTNATAL ADJUSTMENT

Feminist writers are critical of the presumption that unproblematic adaptation to motherhood is normal whereas experience of difficulties is not, and argue that easy adaptation to first time motherhood is unusual (Oakley 1980, p 278). They believe that the social construction of mothering as a natural and universally fulfilling role for women contribute to many women having idealised and unrealistic expectations of motherhood. This makes it difficult to articulate negative feelings and to acknowledge
anger and guilt and leaves women vulnerable to feeling inadequate and depressed when faced with the endless, unpaid, and invisible work of motherhood (Oakley 1980, p 281; Woollett and Marshall 2000). Nicholson (1998, p 10) further argues that much of the focus of research about motherhood has been on the effects of the ‘quality’ of mothering on children. She points to Bowlby’s theory about the paramount importance of the mother’s presence, love and affection for the optimum development of a child and remarks that “this love, by implication, needs to be ever-available, and offered without qualification, regardless of the mother’s own needs and circumstances”. This, according to Nicholson, places the whole responsibility for the child’s development on the mother while her own needs are ignored.

Nicholson (1998, p 7) describes the notion that motherhood is natural, desirable and totally satisfying for all women as a myth and argues that motherhood is “more than anything a complex social role with ambiguous and potentially contradictory consequences for women”. Similarly, in an information booklet published by the National Australian Health and Medical Research Council (NHMRC) common ideas about motherhood are discussed. Beliefs that motherhood is always happy, that the baby will improve the marriage, that mothers immediately recognise and love their baby and instinctively know how to breastfeed and settle the baby, that a caesarean section birth is a ‘failure’, that mothers cause difficult behaviour in their babies, and that good mothers don’t have negative feelings about their babies are challenged. It is stated that these beliefs may lead to women blaming themselves if they experience difficulties rather than realising that motherhood “…is a very stressful job with few available resources” (NHMRC 2000).

2.4.1 Maternal role attainment

“Maternal role attainment”, the process whereby a woman adapts to the role of mother and develops confidence in her ability to care for the baby, has been conceptualised in a number of ways. Rubin (1967a) described it as a complex cognitive and social process, which is learned, reciprocal and interactive. She suggests that in the process of acquiring this new role mother’s use role models and mimicry (imitating other mothers), role-play, fantasy, introjection-projection-rejection (testing and subsequently rejecting or accepting particular mothering behavior), and grief-work (letting go of a former
identity) (Rubin 1967a; 1967b). Walker et al. (1986) suggest that the process of maternal role attainment involves three distinct components; the development of a maternal identity, perceived (subjective) role attainment, and demonstrated (behavioral) role attainment. Others view the transition to motherhood as encompassing two processes: dealing with the baby’s needs and shedding of parts of the former self, relationships, roles and activities that conflict with the role of mother (Barclay and Lloyd 1996). More recently, Mercer (2004) argues that maternal identity is a dynamic transformation which is continuously evolving with mothers acquiring new skills as new challenges arise. She believes that the term “becoming a mother” should replace the term “maternal role attainment” as it more succinctly describes the changing nature of this process.

The relative ease or difficulty involved in the transition to motherhood is governed by a range of factors and their complex interaction (Koniak-Griffin 1993). Factors that have been found to promote maternal confidence and facilitate maternal role attainment include the presence of a caring and supportive partner (Majewski 1986; Leahy Warren 2005). The availability of other positively perceived informal and formal practical and emotional support and the absence of stress from concurrent distressing life events have also been shown to assist in the transition to motherhood (Koniak-Griffin 1993; Leahy Warren 2005). Previous experience with infants positively affects confidence about baby care and therefore makes the transition to motherhood easier (Fish and Stifter 1993; Barclay et al. 1997). Higher levels of self-esteem and self-confidence are personality factors that have been identified as positively associated with greater maternal confidence (Mercer and Ferketich 1994).

Some factors that may hinder the development of a confident maternal identity have also been identified. The most notable of these is having a temperamentally difficult infant who cries inconsolably and resists soothing (Bullock and Pridham 1988; McGrath et al. 1993; Barr 1998). Mothers of prematurely born babies may perceive them as particularly vulnerable and this may erode their sense of maternal self-efficacy (Teti et al. 2005). A negative birth experience may affect negatively a mother’s self-esteem and thereby her ability to adapt to her new role (Mercer and Marut 1981). Role conflict and role strain created by multiple role demands can increase the difficulty involved in transition to motherhood (Majewski 1986). Also, early mother-infant separation and maternal illness can negatively impact on maternal role attainment (Mercer 1981).

Several studies have found that a mother’s confidence in her ability and beliefs about her competence to care for her baby influences adjustment to the new role of mother (Walker et al. 1986; Williams et al. 1987; Barclay et al. 1997; Tarkka et al. 2000). Hudson et al. (2001) conducted a prospective study of 44 couples who completed questionnaires eight, 12 and 16 weeks after the birth of their first baby. They found a positive association at all four time points between scores on an infant care self-efficacy measure and a measure of parenting satisfaction among mothers. In another study, 303 women of mixed parity completed questionnaires relating to their perceived maternal competence in hospital soon after birth and one, four and eight months later. Perceived maternal competence increased at four and eight months over earlier levels and self-esteem and sense of mastery were predictors of maternal competence at all time points (Mercer and Ferketich 1994). Furthermore, higher levels of support and positive appraisal from a woman’s partner and own mother have been found to positively influence new mothers’ confidence in infant care (Leahy Warren 2005).

2.4.2 Postnatal mood

The substantial physical and emotional work involved in caring for a new baby and the significant changes to women’s lives when they become mothers can be unprecedented and overwhelming. Exhaustion due to the constant demands of the new baby, sleep deprivation, worry about the baby’s health and development, social isolation, changes in the relationship with the partner, and loss of autonomy are common experiences following childbirth. It is therefore not surprising that many women suffer depressed mood in the postpartum year.

2.4.2.1 Postpartum blues

In the psychiatric Diagnostic and Statistical Manual for Mental Disorders, Fourth edition (DSM-IV) (American Psychiatric Association 1994) postpartum blues is described as a mild and transient form of mood disturbance occurring within the first few days after the birth and lasting 3-7 days. It is estimated to affect up to 80% of new mothers (Pope et al. 2000) and symptoms include anxiety, irritability, lability, headaches, tearfulness without sadness, confusion and forgetfulness (Brockington 1996, p 147). The condition is time-limited and no treatment is needed unless symptoms
persist beyond two weeks in which case the woman should be evaluated for possible postpartum depression (Gale and Harlow 2003). A number of factors appear to increase the likelihood of a woman experiencing postpartum blues including a personal or family history of depression, a greater number of stressful life events occurring during the pregnancy, inadequate support and sleep disruption during pregnancy, night-time labour, short interval between births, and having a baby born with health problems (Gale and Harlow 2003). The etiology of postpartum blues is unclear but it is often hypothesised that it is due to hormonal fluctuations after childbirth (Pope et al. 2000). Nicholson (1998, p 55) disagrees with the simple explanation that postpartum blues occur only because of hormonal changes and counters that the symptoms are emotional responses to stressful experiences such as the birth itself, being in hospital, and experiencing pain. In interviews with women who had given birth a number of reasons for distress and tearfulness after childbirth were identified: midwives’ behaviour during labour, pain and tiredness, anxiety about baby care and breastfeeding, staff behaviour in the postnatal ward, adjustment to bringing the baby home and feeling incompetent (Nicolson 1998, pp 56-67). Others dismiss postpartum blues as a common and trivial part of the early postpartum period (Ashurst and Hall 1989, p 156).

2.4.2.2 Puerperal psychosis

Puerperal psychosis is the most disabling form of postpartum psychiatric disorder and is characterised by hallucinations, delusions, severe thought disturbance and dysfunctional behaviour. Puerperal psychosis is rare and occurs following only approximately 1 in 500 births. However, the relative risk of a woman developing psychosis in the postpartum period is thirteen times greater than at other times of life (O'Hara 1995). Risk factors for puerperal psychosis include a past history of puerperal psychosis, pre-existing psychotic illness and a family history of psychosis. In most cases puerperal psychosis develops within the first 30 to 90 days after the birth (O'Hara 1995). The management of it is the same as for psychosis at other times and includes psychotropic drugs (Scottish Intercollegiate Guidelines Network 2002). Women who suffer puerperal psychosis are often incapable of caring for the baby and always need admission to a specialist psychiatric hospital, with or without the baby, or to a mother-baby unit.
Postnatal depression (PND) is described as ‘a non-psychotic depressive illness of mild to moderate severity occurring during the first postnatal year’ (Scottish Intercollegiate Guidelines Network 2002). Symptoms of PND include mood changes, chronic exhaustion or hyperactivity, crying or wanting to cry without knowing why, feeling unable to cope, irritability, sensitivity to noise, anxiety, fear of going mad, negative, obsessive or morbid thoughts including fear of harming the baby, change in sleep patterns, loss of concentration and memory, loss of sexual interest, loss of self confidence and self-esteem, and feelings of guilt and inadequacy (Bishop 1999, p 14). Often PND remits within the first 6 months postpartum but in some women the symptoms persist. Factors associated with persistent depression lasting up to two years after childbirth are lower socioeconomic status, maternal health problems, relationship difficulties, inadequate social support, higher depression scores during the early postpartum period, life stress and depression during pregnancy (Goodman 2004).

Psychiatric conceptualisation of PND does not allow understanding of the reasons why new mothers may be distressed. The Diagnostic and Statistical Manual for Mental Disorders, Fourth edition (DSM-IV) (American Psychiatric Association 1994) does not distinguish PND from depression at other times. According to DSM-IV, a diagnosis of major depression is confirmed if a woman suffers at least five defined depressive symptoms for at least two weeks; depressed mood, loss of interest in pleasurable activities, appetite disturbance, sleep disturbance, excessive fatigue, excessive guilt, difficulties in thinking and concentration, thoughts of suicide, and psychomotor disturbance. However, some of these symptoms such as sleep disturbance, difficulties in thinking and concentration and excessive fatigue are common among new mothers due to the demands of looking after the baby.

Psychological conceptualisations of depressed mood in the months after birth regard factors such as socio-economic disadvantage, impaired physical health of mother or baby, inadequate support from partner and others, and difficult infant temperament and unsettled behaviour as explanations for depressed mood (Armstrong et al. 1998; Brown and Lumley 2000; Hiscock and Wake 2001; Fisher et al. 2004). When these factors are
acknowledged as contributing to postnatal mood, depressed mood in the postpartum may be seen as a normal response to adverse circumstances rather than a manifestation of psychopathology.

Some argue that depressive symptoms in new mothers should be seen as “…the logical result of stress, exhaustion, learning new skills and adapting to the imposition of new patterns of relationships and family routines” and reject the classification of mothers as depressed as this pathologises a normal reaction (Lewis and Nicolson 1998; Nicolson 2000). This view is shared by those who believe that the use of the term PND is unhelpful as it can confuse clinical depression with the unhappiness, anxiety and frustration that many women feel in early motherhood due to the endless demands of caring for the baby, sleeplessness and breastfeeding. They suggest that labelling the distress experienced by women ‘depression’ pathologises the experience and ignores the context of parenting (Barclay and Lloyd 1996). Others however, believe that although symptoms of PND are similar to those of depression at other times, women who are depressed in the postpartum have special needs that require adequate service provision such as mother-infant services. They therefore argue that the diagnostic term PND should not be abandoned as it helps in the provision of tailored support for new mothers who experience depressed mood (Riecher-Rössler and Hofecker Fallahpour 2003).

2.4.2.3.1  Etiology of PND

The etiology of PND is debated and much research has been devoted to discerning the relative contribution of biological, psychological and social factors to causation. Historically the dramatic changes in reproductive hormone levels that occur soon after childbirth were thought to cause the development of PND but current empirical evidence does not support the role of hormonal changes in the etiology of PND. It is however recognised that a subgroup of women may be particularly sensitive to hormonal changes and that this may contribute to the development of postnatal depression in these women (Hendrick et al. 1998; Bloch et al. 2000; Scottish Intercollegiate Guidelines Network 2002). Clearly, there is no simple cause-effect model to explain PND. Current understanding of PND is that a number of biological, obstetrical, psychological, social and infant factors and their complex interactions may increase the risk of a woman developing this condition and that these vary between individual women (Scottish Intercollegiate Guidelines Network 2002).
2.4.2.3.2  Prevalence of PND

In a meta-analysis based on 59 studies published before 1996, the average prevalence rate of PND was estimated at 13% in industrialised countries (O'Hara and Swain 1996). The reported rates of PND in more recent population based studies have been lower, ranging from 6 to 10% (Condon and Corkindale 1997; Johanson et al. 2000; Thompson et al. 2000; Evans et al. 2001; Buist et al. 2005). This may reflect a real change in prevalence, possibly attributable to increased public awareness of the condition and improved support for new mothers, or may be a measurement artifact. Although the prevalence of depression in women after childbirth is similar to that of women who have not recently given birth, the onset of depression is three times more likely within five weeks of childbirth than at other times (Cox et al. 1993).

Studies have shown that not all women who suffer PND are identified by health care providers who care for women in the postnatal period (Bågedahl-Strindlund and Börjesson 1998; Hearn et al. 1998). Women who are depressed may also be reluctant to seek help because of intense feelings of guilt and shame and inadequacy in their mothering role. Some may even fear that the baby might be removed from their care if they reveal how they feel (Scottish Intercollegiate Guidelines Network 2002; Riecher-Rössler and Hofecker Fallahpour 2003).

2.4.2.3.3  Screening for postnatal depression

A number of screening tools for depression are used in clinical and research settings to identify and determine prevalence of PND. These tools have cut-off points and those women scoring below and above these are classified as non-cases and cases of depression respectively. Green (1998) argues that valuable information is lost by dichotomizing women into depressed or non-depressed, as those women who are not clinically depressed “span a continuum from the euphoric to the very miserable”. Screening tools are only able to identify individuals who are likely to be clinically depressed, but to confirm a diagnosis of depression, clinical assessment and interview are required.
The most commonly used screening instrument for PND in both clinical and research settings is the EPDS (Cox et al. 1987) which was specifically designed to screen for PND in the community. The EPDS is also considered useful for detection of probable depression in pregnancy (Murray and Cox 1990). A number of studies have administered the EPDS repeatedly in pregnancy and postnatally to estimate prevalence of depression at different times and to describe changes in mood that occur during pregnancy and in the postnatal period. Examples of such studies and their outcomes are shown in Table 2.4.2.3.3.1.
<table>
<thead>
<tr>
<th>Authors and country of study</th>
<th>Sample characteristics</th>
<th>Assessment time</th>
<th>Mean (sd)</th>
<th>% &gt;12</th>
<th>% &gt;9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyce et al. (1991) Australia</td>
<td>149 non-depressed primiparous women in stable marital relationship recruited in pregnancy</td>
<td>1 months postpartum</td>
<td>6.5 (4.8)</td>
<td>11.3</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>3 months postpartum</td>
<td>5.6 (4.6)</td>
<td>9.4</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>6 months postpartum</td>
<td>4.9 (4.5)</td>
<td>5.4</td>
<td></td>
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<tr>
<td>Condon and Corkindale (1997) Australia</td>
<td>Community sample of 200 women recruited in pregnancy</td>
<td>4 weeks postpartum</td>
<td>5.8 (4.4)</td>
<td>6.1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>4 months postpartum</td>
<td>5.1 (4.0)</td>
<td>3.8</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>8 months postpartum</td>
<td>5.2 (4.6)</td>
<td>5.9</td>
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<tr>
<td>Green (1998) UK</td>
<td>Community sample of 1272 women recruited in pregnancy</td>
<td>35 weeks gestation</td>
<td>8.5 (4.8)</td>
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<td></td>
<td></td>
<td>6 weeks postpartum</td>
<td>7.5 (4.7)</td>
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<tr>
<td>Thompson et al. (2000) Australia</td>
<td>Population cohort of 1252 women recruited in hospital after birth</td>
<td>8 weeks postpartum</td>
<td>6.4 (4.6)</td>
<td>10</td>
<td>8</td>
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<tr>
<td></td>
<td></td>
<td>16 weeks postpartum</td>
<td>5.3 (4.6)</td>
<td>8</td>
<td>8</td>
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<tr>
<td></td>
<td></td>
<td>24 weeks postpartum</td>
<td>5.0 (4.6)</td>
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<tr>
<td>Johanson et al. (2000) UK</td>
<td>Community sample of 417 women recruited in pregnancy</td>
<td>28-34 weeks gestation</td>
<td>8.4 (4.7)</td>
<td>9.8</td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 months postpartum</td>
<td>7.2 (4.6)</td>
<td></td>
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<tr>
<td>Evans et al. (2001) UK</td>
<td>Community cohort of 9028 women recruited in pregnancy</td>
<td>18 weeks gestation</td>
<td>6.6 (4.7)</td>
<td>11.8</td>
<td>13.6</td>
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<tr>
<td></td>
<td></td>
<td>32 weeks gestation</td>
<td>6.7 (4.9)</td>
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<td></td>
<td>8 weeks postpartum</td>
<td>5.8 (4.6)</td>
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<td></td>
<td></td>
<td>8 months postpartum</td>
<td>5.3 (4.6)</td>
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<tr>
<td>Josefsson et al. (2001) Sweden</td>
<td>Community cohort of 1558 women recruited in pregnancy</td>
<td>36 weeks gestation</td>
<td></td>
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<td></td>
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<td>Maternity ward</td>
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<td>6-8 weeks postpartum</td>
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<td></td>
<td>6 months postpartum</td>
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<tr>
<td>Seimyr et al. (2004) Sweden</td>
<td>Community cohort of 248 women recruited in pregnancy</td>
<td>3rd trimester</td>
<td>6.4 (4.2)</td>
<td>21</td>
<td>17</td>
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<tr>
<td></td>
<td></td>
<td>2 months postpartum</td>
<td>5.6 (4.1)</td>
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<td></td>
<td></td>
<td>12 months postpartum</td>
<td>4.8 (3.6)</td>
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<tr>
<td>Buist et al. (2005) Australia</td>
<td>Community sample of &gt;40,000 women recruited in pregnancy of whom &gt;12,500 also completed EPDS postnatally</td>
<td>26-32 weeks gestation</td>
<td>6.9 (4.4)</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6-8 weeks postpartum</td>
<td>5.4 (4.4)</td>
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</table>
Mean EPDS scores and proportions with probable depression (scoring more than 12 or, in some studies, more than 9) vary considerably between studies and these variations may be due to cultural differences between the countries where the studies were conducted, the inclusion criteria used, and when in pregnancy and how long after the birth the women completed the EPDS.

Studies where mood has been assessed with the EPDS in pregnancy and after the birth almost universally demonstrate improvement in the postpartum compared with late pregnancy. Two studies using the Profile of Mood States (POMS) (McNair et al. 1971) to assess mood antenatally and postnatally also found that mood scores improved after the birth (Kermode et al. 2000; Hayes et al. 2001).

Although mean scores for mood are lower postnatally than in pregnancy, not all women experience improved mood after the birth. One longitudinal study of more than 1200 women who completed the EPDS each trimester of pregnancy and 6 weeks after the birth found that 10% scored the same before and after the birth, 55% scored lower postnatally and 35% recorded higher scores after the birth. The majority (72%) had a postnatal score within three points of their antenatal score (Green and Murray 1994).

### 2.4.2.3.4 Risk and protective factors for postnatal depression

A wide range of risk and protective factors for the development of clinical depression after childbirth has been identified. Table 2.4.2.3.4.1 outlines the methods and findings from studies that have investigated risk factors for PND.

<table>
<thead>
<tr>
<th>Authors and country of study</th>
<th>Study design, sample and time and type of assessment</th>
<th>Risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kumar and Robson (1984) UK</td>
<td>Prospective longitudinal 119 nulliparous women recruited from antenatal clinic followed from pregnancy to 1 year postpartum Clinical interviews and self-report measures</td>
<td>Subfertility (trying to conceive ≥2 years) Marital conflict Severe doubts about having the baby Partner prior psychiatric problems Problems in relationship with own mother Age &gt; 30</td>
</tr>
<tr>
<td>Study Authors</td>
<td>Study Country</td>
<td>Study Design</td>
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<tr>
<td>Webster et al. (1994)</td>
<td>New Zealand</td>
<td>Cross-sectional</td>
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<tr>
<td>Astbury et al. (1994)</td>
<td>Australia</td>
<td>Cross-sectional</td>
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<tr>
<td>Warner et al. (1996)</td>
<td>UK</td>
<td>Cross-sectional</td>
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<td>Bernazzani et al. (1997)</td>
<td>Canada</td>
<td>Prospective longitudinal</td>
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<td>Fossey et al. (1997)</td>
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<td>Brugha et al. (1998)</td>
<td>UK</td>
<td>Prospective longitudinal</td>
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<td>Rhigetti-Veltema et al. (1998)</td>
<td>Switzerland</td>
<td>Prospective longitudinal</td>
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Although many studies have identified a history of psychiatric illness as a risk factors for PND, over 50% of women who develop PND have not previously suffered mental health problems (Stowe and Nemeroff 1995). A number of systematic reviews and meta-analyses of studies investigating risk factors for PND have also been conducted (Stowe and Nemeroff 1995; Beck 1996; O'Hara and Swain 1996; Cooper and Murray 1998; Pope et al. 2000; Beck 2001; Scottish Intercollegiate Guidelines Network 2002; Gale and Harlow 2003). In addition to the risk factors tabled above, these have identified thyroid dysfunction, low self-esteem, depression in the partner and having an unsettled baby as risk factors for PND.

It is important to consider the strength of the evidence presented. In a critical review of the literature up until 1999, conducted by Pope et al. (2000) on behalf of the Australian National and Medical Research Council (NHMRC) evidence for risk factors for PND was graded based on the proportion of reviewed studies that had identified them. The strongest evidence for increased risk of PND was for a personal history of depression, depression during pregnancy, difficulties in the marital relationship, lack of support and stressful life events. These were risk factors confirmed in approximately 75% of studies.
Probable risk factors, those identified by 40% to 60% of studies, included family history of psychopathology, single parenthood, severe postpartum blues, vulnerable personality characteristics, negative cognitive style, negative birth experience and obstetric complications, partner’s level of depression, poor infant health, difficult infant temperament and behaviour, and genetic vulnerability. The evidence for thyroid dysfunction, hormonal changes, early discharge from hospital, premature birth, not breastfeeding, poor relationship with parents, bereavement, maternal age and parity as risk factors for PND was considered weak and ambiguous. Some protective factors identified in this literature included optimism and high self-esteem, having a good marital relationship, increased availability of social support, and adequate preparation for the physical and psychosocial changes that accompany parenthood. In a qualitative study Mauthner (1995) also found that social contacts with other mothers of young children is critical for new mothers’ emotional well-being.

Although longer time taken to conceive has been identified as a risk factor for PND in some studies (Scottish Intercollegiate Guidelines Network 2002) it remains unknown whether assisted conception contributes to the risk of PND as studies to date have not included mode of conception in their investigations of potential risk factors.

There is emerging evidence that having some complication during the pregnancy or the birth may increase the risk of depressive symptoms in the early postpartum period. A sample of 441 women was interviewed in the third trimester of the pregnancy and subsequently at 3 days and 6 weeks after the birth. Obstetric complications were scored using a standardised method and maternal mood was assessed with the EPDS. After adjusting for factors known to be associated with the EPDS score such as demographic characteristics, marital adjustment, parity and depression and anxiety during pregnancy, higher EPDS scores were found in women who had a severe obstetric complication (Verdoux et al. 2002). In a retrospective study, 246 women completed the EPDS six weeks postpartum and then, based on information in their medical records, they were grouped into emergency (n=55) and non-emergency delivery (n=191). There were no differences between the groups on mean age of the woman, parity, gestational age, baby’s weight, Apgar score or mean EPDS score. However, women in the emergency group had a relative risk of 1.81 of developing PND as measured by a score of more than 12 on the EPDS (Koo et al. 2003). An earlier Australian prospective
longitudinal study of 188 women who were recruited in early pregnancy and followed up at 1, 3 and 6 months postpartum compared women who had emergency caesarean section (n=21), forceps delivery (n=49) and spontaneous vaginal delivery (n=118) (four women had an elective caesarean section and were excluded from analyses). Women who had an emergency caesarean section were more likely than women in the other two groups to have an EPDS score over 12, indicating probable depression, at 3 months, but not at 1 or 6 months, postpartum (Boyce and Todd 1992). A possible explanation for this finding may be that in the first few weeks after the caesarean section women were provided with additional support while at 3 months this was no longer available to them.

The birth of a very premature infant has also been found to impact on the psychological health of the mother. In a study of 62 mothers of prematurely born infants (<32 weeks) mothers completed a questionnaire including the EPDS one month after the birth. Forty percent of the mothers scored in the clinical range on the EPDS and high maternal stress increased the likelihood of depressive symptoms (Davis et al. 2003).

Women who have a multiple birth are more likely to develop PND. Hay et al. (1990) compared mothers of twins and mothers of singletons when the babies were three months old and found that mothers of twins had a five times higher rate of depression than mothers of singletons. Among women who have triplets the proportions with depression are even higher (Robin et al. 1991; Garel and Blondel 1992). The extraordinary demands on women caring for more than one newborn is likely to explain the increased risk of depression among women who have twins and triplets.

Recent research has drawn attention to the impact of infant behavior and temperament on the mother’s emotional well-being. According to Hiscock and Jordan approximately 20% of parents experience problems with infant crying or irritability (2004) in the first three months. These problems peak at about 6 weeks and have usually settled by 12-16 weeks. The causal relationship between infant crying and depression in the mother is difficult to establish but most research suggests that unsettled infant behavior, persistent inconsolable crying and frequent nighttime waking may lead to maternal exhaustion and depressed mood. In a survey of 738 Australian mothers (94% response rate) with children aged between 6 and 12 months, 46% reported infant sleep problems including sleeping in parents’ bed, being nursed to sleep, taking a long time to fall asleep, waking
often and being awake for long periods over night. These sleep patterns were associated with higher mean EPDS scores and maternal reports of infant sleep problems predicted EPDS scores in the clinical range (Hiscock and Wake 2001). Others have also demonstrated a relationship between maternal mood disorders and unsettled infant behaviour (Edhborg et al. 2000; McMahon et al. 2001; Lam et al. 2003; Fisher et al. 2004).

Maternal fatigue due to difficult infant behaviour is sometimes interpreted as depression. In a survey of consecutive admissions (n=109) of mother-baby dyads to a private hospital mother-baby unit the mothers completed two measures of mood on the day they were admitted. These were the EPDS (Cox et al. 1987) and the POMS (McNair et al. 1971), which measures six independent dimensions of mood; depression, anxiety, vigour, fatigue, anger and confusion. Almost half the sample scored over 12 on the EPDS indicating probable depression. However, cluster analyses of the EPDS and POMS subscale scores revealed three distinct groups. Women in the “Probably Depressed” group had clinically elevated average scores on all scales, those who were “Fatigued and Distressed” had scores indicating severe fatigue, impaired functional efficiency and clarity of thinking, while the “Fatigued Only” group only had clinically significant symptoms of fatigue (Fisher et al. 2002 b).

Some authors argue that a vulnerable, unassertive and timid personality and low self-esteem may predispose some women to PND (Beck 2001; Riecher-Rössler and Hofecker Fallahpour 2003). Evidence supporting this includes the finding from a study of 490 women in the postpartum. Women with PND scored higher on the Vulnerable Personality Scale (VPS, Boyce et al. 2001) and were more likely to describe themselves as nervy, shy/self-conscious, obsessional, angry or as a worrier than women who were not depressed (Johnstone et al. 2001). Other studies have found that anxious personality correlated with more depressed mood, more concerns about the baby and less confidence about caring for the baby among primiparous women (Barnett and Parker 1986), and that depressed mood in the early postpartum was associated with interpersonal sensitivity (Matthey et al. 2000). Kermode et al. (2000), in a prospective longitudinal study of 320 multiparous women, measured two dimensions of personality in pregnancy: locus of control and defense style, defined as the way of responding to anxiety-provoking situations, and found that both were associated with postnatal
mood. Women with external locus of control, that is those women who were prone to attribute the cause of events to powerful others or chance rather than to themselves, were more likely to develop PND than those with an internal locus of control. The same finding also applied to women who had a defense style classified as “immature”, meaning that they commonly respond to anxiety arousing situations with somatisation, denial, passive aggression, isolation or by acting out.

Some authors contend that there are many obvious and good reasons why women become depressed after childbirth such as feeling out of control, having more tasks than hours in the day, fatigue, traumatic events, lack of confidence in mothering ability, and lack of help and support (Barclay and Lloyd 1996; Kendall-Tackett 2001, p 19). Lloyd et al. (2003) argue that focussing on risk factors and predisposing factors may prevent the development of solutions that take into account the social and cultural context of women with young children (Lloyd and Hawe 2003). The importance of considering context of motherhood was demonstrated by Small et al. (1994). They found that women who were depressed 8-9 months after giving birth had reported less practical and emotional support from their partner and others, had experienced more negative life events since the birth, and had poorer physical health than had women who were not depressed.

Some of the risk factors for PND identified in the literature are common among women who give birth after assisted conception such as longer time to conception (Kumar and Robson 1984), having a multiple birth (Hay et al. 1990), having a first baby when aged over 35 and having an operative birth (Astbury 1994). However, many other known risk factors are uncommon or non-existent in this group of women, for example unplanned or unwanted pregnancy, being single, multiparity, low socio-economic status, and younger age.

2.4.2.3.5 Impact of PND

PND severely impacts on sufferers’ well-being and functioning. In addition, if left untreated, it may have long-term detrimental effects on the mother-infant relationship and adversely affect the child’s psychological, social and cognitive development (Murray and Cooper 1997; Luoma et al. 2001; Scottish Intercollegiate Guidelines
Network 2002). There is also some evidence that PND may impact on the child’s physical well-being. Early cessation of breastfeeding is associated with PND (Henderson et al. 2003) and children of mothers with PND are more likely to fail-to-thrive in the first two years than children of non-depressed mothers (O’Brien et al. 2004). Burke (2003) makes the point that the impact of maternal depression on the child needs to be seen within a social and family framework as it will vary depending on the severity of the depression, whether the father also is depressed, there is conflict between the parents, undesirable living conditions, and lack of social supports.

The direction of causality between the well-established positive relationship between PND and problems in the partner relationship is ambiguous. Poor marital relationship is known to be a risk factor for PND (Kumar and Robson 1984; Webster et al. 1994; Johanson et al. 2000) but PND can also contribute to relationship difficulties (Burke 2003). Mood disorders in the male partner has also been shown to influence maternal postnatal mood. Morse et al. (2000) conducted a longitudinal study of 327 couples who were expecting their first child and found that anxiety and negative affect in the male partner in pregnancy predicted maternal postnatal distress.

2.4.2.3.6 Prevention of PND

Considering the serious consequences of PND for the woman and her family primary prevention or early detection of PND are desirable. It has been suggested that screening women for depression in pregnancy would allow the implementation of interventions to prevent postnatal depression. However, reviews of studies trialling antenatal screening to predict postnatal depression conclude that none of the screening instruments used met criteria for routine application as they all had poor sensitivity and positive predictive values (Lumley and Austin 2001; Scottish Intercollegiate Guidelines Network 2002; Austin and Lumley 2003). In addition, a review of randomized controlled trials of antenatal group interventions to reduce PND in ‘at risk’ women found little evidence of their efficacy (Austin 2003).

Recent randomised controlled trials (RTC) of antenatal interventions to prevent PND confirm this. In an Australian study all women who attended an antenatal clinic were screened for risk factors for PND and those identified as ‘at risk’ were randomised to
the intervention (n=299) or control (n=301) arm of the trial. Women in the intervention group received a booklet about PND and a letter was sent to the referring doctor and local Child Health Nurse alerting them to these women’s heightened risk of PND while women in the control group received standard care. The outcome measure was EPDS score >12 at 16 weeks postpartum. The proportion of women scoring in the clinical range did not differ between the intervention group and the control group (Webster et al. 2003). In another Australian prospective RCT of first time mothers the antenatal intervention to prevent PND consisted of an educational package tailored to the information needs of primiparous women. The outcome measure in this study was changes in mood as measured by POMS antenatally and twice postnatally. Experienced midwives followed the women through the study and guided those in the intervention group through the educational package. However, as in the previous study, the education package made no difference to the incidence of PND and the authors concluded that this challenges the view that PND can be reduced through antenatal education (Hayes et al. 2001). These findings support the view that depressive symptoms after birth may be a response to the considerable physical, social and emotional difficulties inherent in caring for a newborn.

Some postnatal interventions to improve maternal mental health have been disappointing. In a RCT of 683 rural and metropolitan Australian women to investigate whether women who had an early postnatal check-up with their general practitioner (one week after the birth) had lower scores on the EPDS than those whose visit was scheduled for 6 weeks, no significant differences were found between the two groups on EPDS scores (Gunn et al. 1998). In another RTC conducted in the UK, 623 women who had recently given birth were randomly allocated to an intervention (n=311) or a control (n=312) group. The intervention consisted of up to 10 home visits in the first postnatal month of up to three hours duration in the woman’s home by a community postnatal support worker. Mood as measured by EPDS and general health as measured by SF-36 at 6 weeks and 6 months postpartum did not differ between the groups (Morrell et al. 2000).

However, some successful postnatal interventions have also been described. In a very large RCT in the UK 1087 women received midwife led postnatal care that was flexible and responsive to individual women’s expressed needs and extended to 3
months postpartum, and 977 women received routine postnatal community care. In this study women in the intervention group had a significantly lower risk of recording a score of >12 on the EPDS at 4 months than the controls (OR 0.57, CI 0.43-0.76) (MacArthur et al. 2002). A postnatal intervention targeted to those who may be at increased risk of PND has also reported positive results. Armstrong et al. (1999) found that an intensive nurse led home visiting program supported by a social worker and a pediatrician was superior to standard community child health services in reducing the incidence of PND in Australian women with self-reported vulnerability factors to PND.

Some interventions have been shown to improve infant behaviour and maternal mood. Several reports have confirmed that admission to a residential mother-baby unit where rest, support, and education about infant sleep patterns and settling techniques are provided dramatically improves infant sleep pattern and behaviour and maternal mood (Armstrong et al. 1998; Armstrong et al. 2000; McMahon et al. 2001; Hiscock and Wake 2002; Fisher et al. 2004). Parental education about infant sleep behaviour and settling techniques have also had demonstrated positive effects on infant settling and night-time waking problems (Kerr et al. 1996). Thome and Adler (1999) in a randomised controlled trial of distressed mothers with a behaviourally difficult infant of 2 to 3 months of age showed that a telephone intervention where mothers were contacted up to five times by a specialised nurse who provided support and advice significantly reduced maternal fatigue and its side-effects.

2.4.2.4 Postnatal anxiety

Anxiety is common in the early puerperium and sometimes co-exists with depression. Postnatal anxiety disorders have been largely overlooked in the literature and the true rate of postnatal mood disorders may therefore be higher than is commonly thought as the quoted rates include only a diagnosis of depression. Matthey et al. (2003) demonstrated that when DSM-IV criteria for depression and anxiety disorders were included as part of the clinical assessment of the psychological functioning of new mothers the rates of caseness increased by between 57% and 100%. In another study a community-based sample of 68 women were assessed for general anxiety disorder eight weeks after birth. Although only 4% met diagnostic criteria for generalised anxiety disorder, an additional 28% reported experiencing uncontrollable worry at a subclinical
level in the first eight weeks after childbirth (Wenzel et al. 2003). For some women anxiety may be caused by a lack of confidence in the ability to keep the newborn alive resulting in a reluctance to be alone with the baby or an intense fear of sudden infant death syndrome (Brockington 1996, p 157).

2.4.3 Mother-infant attachment

According to Bowlby’s (1988) theory of attachment, in order to develop secure attachment an infant needs a caregiver who is consistently available, both physically and emotionally and is responsive to his or her needs. Mertin (1986) suggests that a mother’s attachment to her newborn baby is determined by a range of antenatal and postnatal factors, including the intensity of the antenatal attachment to the fetus, the birth experience, the degree of congruence between the imagined and real baby, the father’s attitude and the support he provides. Standardised self-report measures, observational methods or both are used in research to assess the quality and intensity of mother-infant attachment.

Some evidence suggests that stronger maternal-fetal antenatal attachment is predictive of a more positive experience of motherhood and more intense mother-infant attachment. Fowles (1996) assessed 136 primiparous women at 24 to 40 weeks of pregnancy and 9 to 14 weeks after the birth and found that antenatal maternal-fetal attachment was associated with a positive perception of the role as a mother. In a study by Condon and Dunn (1988) 115 women and 110 fathers completed questionnaires about their recalled attitudes towards the unborn child, their experience of the delivery, and their first impression of their baby within five days of the baby’s birth. A significant correlation between positive and affectionate antenatal feelings for the baby and positive feelings towards the newborn was detected. However, as antenatal feelings were assessed retrospectively it is possible that recall may have biased these results. In a prospective longitudinal study 100 pregnant women completed the Prenatal Attachment Inventory (PAI, Müller 1993). Their interaction with the infant was subsequently observed and videotaped 12 weeks postpartum and a positive association between antenatal attachment and early mother-infant relationship was confirmed (Siddiqui and Hagglöf 2000). Müller (1996) however, in her study of 196 women who completed standardised measures of attachment before and after birth found that antenatal attachment scores only explained 17% of the variance in postnatal attachment scores.
She therefore concluded that other factors also influence the development of postnatal attachment.

This was supported by data from a study by Condon and Corkindale (1998) who investigated parent-infant attachment in a cohort of 200 mothers and fathers soon after birth and four and eight months later. In this study anger, depression and an infant perceived as difficult were predictors of low attachment scores as measured by the Maternal Postnatal Attachment Scale (MPAS) developed by the authors. The impact of infant factors on attachment was also demonstrated in a study where 210 mothers completed the Early Infant Temperament Questionnaire (EITQ, Medoff-Cooper et al. 1993) and the MPAS (Condon and Corkindale 1998) 2 to 4 months postpartum. Mothers of infants classified as ‘easy’ to manage had significantly higher scores on the MPAS, indicating stronger attachment, than those with infants categorised as ‘difficult’ (Scopesi et al. 2004).

Separation from the newborn and the prospect of losing the baby may influence a woman’s developing attachment to her baby. In a study of women’s thoughts and behaviours in relation to their newborn, 91 women were interviewed in the neonatal period. Approximately one third of these women delivered at term and remained physically close to the baby, one third delivered healthy babies prematurely and were separated from them and one third delivered very low birth weight babies that were possibly not going to survive and from whom they were separated for a prolonged period of time. Mother-infant attachment was assessed through interviews with the Yale Inventory of Parental Thoughts and Actions (YIPTA, Leckman et al. 1994) which is a validated instrument assessing dimensions of parental attachment. Women who were not separated from their babies had medium to high levels of preoccupation with thoughts of the infant’s safety and well being. Greater preoccupation was observed among those who delivered healthy babies prematurely and lower preoccupation among those who faced a potential loss of the baby. Attachment behaviour was highest in women who were not separated from the baby and decreased linearly with increasing time of separation from the baby (Feldman et al. 1999). This suggests that physical contact and proximity to the baby promotes the development of early maternal-infant attachment. In another study, 121 pregnant women who were hospitalised due to obstetric risk and 182 women with low obstetric risk who attended a general obstetric
clinic completed questionnaires in late pregnancy and one week and eight months postpartum. Soon after birth the high-risk women scored significantly higher on a measure of attachment than the low-risk women but the difference at eight months was not significant. It was assumed that the extensive surveillance and hospitalisation that the high-risk women had undergone during pregnancy may have led them initially to place a higher value on the infant whom they had feared they might lose. In this study a major predictor of maternal attachment for both groups at both time points was self-assessed maternal competence, which was predicted by self-esteem (Mercer and Ferketich 1990).

2.4.4 Changes in the relationship with the partner

There is consistent evidence that the birth of a baby places strain on the relationship between partners and that women and men commonly experience a postpartum decline in marital satisfaction. Women may be overwhelmed by the increased workload and disappointed if this workload is not shared by the partner (Ohye et al. 2003) and men may feel excluded when the new mother focuses all her attention on the baby (Boyce 1994). In an Australian longitudinal study of 107 women and 103 men, spouse dissatisfaction was assessed in pregnancy and three months postpartum. Spouse dissatisfaction scores were higher for both women and men after the birth than in pregnancy. Overall women reported more dissatisfaction with their spouse than men, and primiparous women reported a greater increase in dissatisfaction than multiparous women (Wilkinson 1995). Cox et al. (1999) tested the hypotheses that individual depression, and whether the pregnancy was planned or not would predict marital satisfaction in couples having their first child. They recruited 136 couples in pregnancy and followed them until two years after the birth. Marital satisfaction levels were highest antenatally and declined over time with the lowest levels noted at the end of the child’s first year. Women and men did not differ significantly in their reported marital satisfaction. Couples with a planned pregnancy were more satisfied with their relationship than those with an unplanned pregnancy, and depressive symptoms were associated with lower marital satisfaction (Cox et al. 1999).
2.4.5 Breastfeeding

Breastfeeding as the preferred method of infant feeding is advocated internationally. Factors positively associated with initiation and duration of breastfeeding include maternal age over 25 years, higher educational level, being partnered and having higher socio-economic status (Scott and Binns 1998). A positive attitude to breastfeeding and support from the social network also increase the likelihood of successful breastfeeding (Tarkka et al. 1999). Although initiation of breastfeeding is delayed for women who have a caesarean section birth this has not been found to affect duration of breastfeeding (Kearney et al. 1990; Rowe-Murray and Fisher 2002).

Existing evidence suggests that provision of breastfeeding support from health care professionals in the postpartum such as lactation consultants, community midwives, other health workers and doctors have beneficial effects on duration of breastfeeding (Sikorski et al. 2003). However, in a randomised controlled trial of two antenatal interventions to increase initiation and duration of breastfeeding, neither was more successful than standard antenatal care (Forster et al. 2004). In this study 981 nulliparous women were assigned to one of three groups; a 1.5 hour class on practical aspects of breastfeeding, two one-hour classes exploring family and community attitudes towards and experiences of breastfeeding or standard antenatal care. As the rate of initiation of breastfeeding was very high even without intervention (96%) the authors concluded that this left little room for improvement resulting from the trialled interventions.

2.4.6 Maternal postpartum physical health

In pregnancy, particularly in the third trimester, women experience a range of physical symptoms of which the most common are frequent micturition, fatigue, pelvic pressure, insomnia and lower back ache (Zib et al. 1999). Although there is a marked decline in these symptoms after the birth, a number of other health problems resulting from the birth are common and in some cases persistent.

In a population based survey of 1336 women who had given birth 6 to 7 months earlier, 94% reported at least one health problem with the most common problems being tiredness, backache, sexual problems, hemorrhoids and perineal pain (Brown 1998).
This study also demonstrated a positive association between physical health problems and depression. Significantly increased odds of depression were found if women reported tiredness, urinary incontinence, back pain, sexual problems, minor illnesses and bowel problems (Brown and Lumley 2000).

Thompson et al. (2002) in a prospective longitudinal study, surveyed 1193 women four days and 8, 16 and 24 weeks after the birth. In this study some spontaneous resolution over time was noted for bowel problems, urinary incontinence and perineal pain whereas exhaustion and backache were still common after six months. Perineal pain was more common among first time mothers than women who had given birth before and women were more likely to report perineal pain and sexual problems after instrumental than after spontaneous vaginal birth after adjusting for parity, perineal trauma, and length of labour. Worse exhaustion, more sleep disturbance and bowel problems and a greater likelihood of being readmitted to hospital were reported after caesarean delivery than after unassisted vaginal birth (Thompson et al. 2002).

2.4.7 The experience of motherhood

A woman’s experience of motherhood is influenced by a range of factors such as the state of her own physical and emotional health, the quality of the relationship with her partner, the infant’s health, temperament and behaviour, the amount and quality of emotional and practical support available to her, her financial situation and concurrent adverse life events.

Green and Kafetsios (1997) investigated the correlates of a positive experience of motherhood as measured by scores on the “positive experiences of motherhood” scale (POSMO) created by the authors. The POSMO gauges mothers’ enjoyment of looking after the baby, feelings of pride about motherhood and perception of themselves as good mothers. It also asks mothers to rate life difficulties since the birth, feelings of disappointment with motherhood and whether they feel they have enough time to themselves. In this prospective study 1285 women completed questionnaires in pregnancy and 6 weeks after giving birth. The two most important explanatory variables for the variance in PSMO were expectations of motherhood assessed at 35 weeks gestation and concurrent mood as measured by the EPDS score. Anxiety, perceptions of
the baby, and tiredness also made significant independent contributions to the variance in the POSM score. More positive expectation in pregnancy about the experience of motherhood, lower EPDS score, less anxiety, a more settled baby and less reported tiredness at six weeks all contributed to a more positive experience of motherhood.

Many women feel unprepared for even the most basic task of motherhood, which is to keep the newborn alive. Most new mothers are concerned about the health and well-being of the infant and worry about the baby stopping breathing, about her ability to produce enough milk and to protect the baby from dangers (Stern and Bruschweiler-Stern 1998, pp 93-102). The responsibility for the baby’s survival, growth and development can be daunting and anxiety-provoking and women may feel inadequate and incompetent as they are unable to live up to their own expectations of being a “good mother”. In their study of 90 women whose infants were aged around two, Brown et al. (1997) found that although most accepted that it was impossible to always be like their ideal of a “good mother” they felt compelled to try. Sometimes women compare themselves to what they perceive as the ideal mother and as a result, they may feel a sense of failure if their lived experience does not match this ideal (Ussher 1989, p 83).

Sleep deprivation due to frequent nighttime waking leaves many new mothers mentally and physically exhausted. Furthermore, the expected rewards of parenting and the anticipated attachment to the baby may not be apparent immediately and expectations about help and support with baby care and domestic work may be unfulfilled (Barclay and Lloyd 1996). In a study investigating the early motherhood experiences of 79 first-time mothers, most reported feeling unprepared for the constant demands of infant care, the extensive fatigue that they experienced, and the loss of personal time and space (McVeigh 1997).

A single study was identified that in part addressed women’s experience of early mothering after infertility and infertility treatment. Carolan (2005), in a qualitative study, investigated the mothering experience of first-time mothers aged over 35 years. In this study 22 women, of whom 10 had undergone fertility treatment prior to conception, were interviewed in late pregnancy and two weeks and eight months postpartum. Despite meticulous antenatal preparation, which included extensive reading, the women reported overwhelming feelings of helplessness, inadequacy, uncertainty, fatigue, and shock and unpreparedness about the requirements of parenting.
in the newborn period. Not until the babies were six to eight months did they begin to feel more confident in their role as mother and by then most described mothering as a very positive experience. All women in this study were aged over 35 years, almost half had undergone fertility treatment and some of the remainder reported unanticipated delays in conception. Therefore, in terms of their age and the proportion that had experienced extensive difficulties conceiving, this sample approximates women who become mothers after assisted conception.

Motherhood entails both gains and losses. Brown et al. (1994, pp 161-172) interviewed 90 women about their experience of motherhood and these interviews clearly demonstrated the mixed feelings evoked by motherhood. Although 75% rated the overall experience of motherhood as very positive or mostly positive, more than half felt that they had no time to pursue their own interests and did not have an active social life, did not enjoy mealtimes, needed a break from the child, and felt less confident about parenting since becoming a mother.

2.4.8 Mothering twins

For mothers of twins, the extraordinary and relentless demands of caring for two infants may be overwhelming and challenge the resources of individuals. Prematurity and low or very low birth weight is almost universal among twins. The babies often need to spend time in a neonatal intensive or special care nursery and the mother may be separated from them for prolonged periods, which can compromise maternal-infant emotional attachment (Bryan and Denton 2001). Once the babies are brought home the demands of caring for more than one newborn can be extremely demanding and it is estimated that up to 25% of mothers of twins experience significant anxiety and depressive symptoms (Leonard 1997). Also, it is not uncommon for one or more of the children to have developmental or physical problems due to prematurity and the physical, emotional and financial strain of caring for a child with special needs, in addition to caring for one or more healthy children, is immense (Denton and Bryan 2002). For those who do not enjoy considerable emotional and practical support from the partner and others, the work involved in caring for two babies can be extremely arduous. In addition, mothers of twins often experience social isolation due to the practical difficulties involved in leaving the home to participate in social activities (Fisher and Stocky 2003).
2.4.9 Postnatal adjustment after assisted conception

The negative effect of infertility and infertility treatment on self-confidence and self-esteem are well documented (Andrews et al. 1991; Abbey et al. 1992; Downey and McKinney 1992; Anderson et al. 2003). The impact of this erosion in self-confidence on maternal role attainment and the experience of early mothering in women who conceive with ART is poorly understood. Citing clinical experience, Brockington (1996, p 161) noted more anxiety about the baby thriving in women who had had difficulty conceiving than in those who had conceived without difficulty. Dunnington and Glazer (1991), in a qualitative study comparing mothering behaviour in six previously infertile women and five women who had never experienced infertility problems, found that the previously infertile women had less self-confidence than the fertile group. Others propose that the losses associated with infertility may render women more vulnerable to depression following birth (Olshansky 2003).

In a large prospective study, 185 infertile and 90 presumed fertile couples were interviewed at recruitment and two years later. After two years, 42% of the infertile couples and 36% of the presumed fertile couples had become parents. The group of infertile women who became mothers reported less stress, greater global life quality, increased personal control and less negative affect after becoming a parent than the presumed fertile group (Abbey et al. 1994). This study thus does not lend support to the theory that previously infertile women experience more adjustment problems after childbirth. However, the validity of these findings may be questioned on the basis that non-standardised measures were used. In addition the authors did not provide information about the duration of infertility or whether couples used ART or other infertility treatment. It should also be noted that the members of the infertile group were significantly older and had been married for longer than the presumed fertile group.

Most empirical studies on the impact of ART on mothering have focused on the mother’s mood and whether her ability to care for the child may be affected by the experience of infertility and treatment. However, to date there is little account of whether infertility and treatment, social, interpersonal, and infant-related factors influence the experience of mothering after ART. Studies of women’s postnatal adjustment after ART and their main findings are summarised in Table 2.4.9.1.
### Table 2.4.9.1 Maternal postnatal adjustment after assisted conception

<table>
<thead>
<tr>
<th>Authors and country of study</th>
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<th>Type of study and time of assessment</th>
<th>Method</th>
<th>Main findings</th>
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<td>33 women who had conceived with ART (ART group) and two matched control groups; 33 who had conceived spontaneously after infertility (Inf group) and 33 who had conceived spontaneously without any difficulties (SC group)</td>
<td>Longitudinal qualitative study</td>
<td>In depth interviews</td>
<td>No differences between the groups in the proportions experiencing postnatal adjustment problems. More sleep disturbance and maternal depressive symptoms at 9 months among previously infertile women than SC group (not statistically significant) but these differences were not detectable at 18 months</td>
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<td>Excluded women with multiple birth</td>
<td>Assessment at birth and 9 and 18 months postpartum ART, Inf and SC groups compared</td>
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<td></td>
<td>Recruited from a maternity hospital</td>
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<td>Response rate not stated</td>
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<tr>
<td>Weaver et al. (1993)</td>
<td>20 couples with an ART conceived child (ART group) matched with 20 couples with a spontaneously conceived child (SC group)</td>
<td>Cross-sectional study</td>
<td>Interviews and standardised measures of emotional health, marital adjustment. Non-standardised measures of quality of life, parental feelings, and mother-child relationship</td>
<td>ART group within normal ranges on measures of emotional health and marital adjustment. ART group recorded more positive ratings for their feelings about their baby and for one aspect of quality of life (feelings of freedom) than SC group. ART group reported being more overprotective towards the child than SC group</td>
</tr>
<tr>
<td>UK</td>
<td>ART group recruited from hospital ART centre, controls were volunteers</td>
<td>Assessment 15-27 months after birth ART compared with normative values on standardised measures and with SC groups on non-standardised measures</td>
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<td></td>
<td>95% response rate for ART group</td>
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<td>Study</td>
<td>Location</td>
<td>Participants</td>
<td>Exclusion Criteria</td>
<td>Recruitment</td>
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<tr>
<td>McMahon et al. (1997)</td>
<td>Australia</td>
<td>70 couples who had conceived with ART</td>
<td>Excluded multiparous women and women with multiple birth and those who had used</td>
<td>Recruited in pregnancy from a hospital ART clinic (ART group) and private obstetrician (SC group)</td>
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<tr>
<td>Gibson et al. (2000)</td>
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<td>(ART group) and 63 matched controls who</td>
<td>donor gametes</td>
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<td>had conceived spontaneously (SC group)</td>
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<tr>
<td>Greenfeld and Klock (2001)</td>
<td>USA</td>
<td>74 pregnant women who had conceived with</td>
<td>Excluded multiparous women</td>
<td>Recruited in pregnancy from three ART clinics and two private obstetric practices</td>
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<td>ART (ART group) and 40 who had</td>
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<td>conceived spontaneously (SC group)</td>
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53/74 (72%) of the ART and 28/40 (70%) of SC groups retained in the study.
<table>
<thead>
<tr>
<th>Study and Authors</th>
<th>Participants</th>
<th>Study Design</th>
<th>Methods</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydsjö et al., Sweden (2000)</td>
<td>108 couples who had conceived with ART (ART group) and 108 couples who had conceived spontaneously (SC group)</td>
<td>Longitudinal study</td>
<td>Semi-structured interview and questionnaires including standardised measures of marital adjustment and toddler behaviour</td>
<td>ART group more stable relationship from pregnancy until one year postpartum compared with SC group who reported greater decline in marital satisfaction</td>
</tr>
<tr>
<td>Hjelmstedt et al. (2004) Sweden</td>
<td>55 woman and 53 of their partners who had conceived with ART (ART group) and a control group of 40 pregnant women and 36 of their partners who had conceived spontaneously (SC group)</td>
<td>Cross-sectional data from a longitudinal study</td>
<td>Interview including questions about parenting difficulties and standardised measures of perceived parenthood stress and satisfaction with relationship with partner</td>
<td>Levels of parental stress and satisfaction with partner similar for ART and SC groups</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Recruitment</td>
<td>Eligibility</td>
<td>Enrollment</td>
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<tr>
<td>Cox et al. (2006) UK</td>
<td>Longitudinal study</td>
<td>Participants recruited from hospital ART and antenatal clinics</td>
<td>Excluded multiparous women</td>
<td>70 women who had conceived with ART (ART group) and 111 who had conceived spontaneously (SC group)</td>
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These studies vary in their methodology, timing of the study in relation to the birth and in the measures used. Small sample sizes (Raoul-Duval et al. 1993; Weaver et al. 1993), low response rate (Cox et al. 2006), the exclusion of multiparous women (McMahon et al. 1997; Greenfeld and Klock 2001; Sydsjö et al. 2002; Hjelmstedt et al. 2004; Cox et al. 2006), women with multiple birth (Raoul-Duval et al. 1993; McMahon et al. 1997; Hjelmstedt et al. 2004) or women aged over 36 (Hjelmstedt et al. 2004), and differences in socio-demographic characteristics between study populations and control groups (McMahon et al. 1997; Sydsjö et al. 2002; Cox et al. 2006) preclude generalisation of findings to all women who give birth after ART.

In broad terms however, the findings from these studies suggest that levels of parenting stress, anxiety and depressive symptoms, and degree of satisfaction with the marital relationship are similar among women who give birth after ART as among the general population of parturient women.

Findings about mothers’ perception of their baby vary. Compared with women who had conceived spontaneously, Weaver et al. (1993) found that women who had conceived with ART rated their feelings about their baby more positively and were more overprotective of the baby. In the study by Sydsjö et al. (2002) women who had conceived with ART rated their children as more regular, sensitive and manageable than those who had conceived spontaneously. However, McMahon et al. (1997) found that at four months, ART conceived babies were rated as more temperamentally difficult by their mothers than spontaneously conceived controls and when these children were 12 months old they were perceived by their mothers as more vulnerable (Gibson et al. 2000).

Only three studies measured self-esteem or self-efficacy after birth and the findings were contradictory. McMahon et al. (1997) detected lower self-esteem and self-confidence about caring for the baby among women who had conceived with ART than controls four months after the birth, and noted that the difference was mostly explained by the lower scores among women who had undergone more than one ART treatment cycle. This suggests that repeated ART failure in combination with the experience of infertility may reduce women’s self-esteem and confidence. When the children were 12
months old mothers in this study who had conceived with ART still reported lower levels of self-esteem than the control group (Gibson et al. 2000). Greenfeld and Klock (2001) on the other hand found no differences in self-esteem or parenting stress between women who had given birth after ART and controls who had conceived spontaneously. This is perplexing, considering that almost 30% of the study population had given birth to twins or triplets (compared with 4% in the control group) and that multiple birth has been shown to increase parenting stress in other ART populations (Munro et al. 1992; Cook et al. 1998; Oliviennes et al. 2005). In this study 97 women who were pregnant as a result of ART were invited to participate. Of these 74 (76%) agreed and of those who took part 53 remained in the study at the last assessment nine months after the birth. Thus, 55% of the women who were eligible to participate took part and remained in the study throughout the study period and it is possible that they represented a group that coped particularly well with the transition to motherhood. The length of infertility and extent of treatment that the ART group had undergone was not reported and it is therefore not possible to evaluate if these factors affected postnatal adjustment. Cox et al. (2006) measured parenting self-efficacy and found no difference between women who had conceived with ART and the control group who had conceived spontaneously. However, only 17% of the eligible ART mothers were retained in this study and they may not have been representative.

Studies focusing on parenting of older children have found that after ART mothers report being more protective (McWhinne 1995; Hahn 2001), have difficulty with the initial separation from their child (Greenfeld et al. 1996), are more emotionally involved and experience less parenting stress (Golombk et al. 1996), and believe that they have greater appreciation of their children (Mechanick Braverman et al. 1998) than comparable groups. The cognitive, social and emotional development of children conceived with ART appear to be very similar to spontaneously conceived children (Cederblad et al. 1996; Oliviennes et al. 1997; Gibson et al. 1998; Montgomery et al. 1999; Colpin and Soenen 2002; Golombok 2002; Van Steirteghem et al. 2002).

Multiple birth after ART is common and the difficulties associated with a multiple birth therefore affect a significant proportion of women who give birth after ART. There are no existing studies of the early postnatal adjustment among women who have a multiple birth after ART. The few reports available to date concern the experiences of
families where the children are over the age of one. Studies of the parenting experiences of women who have twins or higher order multiple birth after ART are shown in Table 2.4.9.2.

<table>
<thead>
<tr>
<th>Authors and country of study</th>
<th>Sample</th>
<th>Type of study and time of assessment</th>
<th>Method</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munro et al. (1992) Australia</td>
<td>40 couples with ART conceived twins (ART group), 15 with twins conceived after infertility but without ART and 25 couples with spontaneously conceived twins Recruited from an ART clinic and from a twin study and support organisations</td>
<td>Follow-up study Assessment when the children were preschool age Groups compared</td>
<td>Interviews and standardised measure of social interaction</td>
<td>ART group reported more social isolation than non-ART groups</td>
</tr>
<tr>
<td>Garel and Blondel (1992) France</td>
<td>12 mothers of triplets, 11 of whom had conceived with ART Recruited from a maternity hospital</td>
<td>Follow-up study Assessment when the children were aged 1</td>
<td>Semi-structured interviews</td>
<td>Most mothers reported considerable fatigue, stress, social isolation, marital problems and difficulties in providing adequate attention to the three children at the same time</td>
</tr>
<tr>
<td>Garel et al. (1997) France</td>
<td>11 mothers of triplets, 10 of whom had conceived with ART Recruited from a maternity hospital</td>
<td>Follow-up study Assessment when the children were aged 4</td>
<td>Interviews and standardised measure of depression</td>
<td>All mothers reported emotional distress due to fatigue, stress, and difficulties in coping with the behaviour of the children 4/11 mothers scored in the clinical range for depression and used psychotropic medication</td>
</tr>
<tr>
<td>Cook et al. (1998) UK</td>
<td>12 families with ART conceived twins (ART group) and 14 with spontaneously conceived twins (SC group) Recruited from ART centres and Multiple Birth Association Response rate not reported</td>
<td>Cross-sectional study Assessment when the children were aged 4-8 ART and SC group compared</td>
<td>Interview and questionnaires with self-report measures of quality of parenting, parenting stress and child behaviour</td>
<td>No differences between groups on parenting quality or child behaviour but ART group reported greater stress associated with parenting than SC group</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Sample Description</td>
<td>Study Design</td>
<td>Assessment Age</td>
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<tr>
<td>Colpin et al. (1999)</td>
<td>Belgium</td>
<td>24 families with ART conceived twins (ART group), 25 with twins conceived with hormonal treatment (Inf group) and 54 families with spontaneously conceived twins (SC group)</td>
<td>Cross-sectional study</td>
<td>1 Groups compared</td>
</tr>
<tr>
<td>Tully et al. (2003)</td>
<td>UK</td>
<td>121 families with ART conceived twins (ART group) and 121 matched control families with spontaneously conceived twins (SC group)</td>
<td>Cross-sectional data from a longitudinal study</td>
<td>5 Groups compared</td>
</tr>
<tr>
<td>Ellison et al. (2005)</td>
<td>USA</td>
<td>Mothers of ART conceived singletons (n=128), twins (n=111) and triplets (n=10)</td>
<td>Cross-sectional study</td>
<td>1-4 Mothers of singletons, twins and triplets compared</td>
</tr>
<tr>
<td>Oliviennes et al. (2005)</td>
<td>France</td>
<td>Consecutive cohort of 344 families with ART conceived twins (Twin group) and matched comparison group of 344 families with ART conceived singletons (Controls)</td>
<td>Cross-sectional cohort study</td>
<td>2-5 Twin and Control groups compared</td>
</tr>
</tbody>
</table>

These studies indicate that overall women who have a multiple birth after ART experience significantly more parenting stress and depressive symptoms, and find the interaction with the children less pleasurable than mothers of singletons (Ellison et al. 2005; Oliviennes et al. 2005). Also, compared with mothers of twins who conceive
spontaneously, most studies report that those who conceive with ART appear to experience more social isolation, parenting stress, and lower parental competence and psychosocial well-being (Munro et al. 1992; Cook et al. 1998; Colpin et al. 1999).

In summary, research into the experiences of pregnancy, birth and transition to motherhood after ART is sparse and the findings are inconclusive. Some studies are retrospective or cross sectional and are therefore not able to demonstrate changes in psychological well being that may occur over time. The almost universal exclusion of multiparous women and women with multiple birth, small sample sizes and low response and retention rates are other methodological limitations apparent in some studies. In addition, the main focus of the research to date has been on how any psychological vulnerability after infertility and ART may impact on women’s ability to mother and relate to the child whereas women’s experience of the transition to motherhood after ART is under-investigated.

Overall, understanding of how women who become mothers after ART experience the pregnancy and the birth and how they feel about caring for a new baby or babies, their perception of the temperament, health and development of the baby, their postnatal mood, physical health and social circumstances is limited. Furthermore, studies of previously infertile women’s pregnancy and postpartum psychological well-being have not accounted for the degree of difficulty involved in conceiving. The possibility that a legacy of the psychological distress associated with prolonged infertility, previous pregnancy loss and multiple ART attempts may impact on how women experience birth and mothering has not been explored. However, the findings that women who had experienced ART failure were more anxious during pregnancy and reported lower self-esteem and confidence in their ability to care for their baby four months after the birth than those who conceived after their first ART attempt (McMahon et al. 1997) suggest that greater difficulty in conceiving may negatively affect pregnancy and postpartum emotional well-being.

Also, it is unknown whether postnatal adjustment after ART is influenced by mode of delivery, first or later order birth, or multiple birth. Furthermore, the potential mediating effect of partner and other social support, socioeconomic circumstances, age, infant temperament and behaviour, and personality style have not been explored.
CHAPTER 3

3 THE CONTEXT OF CHILDBEARING IN AUSTRALIA ................................................. 125

3.1 The Australian health system ................................................................. 125

3.2 Trends in childbearing in Australia ......................................................... 126

3.2.1 Delayed childbearing ..................................................................... 127

3.2.2 Assisted Reproductive Technology ............................................. 129

3.2.2.1 Rate of use of assisted reproductive technology ...... 129

3.2.2.2 Cost of assisted reproductive technology .................. 130

3.2.2.3 Regulation of assisted reproductive technology ...... 130

3.2.2.4 Assisted reproductive technology providers and users ........................................................................... 131

3.2.2.5 Outcomes of assisted reproductive technology ...... 133

3.3 Maternity care............................................................................................. 133

3.3.1 Systems of maternity care in Australia................................. 133

3.3.2 Antenatal care............................................................................... 134

3.3.3 Obstetric care............................................................................... 135

3.3.3.1 Modes of delivery...................................................... 135

3.3.3.2 Pain relief during childbirth........................................ 136

3.3.3.3 Length of postnatal hospital stay............................... 137

3.3.3.4 Rates of breastfeeding.............................................. 137

3.3.4 Maternal and Child Health Services in Victoria.................. 137

3.3.4.1 Specialised postnatal services................................. 138

3.4 Needs of mothers after assisted conception................................................ 142
3 THE CONTEXT OF CHILDBEARING IN AUSTRALIA

This study was conducted in Victoria, the second most populated state in Australia. According to the most recent Census which was conducted in 2001, almost 19 million people live in Australia and of these, almost 4.5 million reside in Victoria (ABS 2002). The majority of Victorians (3.5 million) live in Melbourne, the capital of Victoria (ABS 2003).

There are many similarities but also important differences between Australia and other industrialised countries in fertility rates, availability and utilisation of assisted reproductive technology (ART), and antenatal, obstetric and postnatal care. The societal trends of increasing age among women giving birth, increasing proportions conceiving with ART and increasing rates of operative births are similar in most developed countries. However, as ART is more affordable for the individual in Australia than in most other countries the utilisation rate of these technologies is comparatively high in Australia. Furthermore, unique to Australia is the range of services available for families with young children who experience early parenting difficulties. In order to provide the context for the study, relevant Australian data pertaining to health care, fertility, assisted conception, and maternity care are described in this chapter.

3.1 THE AUSTRALIAN HEALTH SYSTEM

Australia has a two-tiered health system. The national universal taxpayer-funded Medicare and Pharmaceutical Benefit Schemes cover all Australians. Medicare allows access to out-of hospital medical care and treatment in public hospitals at no or minimal cost to the individual and the Pharmaceutical Benefit Scheme reduces the personal cost of most prescribed medications. In addition to Medicare, private health insurance schemes operate. For most out-of-hospital services such as consultations with doctors, including specialists, the conditions are the same for privately insured and non-insured patients; Medicare provides benefits, which cover 50 to 100 percent of the recommended fees which are based on the “Schedule of fees” set by the Australian Government. Many health care providers charge more than the recommended fees
and the out-of-pocket cost to patients therefore varies depending on how much more the
doctor or service provider charges.

For in-hospital treatments private health insurance allows a number of benefits. Compared with patients who are uninsured, insured patients have shorter wait for elective procedures and have access to more comfortable hospital accommodation. Also, while uninsured patients receive treatment by doctors and specialists nominated by the hospital, private health insurance allows patients to be treated by the doctor of their choice. Insured patients are treated in private wards within public, government-funded hospitals or in privately owned hospitals and the insurer covers most of the cost of the stay. Most uninsured patients are treated in public wards in public hospitals at no personal charge. However, those who are not insured can elect to be admitted as a private patient but are then charged the full cost of hospital accommodation, operating theatre fees, anaesthetist fees etceteras.

Private health insurance is an indicator of social advantage. Among people earning less than AUS $20,000 per year 20% had private health insurance in 1999 compared with 76% of people earning AUS $100,000 or more (ABS 1999).

3.2 TRENDS IN CHILDBEARING IN AUSTRALIA

The ability to conceive and have children is often taken for granted and universally most women give birth at least once in their lifetime. Although some couples choose not to have children, the majority pursue parenthood or wish to pursue parenthood in the future by having biological children (Thomson 1997; Weston et al. 2004; Lampic et al. 2006). Also, of those who have children or wish to have children most want to have more than one. Participants in an Australian population based survey were asked to indicate the number of children they would ideally like to have. Although overall the most popular family size was a two-child family, a preference for three or more children was expressed by over 40% of women from all age groups (Weston et al. 2004).
3.2.1 Delayed childbearing

Over the last twenty years there has been a trend in Australia and other developed countries for women to have children later in life and to have fewer children (Carolan 2003).

The median age of marriage for Australian women rose from 24 years in 1982 to 29 years in 2002 (ABS 2003) and the average age of women giving birth increased from 27.9 years in 1991 to 29.5 years in 2003 (Laws and Sullivan 2005). The average age of mothers having their first baby rose from 25.8 years to 27.6 years in the same time period and the proportion of women aged 35 and over giving birth increased from 12.7% in 1994 to 18.8% in 2003 (Laws and Sullivan 2005). Almost 12% of first-time Australian mothers were aged 35 years or over in 2003 (Laws and Sullivan 2005). In Victoria, the average age of women giving birth in 2002 was 30.2 years, and the proportion aged 35 years or over reached 20.5%, almost doubling in the last ten years. The average age of Victorian women having their first baby rose from 25.6 years in 1986 to 28.6 years in 2002 (Riley and King 2003).

Total fertility rate is defined as the notional total number of children an average woman would have by the end of her reproductive life if she experienced the currently prevailing age-specific fertility rates throughout her childbearing life. Partly as a result of the tendency to postpone childbearing, the fertility rate in Australia declined from 3.55 in 1961 to 1.75 in 2002. In Victoria in 2002 there were 63,069 births which represents a crude birth rate of 58.6 per 1,000 estimated female resident population aged 15 to 44 years. In that year, approximately 42% of women who gave birth were first-time mothers (Riley and King 2003).

These changing fertility patterns may lead to involuntary childlessness or to couples having fewer children than they would have liked to have as women’s fertility progressively decreases with increasing age. By age 35, on average, women will take twice as long to conceive as at age 25 and after the age of 40 the chance of achieving a spontaneous viable pregnancy is negligible (Gosden and Rutherford 1995). As with spontaneous conception, the chance of a live birth resulting from ART decreases with
increasing maternal age. In addition, the higher prevalence of chromosomal abnormalities in pregnancies conceived by older women leads to miscarriage in a large proportion of the pregnancies that are established and the incidence of ectopic pregnancy and stillbirth rises with increasing maternal age (Lansac 1995; Nybo Andersen et al. 2000). Risks of fetal loss, unexplained fetal death, stillbirth, obstetric complications, neonatal morbidity, and maternal death are all increased by maternal age over 35 (Astolfi et al. 1999; Jolly et al. 2000; Nybo Andersen et al. 2000; Fretts 2001; Tough et al. 2002; King et al. 2004).

A number of concerns relating to the consequences of postponing childbearing have been expressed. Nybo Andersen et al. (2000) warns that the current trend to postpone pregnancy increases the incidence of pregnancy loss and that this, apart from the emotional cost to the individual, is a cost to the health care system. Others believe that women should be warned of the maternal and fetal risks associated with delaying childbearing (Watersone et al. 2001). Chapman et al. (2006) citing clinical experience, argue that many couples are ill-informed about the impact of age on fertility and the chance of conceiving with ART. This is supported by findings in a recent survey of a random national sample of 1,608 people aged 20 to 39 years who were in committed relationships. Of these, 42% thought they would use ART if they experienced difficulties having a child. Among childless women, this proportion was 56%. Furthermore, this study found that over 62% of women perceived the likelihood of having children through ART as “very likely” or “likely” and the perceived likelihood did not vary by age (Qu and Weston 2005). This suggests that ART may be viewed as a “fallback option” and that beliefs about the chance of ART resulting in the birth of a child are inflated.

The trend to delay childbearing is thought to be due to a number of changes in society. These include transitions such as leaving the parental home and forming permanent relationships occurring at an older age than previously, increasing rate of marriage breakdown and high rate of separation among couples cohabiting, more women pursuing a career, women’s growing financial independence, and more reliable contraception (Weston and Parker 2002).
Public campaigns to improve awareness of the impact of increasing age on fertility have been advocated (American Society for Reproductive Medicine 2001; Chapman et al. 2006). However, since postponement of childbearing is in part a result of improved educational, occupational and financial opportunities for women, such campaigns are unlikely to significantly reduce the age of childbearing. Consequently, the use of ART to achieve pregnancy is likely to increase in industrialised countries.

3.2.2 Assisted Reproductive Technology

In Australia, couples who seek medical advice for their inability to conceive will commonly have some preliminary investigations and tests performed by their general practitioner before being referred to an infertility specialist for more complex tests and treatment if necessary (McLachlan et al. 2005). Depending on the underlying cause of infertility, couples are then advised about the available treatment options and in most cases this involves a form of ART (Persson 2005).

3.2.2.1 Rate of use of assisted reproductive technology

In Australia and other developed countries, the use of ART to conceive has increased dramatically in the 25 years since these technologies became available. The number of initiated treatment cycles (all treatments that include the in-vitro handling of human oocytes and sperm or embryos for the purpose of establishing a pregnancy) performed in Australia increased from approximately 16,000 in 1995 to approximately 33,000 in 2003 (Lancaster et al. 1997; Waters et al. 2006). In Australia in 2002 there were 8.0 treatment cycles per 1,000 women between the ages of 15 and 44 years (Bryant et al. 2004). Calculated as a rate per million inhabitants, which allows international comparisons, this represents a utilisation rate of approximately 1,600 cycles per million inhabitants (Chambers et al. 2006). This is similar to that reported in Israel and the Scandinavian countries, slightly higher than in most other European countries and considerably higher than utilisation rates in Canada and the USA (Collins 2002; Nyboe Andersen et al. 2005).
3.2.2.2 Cost of assisted reproductive technology

The utilisation rate of ART is largely dependent on the degree of government and private health insurance funding provided for these services. Most developed countries recognise infertility as a medical condition and provide a subsidy towards the cost of ART for those who choose to undergo treatment. The cost to the individual can vary from zero to 100% depending on the country’s policy in relation to funding of ART (Nachtigall 2006). In Australia ART is widely available and subsidised by government and private health insurance schemes with no stipulated limit on the number of subsidised cycles a couple can have. The average direct health care treatment cost of a treatment cycle in 2002 was approximately AUD $7,500. The universal Medicare and Pharmaceutical Benefit Schemes cover more than half of this cost and private health insurance schemes further reduce the out-of-pocket cost to the individual (Chambers et al. 2006). The vast majority of couples who seek ART are privately insured in order to reduce the cost of treatment. Depending on the clinic and the type of procedure performed, the out-of-pocket cost per treatment cycle for those covered by private health insurance is approximately AUD $2,500 to AUD $4,000.

The health care cost of a live-birth event following ART depends on the age of the woman. In Australia, excluding births resulting from gamete donation, the average cost per ART live birth in 2002 was approximately AUD $25,000 for women aged 30 years or younger while for those aged 40 years or more the cost was almost AUD $98,000 (Chambers et al. 2006).

There is broad support in the Australian community for provision of government subsidies for ART procedures. In a population based survey almost 80% approved of ART services being funded by Medicare (Kovacs et al. 2003)

3.2.2.3 Regulation of assisted reproductive technology

There is no Australia-wide government body or legislation regulating the provision of ART services. However, all ART clinics are required to comply with the Code of Practice for Reproductive Technology Units developed by the Reproductive Technology Accreditation Committee (RTAC) which performs triennial accreditation
visits to all ART clinics. The purpose of the code is to set minimum standards for clinics in Australia and New Zealand providing ART services and to encourage continuous improvement in the quality of care provided to couples who undergo treatment (Reproductive Technology Accreditation Committee 2006). The RTAC Code of Practice requires all ART clinics in Australia and New Zealand to provide detailed information to the Australian Institute of Health and Welfare’s National Perinatal Statistics Unit (AIHW NPSU) about the number and type of treatment cycles performed and the number of pregnancies and births resulting from treatment. Information about pregnancy complications, gestational length of pregnancies, modes of delivery and birth weight of babies is also reported by the infertility clinic. As pregnancy outcome information is obtained by the clinic from the patient or her treating obstetrician data are limited by the self-reported nature of the information (Waters et al. 2006). Treatment and pregnancy outcome data are compiled by the NPSU and published in an annual report.

In addition to RTAC, three Australian states have legislation which regulates ART, but in the other three states and two territories there is no legislation. In Victoria, ART is governed by the 1995 Infertility Treatment Act (Infertility Treatment Act Victoria 1995). The Infertility Treatment Authority (ITA), an independent statutory authority, was formed in 1996 to oversee the adherence to the Infertility Treatment Act. Licensing of Victorian ART programs, formal approval of ART practitioners, maintenance of registers related to donor gamete procedures, and monitoring and reporting of information about ART procedures through an annual report are the main functions of the ITA as stipulated by the Act (Infertility Treatment Authority 2004).

3.2.2.4 Assisted reproductive technology providers and users

In 2002 there were approximately 30 primary ART clinics around Australia, mostly located in major cities. Many of these clinics also operated satellite clinics in smaller towns in rural areas (Reproductive Technology Accreditation Committee 2004). In the same year, over 32,000 treatment cycles were performed and almost 6,000 children were born as a result, accounting for 2% of all Australian births that year (Bryant et al. 2004). Most ART clinical services are privately owned and operated but some large public teaching hospitals also provide infertility services, including ART. In Victoria in
2001, two large ART programs located in Melbourne and 11 small regional centres performed over 10,000 ART treatment cycles, comprising over one third of all ART cycles initiated in that year in Australia (n=28,797) (Infertility Treatment Authority 2002; Dean and Sullivan 2003).

Among couples who used ART in Australia and New Zealand in 2001, the proportions of causes of infertility were 27% female factor, 30% male factor, 24% multiple factors and 20% unexplained cause (Dean and Sullivan 2003). Male infertility is estimated to contribute to half of all infertility problems in couples generally and is an underlying cause of infertility for 40% of couples seeking ART (McLachlan and de Kretser 2001).

The annual report of ART procedures performed in Australia and New Zealand in 2002 contains some demographic information of couples using ART, the different types of procedures used, and the outcomes of these procedures (Bryant et al. 2004). Almost three-quarters of the women using ART were nulliparous but the rest had treatment to conceive a second or subsequent child (Dr E Sullivan, Director NPSU, Personal communication, March 3 2006). The average age of women undergoing treatment in 2002 was 35.2 years and the average age of women giving birth as a result of treatment was 34.4 years, 5.2 years older than the average age of all Australian mothers, which was 29.2 years in 2001 (Bryant et al. 2004). In that year 34% of women using ART were aged between 35 and 39 years and 20% were aged 40 or more. Since the chance of a woman conceiving, spontaneously or with ART, is markedly reduced after age 35 (Nugent and Balen 2001), this means that over 50% sought treatment at an age when the chance of a successful outcome is low.

As in other countries, the proportion of women having the gamete intra Fallopian transfer (GIFT) procedure was very low. While in 1993 GIFT represented 36% of treatment cycles, this has decreased over time and in 2002 was only 1%. In contrast, the use of intracytoplasmic sperm injection (ICSI) has increased more than eight-fold since 1993 and was a more common procedure than IVF in 2002. In that year, 31% of ART cycles involved the transfer of frozen embryos and almost 5% involved donated oocytes or embryos (Bryant et al. 2004).
3.2.2.5 Outcomes of assisted reproductive technology

Of all ART pregnancies 76% resulted in the birth of one or more live babies. The remainder ended in miscarriage (18%), ectopic pregnancy (2%), stillbirth or neonatal death (1%), or termination (1%) and in 2% the outcome was not stated (Bryant et al. 2004).

The average birth rate in 2002 was 18.3% per started stimulated treatment cycle where fresh embryos were transferred and ranged between clinics from 14.8% to 21.8%. The corresponding figure for cycles where frozen embryos were transferred was 13.7% (Bryant et al. 2004).

A trend towards the transfer of fewer embryos, in order to reduce the number of multiple births started in 1993. In 2002 one or two embryos were transferred in 94% of ART treatment cycles compared with in 45% in 1993. As a result, there were no quadruplet or higher order pregnancies in 2002 and the rate of triplets had decreased from 2% to 0.6%. However, the number of twin births has remained steady at about 20% of all ART births since 1993. In 2002 the multiple birth rate after ART was 18.9% compared with 1.6% for all Australian births (Bryant et al. 2004). This is considerably lower than the rate of multiple births reported in a world collaborative report on ART where data from 49 countries were pooled and analysed. In these countries the average twinning rate after ART was over 26% and the average rate of triplets was almost 3% (Adamson et al. 2006).

Compared with all Australian births in 2002, after ART caesarean section delivery was almost twice as common (48% versus 23%), births were more likely to be preterm, less than 37 weeks gestation (27% versus 8%), and the mean birth weight of the babies was lower, 2,985g versus 3,364g (Bryant et al. 2004).

3.3 Maternity care

3.3.1 Systems of maternity care in Australia

Most births in Australia occur in hospital under medical management. In 2000 only 672 planned home births (0.3% of all confinements) were notified to the National Perinatal Statistics Unit, a national government funded body that compiles and publishes information about all Australian births (AIHW NPSU 2003).
There are two broad systems of maternity care in Australia, private and public sector care. In private care, women attend a private obstetrician or general practitioner of their choice in pregnancy and are cared for by the same doctor during birth and postnatally. Antenatal care is provided in the doctor’s private consulting rooms and for the birth women are admitted to a private hospital or to a private ward in a public hospital. In public care, antenatal care is provided in a public hospital outpatient’s clinic by staff employed by the hospital and women attend the same hospital for the birth and postnatal care. Midwives usually care for women with uncomplicated pregnancies and births but when needed resident medical staff, under the supervision of consultant obstetricians, provide antenatal and obstetric care.

Most women who use private maternity care are privately insured. It is possible for uninsured women to use private care providing they are able to pay the substantial cost involved. Conversely, most women in public care are uninsured but women with private health insurance occasionally use it. The proportion of Australian women aged 35 to 44 who were covered by private health insurance in 1999 was approximately 40% (ABS 1999).

3.3.2 Antenatal care

There are no Australia-wide recommendations about the number and timing of routine antenatal visits. In evidence-based guidelines published by three large teaching hospitals in Victoria a baseline eight visit antenatal schedule with two visits in the first and second trimesters and four visits in the last trimester was suggested for uncomplicated pregnancies (Three Centres Consensus Guidelines on Antenatal Care Project 2001). Most Australian public hospital protocols recommend that women with uncomplicated pregnancies are seen monthly until 28 weeks gestation, then every two weeks until 36 weeks, and then every week until delivery (Hunt and Lumley 2002).

Screening tests routinely offered to pregnant women in Victoria include antenatal ultrasound and Maternal Serum Screen Test (MSST) performed in the second trimester to detect fetal abnormalities. If screening tests suggest the possibility of fetal chromosomal abnormality, diagnostic testing is offered. As the risk of fetal chromosomal abnormalities increases with increasing maternal age prenatal diagnostic
testing to detect chromosomal abnormalities is recommended as an option for women aged 37 and older. Prenatal diagnostic testing is also recommended for younger women with elevated risk of fetal chromosomal abnormalities. In 2001 8% of pregnant Victorian women underwent prenatal diagnostic testing. Of these 64% had amniocentesis and 36% chorion villi sampling (CVS). In the age group 37 to 39 years, 41% had prenatal diagnostic testing and among women aged 40 years and over 63% utilised these tests. The proportion of younger women (<37 years) having prenatal diagnostic testing was 3.6% (Webley and Halliday 2002).

3.3.3 Obstetric care

Of the 63,069 Victorian births in 2002, 37% occurred in private and 63% in public maternity care. Women aged 35 years and over were more likely than younger age groups to give birth in private care in 2002. Those aged 35 years and over represented 29% of all women who gave birth in the private system, but only 15% of those in public care (Riley and King 2003).

Perinatal factors that may be associated with maternal postnatal emotional adjustment include mode of delivery, pain relief during childbirth, length of postnatal hospital stay, and breastfeeding. Australian and Victorian information pertaining to these factors were used as comparisons in this study.

3.3.3.1 Modes of delivery

In recent decades an upward trend in the rate of caesarean section deliveries has been observed in Australia and elsewhere (AIHW NPSU 2003). In 1991 approximately 18% of Australian parturient women experienced a caesarean birth and this rose to 23.3% in 2000. A further 11.2% experienced an instrumentally assisted (using vacuum extraction or forceps) vaginal delivery (AIHW NPSU 2003). In Victoria in 2001 to 2002, 12.8% of women had an instrumentally assisted vaginal birth and 27% a caesarean section birth. Of the caesarean sections, 14% were classified as elective, that is they were planned before labour, and 13% as emergency caesarean sections (Riley and King 2003). The caesarean section rate is higher among older women than younger women and higher in private care than in public care (Riley et al. 2005).
These higher rates of obstetric intervention are clearly not wholly related to greater obstetric risk among privately insured women. In an Australian population based study of over 170,000 women who gave birth in 1996 and 1997, risk profiles of women in public and private obstetric care were compared. In both care systems almost half of the women were classified as low obstetric risk. Within these low-risk groups, privately insured women were on average older than uninsured women but the proportion classified as low obstetric risk was the same in each group. However, low risk, privately insured first-time mothers were significantly more likely to experience obstetric interventions such as induced or augmented labour and instrumental and caesarean section delivery than those classified as having low obstetric risk who gave birth in public care (Roberts et al. 2000). Also, in a sample of 242 Australian first time mothers, women with private health insurance were significantly more likely to experience instrumental vaginal (relative risk 1.53) or caesarean section delivery (relative risk 1.91) than uninsured women (Fisher et al. 1995). In addition to private health insurance, fear of litigation, obstetrician preference, and assertive and highly educated patients have been implied as non-clinical determinants of interventions in childbirth in Australia (Fisher et al. 1995; King 2000).

3.3.3.2 Pain relief during childbirth

Pain relief during childbirth is also related to care system. In 2002, 26% of all Victorian women who experienced labour had no analgesia, 22% had nitrous oxide only and 25% had epidural or spinal analgesia. However, women in private care who had a vaginal birth were twice as likely to be administered epidural analgesia as women in public care, 20.7% versus 10.2% (Riley and King 2003).

Ninety percent of women who had a caesarean section delivery had regional anaesthesia (Riley and King 2003).
3.3.3.3 Length of postnatal hospital stay

The average length of postnatal stay in hospital varies depending on mode of delivery and care system. In 2002 in Victoria, the average length of postnatal stay for mothers in public care was 3.1 days compared with 4.5 days for mothers in private care. In the public care system, the mean postnatal stay for mothers who had a vaginal birth was 2.7 days and for those who had a caesarean section 4.4 days. For mothers in private care the corresponding length of stay was 4.0 and 5.4 days respectively (Riley et al. 2005).

3.3.3.4 Rates of breastfeeding

In 1995 a National Health Survey, which included questions about breastfeeding, was conducted in Australia (ABS 1995). Almost 82% of all Australian babies were breastfed at discharge from hospital. The proportions exclusively and partially breastfed at three and six months were 63% and 46% respectively. Rates of breastfeeding varied depending on socio-economic circumstances. The proportions of mothers living in the most socio-economically disadvantaged areas initiating breastfeeding and still breastfeeding at three and six months were 75%, 53% and 37% respectively. Corresponding figures for mothers residing in the most socio-economically advantaged areas were 87%, 67% and 53% respectively (Donath and Amir 2000).

3.3.4 Maternal and Child Health Services in Victoria

In Victoria a universal Maternal and Child Health Service, jointly funded by state and local governments, provides a free-to-consumers service for families with under-school-aged children. This service offers clinical care and information, support and advice about child health, behaviour and development, parenting, immunisation, breastfeeding, and maternal health (Victorian Government Department of Human Services 2004). Maternal and Child Health centres are located in every local government area and staffed by qualified Maternal and Child Health Nurses. When a Maternal and Child Health Nurse is notified of a birth she contacts the new mother to arrange a home visit within the first few days after discharge from hospital. After the initial contact mothers visit the Maternal and Child Health centre regularly for monitoring of the baby’s health and development.
Weekly group sessions for new first-time mothers attending local Maternal and Child Health services are organised and led by the Maternal and Child Health Nurse. During these sessions the nurse provides health education, parenting strategies and advice, and information about other community based services for parents. Primiparous mothers are encouraged to participate in these mothers’ groups, as they are intended to be a forum where mothers can develop their social network, gain self-confidence and access useful information about child health and parenting (Hanna et al. 2002). At the end of the structured program, which usually spans 8 to 10 weeks, many groups continue to meet regularly, in some instances for years. Other mother-infant groups and activities commonly accessed by new mothers include playgroups, which are often organised by local churches, baby-focused activities such as baby massage and baby swim programs and informal gatherings between mothers of young children.

3.3.4.1 Specialised postnatal services

In Victoria, specialised postnatal early parenting services for parents who are experiencing parenting difficulties can also be accessed by new parents. These provide support and structured educational programs about parenting and infant feeding and settling. These early parenting programs are available through both public and private care. Most are day attendance programs where mothers are assisted with infant feeding and educated about infant settling techniques. Outreach home-based services and parenting seminars are also integral parts of early parenting services. In the Melbourne metropolitan area there are also several residential mother-baby units where mothers with early parenting difficulties are admitted with their babies for up to five nights. Two of the residential early parenting services in the public system have a statutory obligation to provide a 10-day program for a small number of families identified as at risk of abusing children.

Common infant problems among those admitted to private and public residential early parenting services include unsettled behaviour, dysregulated sleep, frequent night time waking, inconsolable crying, resistance to soothing and feeding difficulties. The admitted mothers often suffer health problems such as mild to moderate depression, anxiety and clinically significant exhaustion (Fisher and Rowe 2005). Some programs have an upper age limit of 12 months for the baby while others provide services for
families with children aged up to 48 months. Women who are referred to residential mother-baby programs participate in a structured psycho-educational group program during their stay and are provided with individualised supported education in infant care. In addition, they are given an opportunity to rest and have their health care needs assessed. These interventions which aim to improve infant sleeping and feeding patterns and maternal psychological well-being, assist with parentcraft, and strengthen the parent-infant relationship appear to be effective and well accepted by parents (Fisher and Rowe 2005).

Two of the private residential mother-baby services also cater for new mothers who require psychiatric care. In these services a proportion of mother-baby dyads is referred with unsettled infants to attend a four to five day structured program to improve infant sleeping and feeding behaviours and to allow the mother to rest. Other service users are referred to the service for treatment of maternal psychiatric illness and the length of stay for these mothers varies depending on the severity of the mother’s condition and the speed of her recovery.

Finally, four units with psychiatric designation, three in the public and one in the private sector, also provide joint admission for mothers and babies aged up to 12 months. Mothers with severe psychiatric conditions such as schizophrenia, severe depression, puerperal psychosis or bipolar disorder can be admitted to these units. The average length of stay for the women admitted in 2002 varied between units from 15 to 27 days (Buist et al. 2004).

There is no available statewide information about the annual number of joint mother-baby admissions to residential parenting services in Victoria. However, by sourcing information from the published research literature and Annual Reports, where they were available, and through communication with executive staff and administrators, an estimation of the total number of mother-baby admissions per year was calculated. A description of existing Victorian residential parenting services and the number of mother-baby dyad admissions per year to these services are shown in Table 3.3.4.1.1.
Table 3.3.4.1.1 Residential postnatal services in Victoria

<table>
<thead>
<tr>
<th>Name of centre and care provider</th>
<th>Type of service</th>
<th>Number of admissions per year</th>
<th>Year and Source of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tweddle Child and Family Health Service Public</td>
<td>Two, three, four and ten* day parenting programs for families with children aged up to four years</td>
<td>751</td>
<td>2002-2003 Annual Report</td>
</tr>
<tr>
<td>The Queen Elizabeth Centre Public</td>
<td>Five or ten* day parenting program for families with children aged up to four years</td>
<td>659</td>
<td>2004-2005 Health Information Officer</td>
</tr>
<tr>
<td>O’Connell Family Centre Public</td>
<td>Three or four day parenting program for families with children aged up to four years</td>
<td>500</td>
<td>2004 Assistant Clinical Director</td>
</tr>
<tr>
<td>Masada Private Hospital Mother Baby Unit Private</td>
<td>Five day parenting program for families with children aged up to 12 months</td>
<td>Approximately 375</td>
<td>2001 Fisher et al. (2004)</td>
</tr>
<tr>
<td>South Eastern Private Hospital Mother Baby Unit Private</td>
<td>Five day parenting program for families with children aged up to 12 months</td>
<td>Approximately 275</td>
<td>2002 Unit Manager</td>
</tr>
<tr>
<td>Northpark Private Hospital Mother Baby Unit Private</td>
<td>Service for mothers with babies aged up to 12 months with parenting difficulties and/or psychiatric disorder. Length of stay varies</td>
<td>588 **</td>
<td>2005 Unit Manager</td>
</tr>
<tr>
<td>Hospital/Unit</td>
<td>Description</td>
<td>Length of Stay</td>
<td>Year</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------</td>
<td>------</td>
</tr>
<tr>
<td>Mitcham Private Hospital Mother Baby Unit</td>
<td>Service for mothers with babies aged up to 12 months with parenting difficulties and/or psychiatric disorder. Length of stay varies.</td>
<td>Approximately 350</td>
<td>2002</td>
</tr>
<tr>
<td>Monash Hospital Mother Baby Unit</td>
<td>Psychiatric clinic providing joint mother-baby admission for mothers with children aged up to 12 months suffering severe psychiatric disorder. Average length of stay 15 days.</td>
<td>80</td>
<td>2002</td>
</tr>
<tr>
<td>Banksia House Mother Baby Unit</td>
<td>Psychiatric clinic providing joint mother-baby admission for mothers with children aged up to 12 months suffering severe psychiatric disorder. Average length of stay 17 days.</td>
<td>90</td>
<td>2002</td>
</tr>
<tr>
<td>Mercy Hospital for Women Mother Baby Unit</td>
<td>Psychiatric clinic providing joint mother-baby admission for mothers with children aged up to 12 months suffering severe psychiatric disorder. Average length of stay 27 days.</td>
<td>64</td>
<td>2002</td>
</tr>
<tr>
<td>Albert Road Clinic Parent-Infant Program</td>
<td>Psychiatric clinic providing joint mother-baby admission for mothers with children aged up to 12 months suffering severe psychiatric disorder. Average length of stay 23 days.</td>
<td>89</td>
<td>2002</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>Approximately 3,800</td>
<td></td>
</tr>
</tbody>
</table>

* Tweddle Child and Family Health Service and The Queen Elizabeth Centre have a statutory obligation to provide 10-day programs for families identified as at risk of abusing children.

** 441 admitted with parenting difficulties and 147 with psychiatric disorder.
Based on the estimation of 3,800 admissions per year to these residential early parenting services the annual rate of admissions for the approximately 63,000 women who gave birth in Victoria in 2002 was 6%. In the two units that cater for mothers with parenting difficulties and for mothers with psychiatric disorders (Northpark Private Hospital Mother-Baby Unit and Mitcham Private Hospital Mother-Baby Unit), approximately three-quarters are referred for parenting difficulties and the remainder for psychiatric problems. Therefore, of the 3,800 annual mother-baby admissions, approximately 3,250 are of mothers with mild to moderate depression and exhaustion who have babies with sleeping and or feeding difficulties and 550 are of mothers with more severe psychiatric illness. This represents 5.1% and 0.9% respectively of the parturient Victorian population.

### 3.4 Needs of Mothers after Assisted Conception

A number of characteristics among women who give birth after ART may place them at increased risk of adjustment difficulties after birth. In addition to the difficulties involved in conceiving, these women are on average older than those who give birth after spontaneous conception, more likely to be first-time mothers, and more likely to have an operative birth, a premature baby or a multiple birth. They also have characteristics that may reduce their risk of postnatal mood disturbance as they are generally socio-economically advantaged, almost universally partnered and clearly planned and desire the baby. As the present trend to delay childbearing until the fourth or fifth decade of life is unlikely to change, the proportion of women who seek ART and give birth after such procedures can be expected to increase. It is therefore imperative to advance knowledge of the needs of these women in their transition to parenthood.

Emerging Australian evidence suggest that women who conceive with ART may have more early parenting difficulties than the general parturient population. A study of a cohort of Australian mothers (n=109) admitted with their infants to a private hospital residential mother-baby service, which offers a structured educational program for mothers with infants aged less than 12 months with dysregulated sleep patterns and feeding difficulties was conducted. It was noted that 6.5% had conceived with ART
(Fisher et al. 2002 a). This was an apparent five fold over representation compared with the national rate of ART births of 1.2% at that time (Hurst et al. 1999). This finding was unexpected but was confirmed in two subsequent studies. First, in a systematic audit of 745 medical records of women admitted to the same mother-baby unit between July 2000 and August 2002, mode of conception was recorded in 526/745 (70.6%) cases, and of those, 45 were recorded as ART conception births. This represented 6% (45/745) of the admissions, compared to an assisted conception birth rate of 1.52% in the general population at that time (RR 4.0, 95% CI 3.0 - 5.4) (Fisher et al. 2005). Among the admitted women who had conceived with ART nearly 70% had experienced a caesarean delivery compared with 34% of women who had conceived spontaneously. In addition, close to 36% had given birth to twins compared with 3.3% for women with spontaneous conception. These findings suggest that infertility and ART, particularly in combination with a caesarean delivery and the birth of twins, may render women vulnerable to early postnatal adjustment difficulties. It could be hypothesised that women who have undergone ART are more prone to help seeking because of their extensive experience of using health care and that they therefore may have been less distressed on admission than other women. However, this was not supported in this study. There were no differences in maternal psychological distress as measured by the EPDS on admission between women who had conceived with ART and those who had conceived spontaneously. Second, in another study of women (n=79) who were admitted with their babies to a public hospital residential mother-baby service the rate of ART conception was 6.3%, four times higher than the national rate of ART births at the time of the study (Fisher and Rowe 2005).

In light of these findings, this purpose of this study is to explore the ways in which infertility and ART might contribute to early parenting difficulties to allow better understanding of the needs of women who become mothers after assisted conception.
CHAPTER 4

4 METHODS ............................................................................................................................. 146

4.1 Aims and hypothesis ........................................................................................................ 146

4.2 Study design ..................................................................................................................... 146

4.3 Sampling and recruitment ................................................................................................ 147

  4.3.1 Study sites .................................................................................................................. 147

  4.3.2 Study sample ............................................................................................................. 148

  4.3.3 Sample size ............................................................................................................... 148

  4.3.4 Sampling rationale ................................................................................................. 148

    4.3.4.1 Comparison populations .............................................................................. 150

  4.3.5 Recruitment of participants ..................................................................................... 151

4.4 Procedures ........................................................................................................................ 151

  4.4.1 Scrutiny of medical records .................................................................................... 151

  4.4.2 Telephone interview ............................................................................................... 152

  4.4.3 Postal questionnaires ............................................................................................. 153

4.5 Materials .......................................................................................................................... 154

  4.5.1 Standardised self-report measures ......................................................................... 154

    4.5.1.1 Maternal measures ......................................................................................... 154

    4.5.1.2 Infant measures ............................................................................................. 163

    4.5.1.3 Schedule of administration ......................................................................... 167

  4.5.2 Structured self-report questionnaires ...................................................................... 167

4.6 Ethical considerations ...................................................................................................... 168

4.7 Methods of analysis ........................................................................................................ 169

  4.7.1 Data management ..................................................................................................... 169

  4.7.2 Coding and scoring ................................................................................................. 169
4.7.2.1 Interview responses ................................................... 169
4.7.2.2 Questionnaire responses ............................................ 170
4.7.2.3 Standardised self-report measures ............................. 172
4.7.3 Calculation of scores ........................................................... 173
  4.7.3.1 Burden of Infertility and Treatment ......................... 173
  4.7.3.2 Sleep, Cry and Feeding Patterns ............................... 174
  4.7.3.3 Grandparents’ reaction to the new baby ................. 177
  4.7.3.4 Practical and emotional support ............................. 177
4.7.4 Statistical analysis ............................................................ 178
  4.7.4.1 Descriptive data ..................................................... 179
  4.7.4.2 Univariate measures of association ......................... 179
  4.7.4.3 Regression analysis ............................................... 180
  4.7.4.4 Qualitative data .................................................... 181
4 METHODS

4.1 AIMS AND HYPOTHESIS

The study has two aims. First, to characterize the pregnancy and postpartum psychological functioning of women conceiving through assisted reproductive technology (ART) and compare it to existing knowledge of the characteristics of women who have conceived spontaneously. Second, to identify factors that may be associated with increased risk of postpartum psychological distress as measured by the Edinburgh Postnatal Depression Scale (EPDS), low self-reported maternal confidence and admission to residential early parenting services in women conceiving with ART.

It is hypothesized that mothers who have experienced infertility and conceived with ART are more likely to be admitted to specialised residential early parenting services than mothers who have conceived spontaneously.

4.2 STUDY DESIGN

The study “Women’s experience of pregnancy, birth and mothering following assisted conception”, initiated in 2001, is a prospective longitudinal study of a consecutive cohort of women recruited from two ART centres in Melbourne, Australia. The current project is a component of this larger study and assesses factors known to affect postpartum maternal psychological functioning.

Data were collected for the study by scrutiny of medical records, structured telephone interviews, and mailed self-report questionnaires. Questionnaires were scheduled for the first and last trimesters of pregnancy and at three and eight months postpartum. A third postpartum questionnaire, for completion when the children were 18 months old, was subsequently added to the schedule and mailed to participants who gave their consent. Questionnaires were timed to allow measurement of any changes in mood and psychological functioning occurring between early and late pregnancy and through the phases of mothering a newborn, an older infant and a toddler.

The prospective longitudinal design allowed both cross-sectional and longitudinal analyses to be conducted.
4.3 SAMPLING AND RECRUITMENT

4.3.1 Study sites

Women were recruited to the study from two ART service providers in Melbourne: Melbourne IVF (MIVF) and Reproductive Services (RS) at the Royal Women’s Hospital. MIVF is a private ART centre owned and serviced by nine infertility specialists. The Royal Women’s Hospital is a public, tertiary level government funded hospital where care is provided by both hospital-based specialists and doctors in training and private specialist obstetricians and gynaecologists on a sessional basis. In recent years the management and administration of some sections of this hospital, including RS, have been privatised. Since 1998 RS has been operated by the MIVF company. Patients of the MIVF infertility specialists are all private patients and may receive treatment at either MIVF or RS, depending on their preference and the availability of the doctor. The proportion of women with private health insurance at MIVF is approximately 80% and at RS 70 hardship (Mr P Harcourt, Business Manager, MIVF, Personal communication, April 2005). Private health insurance covers most of the costs associated with admission to hospital for oocyte retrieval. However, for patients who are not privately insured this is an out-of-pocket expense unless they have been issued with a government health care card, which enables subsidised healthcare due to economic hardship (Mr P Harcourt, Business Manager, MIVF, Personal communication, April 2005). At RS there is provision for low-cost ART treatment for women without private health insurance who are health care card holders. Those who are eligible for subsidised treatment attend a public clinic at the RS where the Registrar or the doctor on duty review, plan and monitor the treatment and perform the procedures.

When combined, MIVF and RS is the largest ART service provider in Victoria and in Australia. Of the 10,009 ART treatment cycles initiated in Victoria in 2001, 5235 (52%) were from either MIVF or RS (Infertiltiy Treatment Authority 2002). Of the 28,797 treatment cycles performed in Australia and New Zealand in 2001 (Dean and Sullivan 2003), 18% occurred at MIVF or RS.
4.3.2 Study sample

The study sample constituted a consecutive cohort of women from MIVF and RS, who had an ultrasound-verified viable intrauterine pregnancy detected at six weeks gestation between July and December 2001. All pregnancies were a result of in-vitro fertilisation (IVF) or intracytoplasmic sperm injection (ICSI), with transfer of fresh or cryopreserved embryos, or gamete intra Fallopian transfer (GIFT). Insufficient command of English language and literacy to complete questionnaires was the only exclusion criterion. This study sample included multiparous women, those with multiple gestation pregnancy, those who used donor gametes to conceive, and single women except those from non-English speaking background.

The recruitment of a consecutive cohort of women from two ART centres that together provide a substantial proportion of Australian ART services and represent private and privatised public care, and the broad inclusion criteria were aimed at ensuring that the study sample was representative of all women conceiving with ART in Australia.

4.3.3 Sample size

Three Victorian studies have demonstrated that among women admitted to residential mother-baby services the proportion who have conceived with ART is four times that of the general parturient population (Fisher et al. 2002 a; Fisher et al. 2005; Fisher and Rowe 2005). The calculation of the sample size was based on a conservative estimate that the rate of admission would be 2.5 times higher in the study population than among all women who gave birth in Victoria in 2002 (15% versus 6%). A sample of 144 was needed to detect this difference in admission rates with 95% power at the 5% level, using a 2-sided test based on a single proportion. Therefore, to allow for a 20% attrition rate, at least 180 women needed to be recruited.

4.3.4 Sampling rationale

Women with fertility problems are a sociodemographically and gynaecologically heterogenous group and there is a wide range of intervals between when they decide to have a child and when they conceive. There is therefore no comparison group with
which they can be accurately matched. It has been argued that the use of control groups is inappropriate in research about impact of infertility and ART as few other stressful life events continue for the length of time of an infertility problem, have a comparable chance of success and involve invasive procedures (Hearn et al. 1987). In most of the investigations of psychological functioning in pregnancy after ART where ART and groups who have conceived spontaneously have been compared, there were significant differences in the characteristics of the groups which may have influenced the findings. These include average level of education (McMahon et al. 1997; Klock and Greenfeld 2000; Ulrich et al. 2004); average age (McMahon et al. 1997; Klock and Greenfeld 2000; Hjelmstedt et al. 2003); ethnic diversity (Klock and Greenfeld 2000) and socioeconomic status (Klock and Greenfeld 2000). In addition to between group differences in marital status (Ulrich et al. 2004), the ART participants had been married for significantly longer than the control group participants in most studies (McMahon et al. 1997; Klock and Greenfeld 2000; Ulrich et al. 2004). Other methodological problems relating to the use of control groups that reduce the generalisibility of the findings are apparent. For example, controls have sometimes been selected by matching on a single factor, such as date of birth of the baby (Colpin et al. 1995) and convenience sampling of controls, such as from self-selected volunteers, is common (Klock and Greenfeld 2000). In addition, in order to create a homogenous sample, most studies have excluded multiparous women (Stanton and Golombok 1993; McMahon et al. 1997; Hjelmstedt et al. 2003; Ulrich et al. 2004; Cox et al. 2006), women who have a multiple birth (Raoul-Duval et al. 1993; McMahon et al. 1997; Hjelmstedt et al. 2003; Ulrich et al. 2004; Cox et al. 2006), and those who have used donor gametes to conceive (McMahon et al. 1997; Hahn 2001) and one study excluded women aged over 36 (Hjelmstedt et al. 2003). Another methodological limitation in some studies using comparison groups is small sample and control group sizes (Dunnington and Glazer 1991; Bernstein et al. 1994).

The decision to include women who used donor gametes, as well as those who were multiparous and those with a multiple pregnancy was in the interest of describing accurately the whole population of women who utilise ART. Women who conceive with ART, using their own gametes, having a singleton and their first child only represent approximately 55% of those who undergo ART and therefore the generalisibility of findings from studies that have excluded these groups is
questionable. It was decided in this study to compare characteristics of participants with existing knowledge about women who can be presumed to have conceived spontaneously rather than use matched controls due to the inherent difficulties in identifying an adequate control group.

4.3.4.1 Comparison populations

No single data source exists that allows comparison of all the aspects of postnatal maternal adjustment investigated in this study. Therefore, in order to establish the ways in which women who give birth after assisted conception are similar or different to other childbearing women a variety of data sources were used for comparison.

Where possible, population data generated by the Australian Bureau of Statistics (ABS), the Australian Institute of Health and Welfare (AIHW), and the Victorian Perinatal Data Collection Unit (PDCU) were used as comparison for the study population.

The ABS is Australia’s official national statistical organisation and publishes reports on demographic, economic and social aspects of Australian society based on Census and survey data.

The AIHW National Perinatal Statistics Unit (NPSU) publishes information about all Australian births. Each Australian State and Territory’s health authority submit pregnancy, obstetric and perinatal information for all births to the AIHW. These data are compiled and an annual report of all Australian births is published by the AIHW (Laws and Sullivan 2004).

The PDCU compiles data on all Victorian births. The PDCU was established in 1982 and is a mandatory population based surveillance system which collects and publishes information on obstetric conditions, procedures and outcomes, neonatal morbidity and birth defects for all Victorian births of 20 weeks gestation or more (Riley and King 2003).

The AIHW is also responsible for the compilation and reporting of data in relation to assisted reproductive technology (ART) treatment in Australia and New Zealand. The Australian and New Zealand Assisted Reproduction Database (ANZARD) requires all ART clinics to provide data on ART treatment cycles and outcomes of ART
pregnancies to the AIHW NPSU and this information is published annually (Dean and Sullivan 2003; Bryant et al. 2004).

To allow comparison of findings from this study population with those of community based cohort studies standardised validated self-report measures, which have been widely used in Australian and international studies were used. Some instruments were selected to enable direct comparison with existing studies of the psychological and physical health of new mothers in Australia (Astbury 1994; Fisher et al. 1997; Brown 1998; Brown and Lumley 1998; Boyce et al. 2001; Brown et al. 2001; Bruinsma et al. 2001; Buist et al. 2005). It is acknowledged that studies of parturient women where mode of conception is not ascertained are likely to include women who have experienced infertility and conceived with ART but numbers will be small enough not to influence effects of interest or at least not bias results towards differences.

4.3.5 Recruitment of participants

Individually addressed letters, which were signed by the medical director of MIVF, inviting women to take part in the study, were mailed to all eligible women at the two study sites. A plain language statement (PLS) describing the purpose of the study and what participation would involve, a response form on which to indicate willingness or unwillingness to participate in the study, a consent form for those who agreed to take part, and a prepaid return envelope were also included. The readability of the PLS was aimed at year ten reading ability and was deemed appropriate by the University of Melbourne Human Research Ethics Committee, The Research and Ethics Committees of the Royal Women’s Hospital and the Freemasons Hospital. Women were asked to return the response form within two weeks and, if they agreed to participate, also to sign and return the consent form. The letter stated that a follow-up phone call would be made by the clinic in the event that no response had been received within two weeks.

4.4 PROCEDURES

4.4.1 Scrutiny of medical records

Details about the extent and outcome of ART for participants were extracted from their medical records. Treatment information for non-participants was extracted by MIVF
staff and subsequently provided to the research team in de-identified form. Treatment details included the number of initiated stimulated treatment cycles, the number of cycles initiated with the intention of transferring stored frozen embryos, the number of embryo transfers, whether ICSI or donor gametes were used, number of previous ART births, and whether the index pregnancy was a single or multiple gestation.

### 4.4.2 Telephone interview

After consenting a structured telephone interview was conducted with participants to gather socio-demographic information and take a fertility history. In addition to information gathering, the telephone interview was intended to give participants the opportunity to speak in person with the investigator and, if they wished, ask questions about the study. The socio-demographic and fertility history information ascertained at the interview is shown in Table 4.4.2.1.

<table>
<thead>
<tr>
<th>Socio-demographic information</th>
<th>Fertility history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal and paternal ages</td>
<td>Previous pregnancies and, if applicable, mode of conception and outcome of pregnancies</td>
</tr>
<tr>
<td>Maternal country of birth</td>
<td>Number of children living at home</td>
</tr>
<tr>
<td>Marital status and, if applicable, number of years in the current relationship</td>
<td>Number of months trying to conceive before starting ART treatment</td>
</tr>
<tr>
<td>Highest level of education</td>
<td>Cause of infertility and adequacy of information provided about the cause</td>
</tr>
<tr>
<td>Occupation and hours per week employed if applicable</td>
<td>Fertility treatment other than ART, nature of this treatment and time spent trying if applicable</td>
</tr>
<tr>
<td></td>
<td>Whether attended other ART clinic</td>
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<tr>
<td></td>
<td>Number of months spent on the current ART program</td>
</tr>
</tbody>
</table>

Australia is one of the most culturally and ethnically diverse nations in the world. Almost a quarter (24%) of Australia’s population is over-seas born and the diversity of countries of birth has increased substantially since the Second World War (ABS 2006). Furthermore, mixed marriages in Australia are increasing, with Australian-born individuals marrying overseas-born partners or two overseas-born people from different countries marrying (ABS 2000). Although many aspects of ethnic or cultural variety
cannot directly be derived from birthplace information, country of birth is used in official population statistics to indicate ethnic diversity. Therefore, as participants in this study were compared with the whole population of Australian childbearing women, country of birth rather than ethnicity was assessed.

4.4.3 Postal questionnaires

Postal self-report questionnaires were scheduled for the first and last trimesters of the pregnancy and three, eight and 18 months after the birth. The option of collecting data using telephone interviews instead of postal questionnaires was considered as this may reduce the risk of participants not providing complete data (van Campen et al. 1998; Aitken et al. 2004). However, some studies comparing the quality of data collected by mail versus telephone interviews have found few differences (Brogger et al. 2002; Hawthorne 2003; Hepner et al. 2005). Due to the considerable length of the questionnaires and the unpredictable schedule of mothers with new babies, it was presumed that postal questionnaires would be more appropriate in this study as they could be completed at a time suitable to responders.

Data from the medical records, the telephone interviews and the three postnatal questionnaires are reported in this thesis. Table 4.4.3.1 shows the timing of the steps involved in the larger study with the outlined areas indicating the data included in this thesis. The information from the two questionnaires completed in pregnancy will be analysed and prepared for publication by other researchers.

Table 4.4.3.1 Steps in the larger study with outlined areas indicating material included in this thesis

<table>
<thead>
<tr>
<th>Timing</th>
<th>Scrutiny of medical records</th>
<th>Telephone interview</th>
<th>Postal questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>At recruitment</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>When accepting entry into study</td>
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<tr>
<td>First trimester of pregnancy</td>
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<tr>
<td>Third trimester of pregnancy</td>
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<tr>
<td>Three months after expected date of delivery</td>
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<td></td>
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<tr>
<td>Eight months postpartum</td>
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<td></td>
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<tr>
<td>Eighteen months postpartum</td>
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</tbody>
</table>
At each time point, prior to mailing the questionnaires, participants were contacted by telephone by the investigator to ensure they were still at the same address and willing to receive the next questionnaire. This brief contact also served to encourage the completion and return of the questionnaires.

The investigator performed all checks of medical records, telephone interviews and telephone calls, and managed the mailing of research material.

4.5 MATERIALS

Each postpartum questionnaire included stage-specific questions about maternal physical and emotional health, social circumstances, available support and the health and development of the baby. In addition, standardised, valid and reliable psychometric instruments to assess maternal mood, postnatal mother-infant emotional attachment, quality of the relationship with the partner, relevant personality factors, the experience of motherhood, infant and toddler temperament, maternal separation anxiety and satisfaction with life were used as outlined below.

4.5.1 Standardised self-report measures

4.5.1.1 Maternal measures

4.5.1.1.1 Edinburgh Postnatal Depression Scale

The Edinburgh Postnatal Depression Scale (EPDS) which is a 10-item self-report screening instrument for postnatal depression with demonstrated high specificity and sensitivity (Cox et al. 1987), was used as a repeat measure in this study to allow for description of changes in mood over time within the study population. It was developed specifically for the detection of probable depression in community samples of postpartum women and is widely used in clinical and research settings in Australia and internationally. The scale assesses the presence and intensity of depressive symptoms within the previous seven days. Five items explore dysphoric mood, two examine anxiety and one each guilt, suicidal ideas and functional capacity. Scores for each item range from 0 to 3 and a total score between 0 and 30 is obtained. Higher scores denote more depressive symptomatology and a score of more than 12 is commonly used as indicative of probable depression.
In the validation of the EPDS 84 new mothers who had been identified by a health visitor as potentially depressed and 12 mothers who were not depressed completed the EPDS in their home and were interviewed using Goldberg’s Standardised Psychiatric Interview (SPI) (Goldberg 1992). The diagnosis of depressive illness was based on the Research Diagnostic Criteria (RDC) (Spitzer et al. 1978). A cut-off of more than 12 on the EPDS successfully identified 30 of the 35 women who were depressed according to RDC and 38 of the 45 women classified as non-depressed (EPDS score ≤12) were true negatives for depression according to RDC. Based on this, the sensitivity of the EPDS was 86%, its specificity 78% and predictive value 75% (Cox et al. 1987). In an Australian validation study 103 women completed the EPDS and were interviewed using the Diagnostic Interview Schedule (DIS) (Robins et al. 1989). A cut-off score of >12 successfully identified all women who reached DIS criteria for major depression (sensitivity 100%) and 95.7% of women who were not depressed according to DIS (Boyce et al. 1993).

EPDS scores are also reported as a continuous variable where means and standard deviations are used as measures of postnatal mood and group means are compared (Kearns et al. 1997; Green 1998; Webster et al. 2000). In the current study, both methods of reporting EPDS scores were used. The EPDS is well accepted by childbearing women and takes less than five minutes to complete (Cox et al. 1987).

4.5.1.1.2 Profile of Mood States

The Profile of Mood States (POMS) is a 65-item mood adjective checklist designed specifically to assess mood variation across events or interventions in psychologically normal populations (McNair et al. 1971). For each adjective, respondents are asked to indicate on a five-point scale (“Not at all”, “A little”, “Moderately”, “Quite a bit”, “Extremely”) how they have been feeling during the past week. Completing the POMS takes approximately 10 minutes. One positive and five negative mood subscales representing different dimensions of mood are yielded from the 65 items. “Vigour-Activity”, the only positive mood subscale, explores feelings of emotional well-being and functional efficiency. Of the negative mood subscales, “Tension-Anxiety” assesses feelings of anxiety, “Depression-Dejection” explores feelings of inadequacy, gloominess, hopelessness, and isolation, “Fatigue-Inertia” examines feelings of weariness and lack of
energy, “Anger-Hostility” describes hostility and irritability and “Confusion-Bewilderment” clarity of thinking. Factor analytical studies demonstrated that these six mood dimensions can be reliably identified, measured and replicated (McNair et al. 1971). Lower scores on the “Vigour/Activity” subscale and higher scores on the other subscales indicate more emotional distress. A research concept of overall mood disturbance (Total Mood Score) can be calculated by deducting the positive score from the sum of the scores on the negative dimensions.

The POMS has demonstrated ability to measure mood changes in response to intervening events and it was therefore included at all time points in this study to allow assessment of changes in maternal mood over the first 18 months after childbirth. Normative data for females for the POMS were derived from 516 American female college students. The considerable differences in socio-demographic circumstances between this normative sample and study participants does not allow meaningful comparisons on the POMS between these two groups. However, the POMS has been widely used in Australian parturient populations and these were used where appropriate as comparisons for this study (Fisher et al. 1997; Kermode et al. 2000; Hayes et al. 2001; Rowe-Murray 2001).

4.5.1.1.3 Vulnerable Personality Scale Questionnaire

There is evidence that certain personality traits may increase vulnerability to depression. For example, being overly conscientious, having a pessimistic outlook on life, being a perfectionist and having very high expectations of oneself, feeling personally responsible for negative events, and being excessively timid, unassertive and sensitive to the opinions of others are thought to predispose people to depression, particularly when exposed to stressful life events, including childbirth (Boyce 1994; Read and Lampe 2003). Low self-esteem and lack of feelings of self-worth are also known to be associated with heightened risk of developing depression (Read and Lampe 2003). Boyce et al. (2001) theorised that the same personality attributes that predispose to depression in general also predispose women to postnatal depression (PND) and developed the Vulnerable Personality Style Questionnaire (VPSQ) as a tool for screening for heightened risk of PND. The VPSQ is a nine item personality measure for identification of those at risk of developing postnatal depression (Boyce et al. 2001). Two subscales, the “Vulnerability” and the “Organised/Responsive”, are calculated. The
“Vulnerability” subscale comprises six items representing six personality traits; anxiety, worry, sensitivity, unassertiveness, volatility, and obsessionality. The “Organised/Responsive” subscale includes three items which delineate traits of having control over one’s life, generally coping and being emotionally reactive. Each item is included in a self-statement and respondents are asked to indicate on a five-point Likert scale their agreement with the statement in terms of how they feel in general.

In the development of the scale it was administered postnatally to 475 Australian women within two days of giving birth. These women also completed the EPDS (Cox et al. 1987) in hospital and subsequently 6, 12, 18 and 24 weeks postpartum. The internal consistency for the “Vulnerability” subscale was relatively high (α-coefficient 0.75) but for the “Organised/Responsive” subscale the α-coefficient was only 0.36. Women who scored over 12 on the EPDS on more than two occasions were interviewed using the SCID (Structured Clinical Interview for DSM-III-R) (Spitzer et al. 1990) to determine if they met criteria for clinical depression. Only the “Vulnerability” subscale distinguished between depressed and non-depressed women and the 42 women who were identified as depressed (scoring >12 on the EPDS more than twice and meeting SCID criteria for depression) had significantly higher scores on the “Vulnerability” subscale than non-depressed women (16.4 versus 13.2, p<0.001). Therefore, in the present study, only scores obtained on the “Vulnerability” subscale scores are used. The score that can be obtained on the “Vulnerability” subscale ranges from 6 to 30. The total scale takes less than five minutes to complete.

4.5.1.1.4 Intimate Bonds Measure

A relationship with an intimate partner which is characterised by lack of emotional and practical support, conflict, and low satisfaction has consistently been found to be a risk factor for postnatal depression (O’Hara and Swain 1996; Scottish Intercollegiate Guidelines Network 2002). The Intimate Bonds Measure (IBM) is a 24-item self-report measure developed in Australia that quantifies two independent dimensions of perceived quality of the relationship with the partner. The “Care” dimension reflects emotional and physical care incorporating warmth, consideration, affection and companionship and the “Control” dimension assesses domination, intrusiveness and authoritarian attitudes and behaviours (Wilhelm and Parker 1988). Twelve items on
each of the two dimensions describe attitudes and behaviours. Respondents are asked to rate, on a four-point Likert scale their partner’s attitude and behaviour towards them in recent times. The scores for all items on each dimension are added to derive scores ranging from 0 to 36 on each subscale. Completion of the IBM takes approximately five minutes.

In the development of the IBM, married attendees of general practices, aged 20-65 (148 women and 96 men) rated their partner’s attitudes and behaviours in recent times on 83 items derived from the literature and interviews with married couples. Principal component analysis indicated a two-factor solution and after elimination of similar items two 12-item subscales, the “Care” and the “Control” subscales were generated. The internal consistency was very high for both the “Care” dimension (α-coefficient 0.94) and for the “Control” dimension (α-coefficient 0.89). The IBM scores were not affected by socio-economic variables and minimally influenced by mood state. In a validation study 33 volunteers were interviewed by two raters who asked predetermined questions to elicit the degree of “care” and “control” described by these subjects. They then completed the IBM and correlation between interview and scale scores was calculated. Correlation for the “care” scale was 0.68 for the first rater and 0.43 for the second rater and correlation for the “control” scale was 0.74 and 0.55 for the first and second raters respectively (Wilhelm and Parker 1988).

The IBM has been used in many Australian studies of pregnant and parturient populations (Boyce et al. 1991; Condon and Corkindale 1997; Gibson et al. 2000; Morse et al. 2000; Fisher et al. 2002 b).

4.5.1.1.5 Maternal Postnatal Attachment Questionnaire

The Maternal Postnatal Attachment questionnaire (MPA) is a measure of mother to infant emotional attachment, which is exclusively concerned with the parental side of this relationship (Condon and Corkindale 1998). The MPA was included in the questionnaire administered in late infancy. The MPA consists of 19 statements describing a mother’s responses to her infant in various situations. Respondents are asked to indicate their feelings about these statements by choosing one of the fixed choice response options. A Global Attachment score is calculated by adding the scores
of the 19 items and a higher score indicates stronger attachment. The possible range of scores is 19-95. Approximately ten minutes are required to complete the MPA.

The development sample for the MPA consisted of 200 Australian women who completed the MPA and a number of other psychometric tests at 4 weeks, and 4 and 8 months postpartum. The \( \alpha \)-coefficient was calculated at each of the three assessments and was 0.78, 0.79, and 0.78 respectively. The test-retest reliability was tested for a subgroup of 56 women who completed the MPA twice two weeks apart at around 4 months postpartum, and revealed a correlation coefficient of 0.81. Validation of the MPA against other measures of maternal-infant attachment has not been carried out.

Test of association between MPA scores and scores on measures of mood, marital adjustment, social support and infant characteristics revealed that the strongest predictors of low attachment scores were high levels of depression and anger, and an infant perceived as difficult. In factor analysis three factors representing different dimensions of attachment emerged; “Quality of attachment”, “Absence of hostility” and “Pleasure in interaction”. Norms for the Global Attachment score were derived from this study but scores for the three separate factors were not reported (Condon and Corkindale 1998). However, several other studies that have used the MPA report their recorded scores for the Global Attachment and for the three factors (McMahon 1997; Feldstein et al. 2004).

With the permission of the authors, the order of the 19 items was changed for this study. In the original version the first item, assessing the degree of annoyance and irritation responders experienced when caring for the baby, was judged to be somewhat confronting and likely to deter some from completing the questionnaire. In the revised version a number of positive items preceded the more confronting items.

### 4.5.1.1.6 Maternal Separation Anxiety Scale

It was expected that a proportion of participants would return to the paid workforce, as their children grew older. It was therefore important to measure the extent of maternal anxiety in relation to separation from the child. The Maternal Separation Anxiety Scale (MSAS) is a 35-item measure of maternal separation anxiety defined as “an unpleasant emotional state reflecting a mother’s apprehension about leaving her child for short term separations” developed by Hock et al. (1989a).
In the development of the MSAS 623 American women completed a 68-item scale shortly after the birth of their first child. After item analyses some items were dropped resulting in the final 35-item form of the MSAS. Principal factor analysis of these 35 items revealed that a three-factor model where each item loaded on only one factor provided the best fit for the data. These factors represented three distinct components of maternal anxiety and were labelled “Maternal separation anxiety”, “Perception of separation effect on the child” and “Employment-related separation concerns”. The MSAS items are rated on a five-point Likert scale. The 21 items in the “Maternal Separation Anxiety” subscale describe a mother’s degree of worry, sadness and guilt when separated from her infant, and the strength of her beliefs about the mother being best able to care for her child, about the child’s preference for being with her rather than with anyone else, and the child’s ability to adapt when cared for by someone else. The “Perception of Separation Effect on the Child” subscale consists of seven items exploring the mother’s perception of how her child reacts to being separated from her and the positive and negative effects of separation on the child. Lastly, the 7-item “Employment-Related Separation Concerns” subscale taps into the mother’s attitudes about balancing her maternal and work roles in relation to mother-child separation. Scores on each of the three subscales range from 7 to 35 with higher scores indicating more anxiety and concerns about being separated from the baby. The MSAS takes approximately ten minutes to complete.

The internal consistency of the items in the subscales was tested and the $\alpha$-coefficient for all three was high, 0.90, 0.71 and 0.79 respectively. The test-retest reliability was assessed by comparing the scores of 400 mothers who completed the MSAS twice, soon after birth and three months later. The correlation coefficients for the subscales were 0.73, 0.58, and 0.72 respectively indicating that mothers’ attitudes and feelings about separation were relatively stable in the first few months after birth (Hock et al. 1989a). Subsequently, 130 first time mothers who were grouped according to employment preference completed the 35-item MSAS when their child was newborn, aged 7 weeks, and 8 and 14 months and the scores obtained at each time point were published. These indicated that for all women scores on the “Maternal Separation Anxiety” subscale decreased in a linear fashion over time and that women who preferred to be employed had lower scores, indicating less anxiety, than those who preferred to provide exclusive care for their child. Mean scores on the “Perception of Separation Effects on the Child”
subscale decreased over time for mothers who preferred to be employed while those who preferred to stay at home with their child recorded higher scores at first assessment and their scores increased over time. Similar differences between women who preferred employment and those who indicated a preference to remain at home were observed for the “Employment-Related Separation Concerns” subscale. In a validation study 36 mothers of three months old babies completed the of the MSAS and the Emotional Status Index (ESI), a brief self-report measure of the degree of separation anxiety a mother experiences when separated from her child for a short time. They were also interviewed about their perceptions, attitudes and feelings about brief separations from their child. These interviews were taped and scored by two raters. Correlation between the MSAS “Maternal Separation Anxiety” subscale and the ESI scores was 0.77 and between the MSAS “Maternal Separation Anxiety” subscale and the interview scores 0.77 (Hock et al. 1989b).

4.5.1.1.7 Experience of Motherhood Questionnaire

The Experience of Motherhood Questionnaire (EMQ) developed by Astbury (1994) is a measure of emotional well-being associated with the experience of motherhood in women with small children. Twenty statements describing a range of feelings about mothering are listed and respondents are asked to indicate degree of agreement on a four point Likert scale. Half the items tap the negative, stressful aspects of motherhood and the other half describe positive, enjoyable aspects. The EMQ takes approximately five minutes to complete. The total score ranges from 20-80 and a lower score indicates a more positive and enjoyable experience of motherhood.

The development sample for the EMQ consisted of 90 mothers of 2-year-old children who had previously taken part in a population-based survey of Victorian mothers conducted at 8 to 9 months after birth (Lumley et al. 1990). Half the sample (45/90) had scored as probably depressed on the EPDS at 8 to 9 months (EPDS score >12) postpartum and the other half had not. Participants completed the EMQ and four standardised measures; the Edinburgh Postnatal Depression Scale (EPDS), (Cox et al. 1987) the Social Support Questionnaire, (SSQ), which is a measure of social support and satisfaction with that support (Sarason et al. 1983), the Life Experience Questionnaire (LEQ) designed for use with women of childbearing age (Norbeck 1984), and the Toddler Temperament Scale (TTS) (Sewel et al. 1988). The internal consistency
of the EMQ was satisfactory (α-coefficient=0.78). Six factors which all contributed 5% or more to the variance in the total EMQ score were distinguished in principal component analysis. “Maternal anxiety/concern” relates to the effect of the baby on the mother’s emotional well-being, “Coping with the baby” concerns the mother’s perception of the practical demands involved in caring for the baby, “Personal autonomy” reflects the effect of the baby on the mother’s enjoyment of her life as a separate individual, “Coping/satisfaction with life” incorporates aspects of the experience of motherhood in the general context of satisfaction with life, “Maternal overload” concerns feelings of being overwhelmed and isolated, and “Extrinsic support” relates to possible sources of external support. Tests of association between EMQ scores and scores on the standardised measures revealed significant correlation between maternal mood (r=0.56), social support (r=-0.31), and toddler temperament (r=0.48) (p<0.001) and the EMQ.

The EMQ was chosen for the current study as it allows an assessment of the overall experience of motherhood but also provides insight into particular aspects of this experience as described by the six factors. Australian norms are available for the EMQ (Astbury 1994). Scores recorded in other studies using the EMQ are also available for comparison with results from this study (Edhborg et al. 2000).

4.5.1.1.8 Satisfaction With Life Scale

The Satisfaction With Life Scale (SWLS) is a five-item, easily completed measure of the life satisfaction component of subjective well-being. Respondents rate their level of agreement with each item on a seven-point Likert scale (Diener et al. 1985). A total score is obtained by adding the rating for all items and can range from 5 (minimal life satisfaction) to 35 (best possible life satisfaction).

In the validation study the SWLS demonstrated good internal consistency (α-coefficient 0.87) and the two-month test-retest reliability was 0.82 (Diener et al. 1985). Factor analyses on a number of data sets have revealed a single factor accounting for about 70% of the variance (Weinman et al. 1995). In several studies using the SWLS significant positive correlations between the SWLS and other validated subjective well-being and self-esteem measures have been demonstrated (Pavot and Diener 1993).
Data for the SWLS are available for a range of non-clinical populations (Pavot and Diener 1993). Published Australian comparative data from a study of the experience of ART treatment among participants who subsequently gave birth as a result of treatment are also available for this measure (Hammarberg et al. 2001).

4.5.1.2 Infant measures

Infants and children vary in their behavioural characteristics and style. At one end of the spectrum, some babies cry very little and are easy to distract and soothe while at the other, babies may cry inconsolably and be extremely difficult to settle. The concept of temperament is used to describe these differences and nine temperament dimensions, distinguishable in the first days of life, are described: activity, rhythmicity, approach, adaptability, intensity, mood, persistence/attention span, distractibility, and threshold to arousal (Thomas and Chess 1977). Temperament is regarded as constitutional and relates to the intrinsic behavioral characteristics that can be modified through interaction with the environment (Thomas and Chess 1977). It has been suggested that there is a relationship between infant temperament and maternal mood where more unsettled infant behaviour is positively associated with maternal distress (Murray and Cooper 1997; Fisher et al. 2002 b). Thus, an age-appropriate measure of infant temperament as reported by the mother was included in each of the three postpartum questionnaires.

4.5.1.2.1 Early Infancy Temperament Questionnaire

The Early Infancy Temperament Questionnaire (EITQ) was designed by Medoff-Cooper et al. (1993) for parents and caregivers to assess the temperament of infants younger than four months old. The EITQ consists of 76 items describing a range of infant reactions and behaviours rated on a six-point scale ranging from “Almost never” to “Almost always”. These items form nine subscales reflecting different aspects of infant temperament. The “Activity” characteristic is described as the infant’s physical motion during sleep, eating, play, dressing, and bathing, “Rhythmicity” as the regularity of sleeping, feeding and elimination patterns, “Approach” as the nature of the baby’s response to new stimuli, “Adaptability” as the ease or difficulty involved in modifying the baby’s reactions to new stimuli, “Intensity” as the energy level of responses to stimuli, regardless of direction, “Mood” as the amount of positive or negative behaviour
in various situations, “Persistence” as the length of time the baby focuses on particular activities, “Distractibility” as how easily the baby is soothed and “Threshold” as the amount of stimulation needed to evoke a noticeable response in the baby. In addition, the EITQ includes ten items describing the parent’s general impression (GI) of aspects of infant temperament and respondents are asked to rate, on a six-point scale, their perception of their own infant compared with other infants of the same age. The items describe the same nine characteristics as the subscales of the EITQ and the tenth item asks the parent to rate overall infant manageability (1=“Very easy” to 6=“Very difficult”). Those scoring 1 and 2 on the GI are categorised as “easy”, 3 and 4 as “average” and 5 and 6 as “difficult” to manage. Approximately 20 minutes are required to complete the EITQ (Medoff-Cooper et al. 1993).

The standardisation population for the EITQ consisted of 404 infants (262 aged one to two months and 142 aged three to four months) from one paediatric practice in the United States. Means for the nine subscales were calculated separately for the two age groups. Internal consistency for the nine characteristics was moderate, ranging from 0.42 to 0.76. Normative values for the GI are not published but it is stated that in the 3-4 months age group 56% of infants were considered by their mothers to be easier than average, 39% as average, and 5% as more difficult. Correlation of the mothers’ general impression of the degree of difficulty involved in caring for the infant (the tenth item of the GI scale) with the nine subscales was strongest for “distractibility” and “mood”. Babies who were rated as more difficult to manage had lower distractibility and more negative mood. The authors therefore conclude that the two most important determinants of the mother’s overall appraisal of the infant’s temperamental difficulty in this age group are how easy or difficult it is to soothe and comfort the baby and the amount of daily crying and fussiness. As no standardised behavioural observation techniques or protocols were available for comparison, the EITQ was not formally validated (Medoff-Cooper et al. 1993).

4.5.1.2.2 Short Temperament Scale for Infants

The Short Temperament Scale for Infants (STSI) aged four to eight months (Sanson et al. 1987) was used at eight months. The STSI was developed from the Revised Infant Temperament Questionnaire (RITQ) (Carey and McDevitt 1978), which has 95
items describing nine dimensions of temperament. The RITQ was administered to mothers of a representative sample of 2,443 Australian infants aged 4 to 8 months who participated in “The Australian Temperament Project” (Prior et al. 1989). For validation purposes mothers also provided an overall rating, on a 5-point scale, of their child’s temperament compared with an “average child”. In addition, the Maternal and Child Health Nurse who was caring for the mother and baby during weekly visits completed the same overall temperament rating as the mother.

Factor analyses revealed significant redundancy in the item content and intercorrelation between the nine temperament dimensions. Redundant items were removed and the number of temperament dimensions reduced. The resulting STSI has 30 items describing five temperament characteristics: “Approach” (7 items), “Rhythmicity” (6 items), “Cooperation/Manageability” (6 items), “Activity/Reactivity” (6 items), and “Irritability” (five items). For each item mothers are asked to indicate on a 6-point Likert scale the frequency which best describes their child’s recent and current behaviour. A composite score using the “Approach”, “Cooperation/Manageability” and “Irritability” scores provides a measurement on an easy to difficult temperament continuum, the “Easy-Difficult Scale” (EDS). The correlation between the EDS and the mothers’ overall rating of the child’s temperament was 0.51 and between the EDS and the Maternal and Child Health Nurse’s overall rating 0.33 (Sanson et al. 1987). One standard deviation below the population mean on the EDS is categorised as “easy” and one standard deviation above is categorised as “difficult”.

The α-coefficient for the five temperament factors ranged from 0.56 to 0.76 and the test-retest reliability from 0.77 to 0.90 (Oberklaid et al. 1984). Approximately five to ten minutes are required to complete the STSI. Australian normative values for the STSI are available and the instrument has been used in numerous Australian studies (Milgrom et al. 1995; McMahon et al. 1997; McMahon et al. 2001).

4.5.1.2.3 Short Temperament Scale for Toddlers

The Short Temperament Scale for Toddlers (STST) that was administered when the children were 18 months old is a shortened version of the 97 item Toddler Temperament Questionnaire (TTQ) developed in the United States by Fullard et al. (1984). In an
Australian validation study of the TTQ mothers and caretakers (either the playgroup leader or the caretaker who looked after the child under the Family Day Care scheme) of a sample of 397 children aged between 12 and 39 months completed the TTQ. In addition, mothers and caretakers rated the children on eight behaviours. According to the authors, relationships between TTQ temperament classification and mothers’ and caretakers’ ratings of behavioural problems suggested concurrent validity of the TTQ. However they added that obtaining satisfactory validity is problematic in temperament research. It was concluded that the content of the TTQ seemed suitable for Australian use (Prior et al. 1987).

Subsequently, 1279 parents of children aged between 18 and 24 months and 1360 parents of children aged between 30 and 46 months completed the validated Australian version of the TTQ. In addition they provided ratings (severe, moderate, mild, or none) of their child’s behaviour in eight areas: sleep problems, excessive crying, temper tantrums, excessive shyness, overactivity, lability of mood, dependency and accident-proneness. Greater temperamental difficulty as measured by the TTQ was associated with higher ratings on the behavioural problems. Factor analysis revealed six temperament factors in the TTQ, which parallel those identified in the Short Temperament Scale for Infants (STSI) described above. On the basis of their loading on these temperament factors, 30 of the 97 items included in the TTQ were chosen for inclusion in the STST. Toddler behaviour is rated on the same six point Likert scale as the STSI. The subscales are labelled “Approach” (5 items), “Cooperation/Manageability” (5 items), “Persistence” (4 items), “Rhythmicity” (4 items), “Distractibility” (4 items) and “Irritability” (8 items). The α-coefficient for the six subscales ranged between 0.85 (“Approach”) and 0.56 (“Distractibility”). As for the STSI, an overall “Easy-Difficult Scale” (EDS) score is calculated as the mean of the three scores for “Approach”, “Cooperation/Manageability” and “Irritability” and one standard deviation below the population mean on the EDS is categorised as “easy” and one standard deviation above is categorised as “difficult”.

The STST is completed in five to ten minutes. Normative values for the STST were derived from a representative sample of 1280 Australian toddlers who participated in the “Australian Temperament Project” (Dr A Sanson, Investigator on The Australian Temperament Project).
Temperament Project, Personal communication, June, 2003) and were used for comparison in this study. The structure of the STSI and the STST permits measurement of stability in temperament over time by comparison of the EDS scores obtained for the two measures (Prior et al. 1989).

4.5.1.3 Schedule of administration

The schedule of the administration of the validated self-report measures is shown in Table 4.5.1.3.1.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>3 months</th>
<th>8 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edinburgh Postnatal Depression Scale, EPDS (Cox et al. 1987)</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Profile of Mood State, POMS (McNair et al. 1971)</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Intimate Bonds Measure, IBM (Wilhelm and Parker 1988)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vulnerable Personality Scale Questionnaire, VPSQ (Boyce et al. 2001)</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Infant temperament scales, EITQ, STSI and STST, (Sanson et al. 1987; Prior et al. 1989; Medoff-Cooper et al. 1993)</td>
<td>EITQ</td>
<td>STSI</td>
<td>STST</td>
</tr>
<tr>
<td>Maternal Postnatal Attachment Scale, MPAS (Condon and Corkindale 1998)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Maternal Separation Anxiety Scale, MSAS (Hock et al. 1989a)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Satisfaction With Life Scale, SWLS (Diener et al. 1985)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>The Experience of Motherhood Questionnaire, EMQ (Astbury 1994)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

4.5.2 Structured self-report questionnaires

The first part of each questionnaire consisted of questions covering a range of areas. The first questionnaire included a number of questions relating to the birth and the stay in hospital, participants’ social circumstances and how grandparents had reacted to the birth of the baby. At all three time points the questionnaires canvassed participants’ physical and emotional well-being, the availability of emotional and practical support, and their perception of the child’s health, development and behaviour. Questions about
arrangements for unpaid work, employment and childcare, and plans for additional children were included in the second and third questionnaires. At 18 months, mothers of twins were asked to complete a set of questions that specifically addressed their experience of caring for two babies.

The format of all three questionnaires was fixed-choice questions with two, three, four, five or six response options. Depending on the nature of the question the response options were “yes” or “no”, or nominal or ordinal scales. In each questionnaire space was also provided where participants were given the option of adding their own comments.

### 4.6 ETHICAL CONSIDERATIONS

The ethical considerations central to this study were related to privacy and voluntary participation. To comply with privacy requirements, the invitation to participate in the study and the plain language statement (PLS) were mailed to the potential participants by the clinic rather than by the researchers. The plain language statement included details of the purpose of the study and explained that information from medical records about the extent and outcome of the ART treatment would be linked to participants’ responses. It also stated that participation was entirely voluntary and that participants were free to withdraw from the study at any time. Further it stated that the information provided would be treated in strict confidence, that only pooled data would be published and that no identifying information would ever be released.

Participants’ names appeared only on the consent form. On all questionnaires individual identification numbers were used rather than names. Completed questionnaires were kept separate from both the names and addresses of participants and the list linking names to identification numbers. All lists and completed questionnaires were kept in locked filing cabinets at the Key Centre for Women’s Health in Society at the University of Melbourne.

A brief letter thanking participants for their ongoing participation in the study accompanied the questionnaires at each time point. Because of the possibility that some of the issues raised could be emotionally arousing, this letter also informed participants
that counsellors from the ART services were available if needed and could be contacted at any time on the telephone number supplied.

The original project was approved by the University of Melbourne Human Research Ethics Committee (HREC No 010158, 31/5/01), The Research and Ethics Committees of the Royal Women’s Hospital (Project no 16/01, 20/6/01) and the Freemasons Hospital in 2001 (Reference No S/01/4, 6/6/01). Permission to extend the study with a third postpartum questionnaire, subject to the consent of participants, was granted by the University of Melbourne Human Research Ethics Committee in June 2003.

4.7 METHODS OF ANALYSIS

4.7.1 Data management

The data were coded, entered and analysed using the Statistical Package for the Social Sciences (SPSS) Version 11.5 (SPSS 2001). Qualitative comments from participants were transcribed to Word files (Microsoft Windows XP 2001).

4.7.2 Coding and scoring

Information drawn from medical records, and interview and questionnaire responses were coded, scored and entered onto computer as nominal, ordinal or interval variables as appropriate. Comments volunteered by participants were transcribed.

4.7.2.1 Interview responses

4.7.2.1.1 Sociodemographic details

Participants’ and partners’ ages and length of the current relationship were entered in years. Marital status was classified as married, de facto, lesbian or single. Maternal country of birth was recorded and coded as Australia or New Zealand, Europe, Asia, Africa or USA/Canada.

Highest level of completed education was coded as part secondary school education, completed secondary, post secondary training, undergraduate university degree or
postgraduate university degree. Occupations were categorised according to the nine
categories of the Australian Standard Classification of Occupations (ASCO) and ranked
in four categories; ASCO1-3 (Managers and administrators, Professionals, and
Associate professionals), ASCO 4-5 (Tradespersons and related workers, and Advanced
clerical and service workers), ASCO 6-8 (Intermediate clerical, sales and service
workers, Intermediate production and transport workers, and Elementary clerical, sales
and service workers), and ASCO 9 (Labourers and related workers) (ABS 1997). ASCO
does not provide a category for homemakers or students so these categories were added.
Number of hours per week spent in paid work in early pregnancy was recorded.

Type of accommodation was classified as a flat or house that was owned or being
purchased, a rented flat or house, or a government owned flat or house. Private health
insurance status was recorded.

4.7.2.1.2 Fertility history

Previous pregnancies were classified according to mode of conception (spontaneous or
ART conception) and outcome of the pregnancy (live birth, miscarriage/ectopic
pregnancy or termination). Children other than the participants’ own but in their care
were recorded.

Time spent trying to conceive before undergoing ART and time spent on the ART
program were recorded in months. Cause of infertility was classified as male, female,
male and female or unexplained. Participants’ perception of how well they had been
informed about the cause of infertility was recorded as adequate or insufficient. Other
fertility treatments undergone before ART were recorded as ovulation induction,
intruterine insemination (including insemination of donor sperm), surgery (female and
male), alternative medicine or other. The time spent trying other treatments was
recorded in months.

4.7.2.2 Questionnaire responses

4.7.2.2.1 Obstetric experiences

Details about place and mode of delivery, methods of analgesia or anaesthesia were
recorded. Number of children born (singleton or twins), sex of the baby, gestational age
in weeks, birth weight in grams were entered. Time intervals between the birth
and when the mother was able to see and hold her baby were entered and, where applicable, the number of days the baby spent in intensive care or special care nursery was recorded. If the baby was admitted to special care nursery the reasons for this and whether the baby stayed in hospital after the mother was discharged was recorded. The duration of the hospital stay was recorded in days and the perceived adequacy of the length of stay was recorded. Ratings of the pain experienced during and after the birth, the perception of the quality of the support, care and information provided during the hospital stay and the overall experience of the birth were scored on 3 to 6 point scales.

4.7.2.2.2 Physical and emotional well-being

Ratings of physical health, feelings of loneliness, amount of sleep at night, and grandparents’ reaction to the birth of the baby were scored on 2, 3, 4 or 5 point scales. Responses to questions about the emotional and sexual relationship with the partner and any current health problems and concurrent distressing life events were entered. The amount of emotional support participants had received from a range of people was scored on a 5-point scale.

4.7.2.2.3 Domestic and paid work and childcare

The availability and sources of practical support was entered and whether participants were satisfied with the division of domestic and childcare work was recorded. The frequency of the partner’s involvement with aspects of childcare was scored on a 4-point scale. Amount of time spent in paid work and independent leisure activities by participants and partners was recorded in hours. Reported satisfaction with the amount of time spent in paid work was entered. Type of childcare arrangements used and weather or not these were perceived as satisfactory was recorded. The amount of practical support participants had received from a range of people was scored on a 5 point scale.

4.7.2.2.4 Baby/infant/toddler care

Questions about the children’s health and sleep, crying and feeding patterns, and duration of breastfeeding were scored on 3 to 6 point scales. Ratings of confidence in and enjoyment of baby care were scored on 4 point scales and utilisation of day-stay or residential postnatal mother-baby services was recorded. How often participants
spent time with other mothers and their perceived enjoyment of this was scored on a 4 and 3 point scale respectively.

**4.7.2.5 Reproductive events**

For the final questionnaire, participants’ wishes in relation to having more children and the occurrence and outcome of any pregnancies that had occurred since the index birth were recorded. Frozen embryos in storage, plans for any frozen embryos and with whom participants had discussed what to do with remaining frozen embryos were recorded.

**4.7.2.6 Caring for twins**

For participants who were caring for twins the sources of information used in pregnancy in preparation for the birth of twins were recorded. The rating of the degree of difficulty involved in performing daily tasks was scored on a 4 point scale. The ability to spend time with only one of the twins was scored on a 3 point scale. The degree of similarity in personalities between the two children, whether participants spent time with other mothers of twins and how enjoyable this was perceived to be was recorded. Lastly, the financial impact of having twins was scored on a 3 point scale.

**4.7.2.3 Standardised self-report measures**

Responses to the self-report measures were entered. Items were reverse-scored as appropriate and subscale and total scores were computed. In the small number of cases where one item had been omitted, the missing item was assigned the mean score of the other items. If more than one item was missing, the case was excluded from analyses. The exception to this was in the scoring of the infant temperament measures where only the items endorsed were included, as specified in the scoring protocols for the instruments.
4.7.3 Calculation of scores

A number of composite scores were calculated. Weighting of the items included in each of these was based on evidence in the literature and the distribution of the data.

4.7.3.1 Burden of Infertility and Treatment

In order to quantify the burden of infertility and infertility treatment experienced by participants, seven items were used to develop a composite score, the Burden of Infertility and Treatment (BIT). The factors used and the weighting for each factor are shown in Table 4.7.3.1.1.

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>&lt;35</td>
<td>35-39</td>
<td>&gt;39</td>
</tr>
<tr>
<td>Time infertile</td>
<td>&lt;2 years</td>
<td>2-3 years</td>
<td>&gt;3 years</td>
</tr>
<tr>
<td>Number of embryo transfers</td>
<td>1-3</td>
<td>4-6</td>
<td>&gt;6</td>
</tr>
<tr>
<td>Cause of infertility</td>
<td>Female/Unexplained</td>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Previous pregnancy loss</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First time mother</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using donor gametes</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Weightings were assigned according to existing evidence about the psychological impact of the variables included. Higher maternal age, prolonged infertility and extensive treatment may contribute to greater distress (Beaurepaire et al. 1994; Chiba et al. 1997; Greil 1997; Amir et al. 1999; Nugent and Balen 2001; Apfel and Kaylor 2002; Jansen 2003; Boivin and Schmidt 2005) and male factor infertility is associated with more distress in both women and men than other types of infertility (Connolly et al. 1987; Mikulincer et al. 1998; Newton et al. 1999). Pregnancy loss is known to increase anxiety in subsequent pregnancies (Statham and Green 1994; Janssen et al. 1996; Stitzinger et al. 1999; Athey and Spielvogel 2000; Brier 2004) and a previous live birth is thought to reduce distress in this context (Callan and Hennessey 1988; Newton et al. 1990; Newton et al. 1999). Finally, use of donor gametes to conceive adds...
psychological complexities to ART conception (Shenfield 1997; Boivin and Kentenich 2002; The American Society for Reproductive Medicine 2004). A total score was calculated by adding the scores for the seven variables yielding a range of scores of 4-14 for the BIT. A higher score is indicative of a greater burden of infertility and infertility treatment.

4.7.3.2 Sleep, Cry and Feeding Patterns

In addition to the standardised measures used to assess infant temperament, questions specifically canvassing women’s perception of infant sleep, cry and feeding patterns were included in the first two postpartum questionnaires. A composite score using these items was calculated by assigning scores to the responses and then adding the scores to arrive at a total score for Infant Sleep, Cry and Feeding Patterns (ISCFP1 and ISCFP2). Weighting of the items was based on the distribution of the data. Where the distribution of responses indicated two groups these were dichotomised and where the distribution indicated more than two groups these were ranked. Higher scores on the two ISCFP measures indicate more unsettled infant behaviour. The questions included and the weighting of the responses for infants aged three months (ISCFP1) are shown in Tables 4.7.3.2.1.
The items used and the weighting of responses for infants aged eight months (ISCFP2) are shown in Table 4.7.3.2.2.
Table 4.7.3.2.2 Items included and their weighting for the Infant Sleep, Cry and Feeding Patterns for infants aged eight months (ISCFP2)

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, how well does your baby sleep?</td>
<td>Very well/Quite well</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Not very well/Poorly</td>
<td>1</td>
</tr>
<tr>
<td>How many times has your baby usually woken between 10 p.m. and 6 a.m. in the past week?</td>
<td>Not at all/1-2 times</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3-4 times/More than 4 times</td>
<td>1</td>
</tr>
<tr>
<td>Does your baby sleep during the day?</td>
<td>3-4 times/More than 4 times</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Not at all/1-2 times</td>
<td>1</td>
</tr>
<tr>
<td>For how long does your baby usually sleep in total between 7am and 7pm?</td>
<td>2-3 hours/3-4 hours</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Less than 1 hour/1-2 hours</td>
<td>1</td>
</tr>
<tr>
<td>In general, does your baby’s sleep pattern allow you to have a break?</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>When your baby wakes during the night, does s/he settle back to sleep by her/himself?</td>
<td>Always/Often</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Sometimes/Never</td>
<td>1</td>
</tr>
<tr>
<td>In general, how much does your baby cry?</td>
<td>Very little</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>A little/Quite a bit of the time/A lot of the time</td>
<td>1</td>
</tr>
<tr>
<td>In general, does your baby cry for episodes that are:</td>
<td>Less than 2 minutes</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2-5 minutes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5-10/10-15/More than 15 minutes</td>
<td>2</td>
</tr>
<tr>
<td>In general, are you able to settle your baby when s/he cries?</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>1</td>
</tr>
<tr>
<td>Overall, how well is feeding progressing</td>
<td>Very well/Satisfactory</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Some difficulties/Not well</td>
<td>1</td>
</tr>
<tr>
<td><strong>Possible range of total score</strong></td>
<td></td>
<td><strong>0-11</strong></td>
</tr>
</tbody>
</table>

In the third questionnaire a composite score for Toddler Sleep Pattern (TSP) was calculated. Questions about crying were not asked at this time and the one question that asked about how feeding was progressing was not included in the TPS as it was apparent that many participants who were no longer breastfeeding understood that the question did not apply to them and therefore omitted it. The items included in the TSP and their weighting are shown in Table 4.7.3.2.3. Higher score on the TSP indicates more severe sleep problems.
Table 4.7.3.2.3 Items included and their weighting for the composite Toddler Sleep Pattern (TSP)

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, how well has your child slept in the last week?</td>
<td>Very well</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Quite well</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Not very well/Poorly</td>
<td>2</td>
</tr>
<tr>
<td>How many times has your child usually woken between 10 p.m. and 6 a.m. in the past week?</td>
<td>Not at all/1-2 times</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3-4 times</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>More than 4 times</td>
<td>2</td>
</tr>
<tr>
<td>For how long does your child usually sleep in total between 7am and 7pm?</td>
<td>More than two hours</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1-2 hours</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Less than one hour</td>
<td>2</td>
</tr>
<tr>
<td>If your child wakes during the night, does s/he settle back to sleep by her/himself?</td>
<td>Always/Doesn’t usually wake</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Sometimes/Often</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>2</td>
</tr>
<tr>
<td>Possible range of total score</td>
<td></td>
<td>0-8</td>
</tr>
</tbody>
</table>

4.7.3.3 Grandparents’ reaction to the new baby

In the first questionnaire questions about grandparents’ reactions to the birth of the baby were asked and the response options were “Very delighted and enthusiastic”, “Pleased”, “Quite interested”, and “Not very interested at all”. Since one or more grandparents were deceased in a significant number of families, it was not meaningful to grade grandparents’ reactions. Instead, the number of grandparents that were reported to be “Very delighted and enthusiastic” about the birth of the baby was added yielding a possible range of 0 to 4.

4.7.3.4 Practical and emotional support

Lack of support from partner and others is a risk factor for postnatal depression (Cooper and Murray 1998; Beck 2001; Scottish Intercollegiate Guidelines Network 2002). In order to gauge how participants in this study perceived the amount of practical and emotional support they had received in the first eighteen months of their baby’s life two composite scores were developed. Participants were asked to rate the amount of each kind of support they had received from a range of people since the birth of their baby on
a 5-point scale from “Considerable” (4), “Quite a bit” (3), “Some” (2), “Very little” (1), to “None” and “Not applicable” (0). The possible range of scores for each potential provider of support was therefore 0 to 4. The potential providers of support included and the possible range of the total scores for “Emotional Support” and “Practical Support” are shown in Table 4.7.3.4.1.

Table 4.7.3.4.1 Potential providers of support included in the “Emotional Support” and “Practical Support” scales

<table>
<thead>
<tr>
<th>Potential provider of support</th>
<th>Emotional Support</th>
<th>Practical support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Own mother</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Own father</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Mother-in-law</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Father-in-law</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Sibling</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Friend</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Mother’s group</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Work colleague</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>General Practitioner</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Maternal and Child Health Nurse</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Paid helpers, e.g. cleaner</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Other</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td><strong>Possible range of total score</strong></td>
<td><strong>0-48</strong></td>
<td><strong>0-36</strong></td>
</tr>
</tbody>
</table>

4.7.4 Statistical analysis

The aims of the study were to compare the postpartum adjustment of women who conceive with ART with that of those who conceive spontaneously and to identify factors that may contribute to psychological distress, low maternal confidence and utilisation of residential mother-baby services. To address these aims study population findings were compared where possible with normative data for all parturient women and the factors associated with postnatal mood as measured by the EPDS score, self-rated maternal confidence, and admission to residential mother-baby services were described.
4.7.4.1 Descriptive data

Frequencies and proportions in percentages were used to describe the range of nominal and ordinal questionnaire responses. Based on their distributions, data were reduced by dichotomising responses to questions with 3 to 6 ordinal response alternatives. Frequencies and proportions of these groups were described. For continuous variables, mean, standard deviation, range and 95% confidence intervals (95% CI) were calculated.

Comparisons between primiparous and multiparous participants, between those who had one baby and those who had twins, and between those who used their own and those who used donated gametes to conceive were made in all analyses of descriptive data.

4.7.4.2 Univariate measures of association

The three outcome variables of interest were maternal postnatal mood as measured by the EPDS, maternal self-rated confidence about caring for the baby and utilisation of residential postnatal services. Factors thought to influence variation in the outcome measures of interest were tested using univariate measures of association. The variables were chosen on the basis that previous research had identified them as factors that contribute to maternal postnatal psychological functioning. In addition, the relationship between the outcome measures and the Burden of Infertility and Treatment score (BIT) was tested as the central question for this research was whether infertility and treatment influence maternal postnatal adjustment. The t-test was used to test for differences between two group means, Pearson’s correlation to test for associations between continuous variables, and the chi-square test to measure between group differences in categorical variables. A p-value of <0.05 was considered statistically significant.

For mothers of twins, the average of the scores on the infant temperament and behaviour measures for the two children were attributed to the mother in analyses of association between infant temperament and behaviour and the maternal outcome variables.
4.7.4.3 Regression analysis

Regression analyses were carried out to determine the associations of presumed explanatory variables with the outcome variables of interest. To deal with the issue of several explanatory variables only variables which showed a statistically significant association with the outcome variable at the p<0.01 level were included, with one exception, the Burden of Infertility and Treatment score (BIT). The BIT score was included in regression analyses when it demonstrated a significant relationship with an outcome variable at the 0.05 level in univariate analyses because the purpose of this study was to evaluate the impact of infertility and infertility treatment on postnatal adjustment. Data were log transformed where the distribution of a continuous variable was skewed.

Where more than one variable measured the same or a similar aspect of postnatal circumstances and the responses co-varied, only one was included in the regression analyses in order to reduce the number of variables included. For example, there was significant overlap in the responses to a question about degree of satisfaction with the domestic and infant care work arrangements and a question about whether or not participants perceived that they were receiving enough help in the three months postpartum questionnaire. Also, as would be expected, measures of infant temperament and infant behaviour and measures of maternal depression and anxiety co-varied at each time point. In these circumstances, the variable that had the strongest statistical association with the outcome variable of interest in univariate analysis was included in the regression analysis.

For analyses of the association between putative explanatory variables and a continuous outcome variable, the following approach was taken. For each time point separately, a general linear model where all presumed explanatory variables were entered simultaneously was fitted. All explanatory variables were either binary categorical variables or continuous scales. The assumptions of the model were assessed using residual plots and analyses. The results were represented by the parameter estimates corresponding to each explanatory variable, and their 95% confidence intervals and p-values.
For analyses of binary outcome variables a logistic regression model was fitted where all putative explanatory variables were entered simultaneously. All explanatory variables were either binary categorical variables or continuous scales. The results were represented by the odds ratios corresponding to each explanatory variable, and their 95% confidence intervals and p-values. Nagelkerke’s R-Square estimates were reported to indicate how much of the variability the model explained (Nagelkerke 1991).

4.7.4.4 Qualitative data

Comments that were volunteered by participants in the spaces provided in the three questionnaires are used throughout the presentation of the results to illustrate quantitative findings. A range of comments is included to represent the diversity of experiences of participants.
CHAPTER 5

5 RESULTS ............................................................................................................................................. 186

5.1 Recruitment and retention rates ......................................................................................... 186

5.1.1 Recruitment and response rate .................................................................................... 186
5.1.2 Retention rate ................................................................................................................. 186
5.1.3 Proportion of singletons and twins and age of babies ................................................. 187

5.2 Representative adequacy and characteristics and of the study sample ................................................. 188

5.2.1 Comparison of treatment information between participants and non-participants .......... 188

5.2.2 Sociodemographic and reproductive characteristics of participants ................................................. 189

5.2.2.1 Age, country of birth and marital status ......................................................... 190
5.2.2.2 Education and occupation .............................................................................. 190
5.2.2.3 Housing and rate of private health insurance .............................................. 192

5.2.2.4 Comparison of socioeconomic measures between Melbourne IVF and Reproductive Services participants ................................................. 192

5.2.3 Reproductive history ........................................................................................................ 193

5.2.3.1 Previous pregnancies ......................................................................................... 193
5.2.3.2 Infertility and ART history ............................................................................... 194

5.2.3.3 The Burden of Infertility and Treatment scale .............................................. 195

5.3 Physical and emotional well-being during pregnancy ......................................................... 195

5.4 Obstetric and perinatal outcomes ........................................................................................ 198

5.5 Postnatal adjustment ............................................................................................................. 201

5.5.1 Experience of the birth and postnatal care ....................................................................... 202
5.5.1.1 Participants’ comments about the experience of the birth......................................................... 204

5.5.2 First encounter with the baby and feeding advice ....................... 206
  5.5.2.1 Participants’ comments about the first encounter with the baby ........................................ 207

5.5.3 Relationship with partner ............................................................. 208

5.5.4 Personality characteristics ........................................................... 210

5.5.5 Physical health............................................................................. 210

5.5.6 Social circumstances.................................................................... 211
  5.5.6.1 Grandparents’ reaction .......................................................... 211
  5.5.6.2 Unpaid work and employment ............................................. 212
  5.5.6.3 Domestic work including childcare................................. 214
  5.5.6.4 Emotional support ............................................................... 215
  5.5.6.5 Coincidental demanding life events .................................. 218

5.5.7 Caring for the new baby .............................................................. 219
  5.5.7.1 Mother-infant emotional attachment ................................. 219
  5.5.7.2 Maternal confidence ............................................................. 221
  5.5.7.3 Anxiety about separation from the baby......................... 225
  5.5.7.4 Infant feeding................................................................. 226
  5.5.7.5 Utilisation of early parenting services ............................. 229

5.6 Infant health, temperament and behaviour .................................................230
  5.6.1 Infant health and development ............................................... 230
  5.6.2 Infant temperament and behaviour ......................................... 230
  5.6.2.1 Early Infant Temperament Questionnaire .................... 230
  5.6.2.2 Infant Sleep, Cry and Feeding Patterns at age three months .................................................................... 233
5.6.2.3 Short Temperament Scale for Infants........................................... 234
5.6.2.4 Infant Sleep, Cry and Feeding Patterns at age eight months ............................................................... 235
5.6.2.5 Short Temperament Scale for Toddlers............................ 235
5.6.2.6 Toddler sleep pattern ................................................................. 237
5.6.3 Changes in mothers’ perception of infant manageability over time ......................................................................................................................... 237
5.6.4 Participants’ comments about infant health, temperament and behaviour .............................................................................................................. 238
5.7 Postnatal maternal mood ................................................................................................................................. 240
5.7.1 Maternal mood in the early postpartum........................................... 241
5.7.1.1 Edinburgh Postnatal Depression Scale ......................... 241
5.7.1.2 Profile of Mood States.......................................................... 242
5.7.2 Maternal mood when caring for older infants ......................... 243
5.7.2.1 Edinburgh Postnatal Depression Scale ......................... 243
5.7.2.2 Profile of Mood States.......................................................... 244
5.7.3 Maternal mood when caring for toddlers ................................. 245
5.7.3.1 Edinburgh Postnatal Depression Scale ......................... 245
5.7.3.2 Profile of Mood States.......................................................... 245
5.7.4 Changes in mood over time ........................................................... 246
5.8 Experience of motherhood........................................................................ 247
5.8.1 The Experience of Motherhood Questionnaire ...................... 247
5.8.2 Participants’ comments about motherhood ............................... 249
5.9 Satisfaction with life .................................................................................... 252
5.10 Mothering twins ......................................................................................... 252
5.10.1 Antenatal preparation ........................................................................... 253
5.10.2 Twins’ health and development ....................................................... 253
5.10.3 Practical aspects of mothering twins ......................... 253
5.10.4 Interaction with the twins ........................................... 254
5.10.5 Participants’ comments about mothering twins ............. 254

5.11 Mothering after gamete donation ........................................ 255

5.12 Reproductive events and decisions ..................................... 256

5.13 Determinants of maternal mood, maternal confidence, and utilisation of postnatal residential services .................. 257

5.13.1 Univariate measures of association ............................. 257
  5.13.1.1 Factors associated with maternal mood ............... 257
  5.13.1.2 Factors associated with maternal confidence ........ 259
  5.13.1.3 Factors associated with admission to a residential mother-baby unit .................. 259

5.13.2 Modelling of outcome measures in regression analyses .... 260
  5.13.2.1 Determinants of maternal postnatal mood as measured by EPDS .................. 260
  5.13.2.2 Determinants of maternal confidence about baby care ................................... 266
  5.13.2.3 Determinants of utilisation of postnatal residential services ......................... 270

5.14 Conclusion ................................................................... 272
5 RESULTS

5.1 RECRUITMENT AND RETENTION RATES

A consecutive cohort of women who conceived at Melbourne IVF (MIVF) and the Reproductive Services (RS) at the Royal Women’s Hospital in Melbourne was systematically recruited.

5.1.1 Recruitment and response rate

Between July and December 2001 a total of 288 women who had been treated at these clinics had at least one fetal heart beat detected at the ultrasound scan which is routinely performed at six weeks gestation. Of these 16 had insufficient English language and literacy to participate in the study. The invitation to take part in the study was posted to the remaining 272 women. One hundred and thirty five women (50%) responded to the invitation within two weeks. Those who did not respond within two weeks (n=137) were contacted by telephone by a designated nurse from the clinic to ascertain their intention to participate. Seventeen of these women had experienced pregnancy loss within two weeks of the ultrasound scan. A further 16 women were unable to be contacted in spite of repeated attempts to telephone them. This reduced the potential study population to 239. Of these, 183 women (77%) agreed to participate in the study and 56 (23%) declined. A greater proportion of women attending MIVF agreed to participate than of women attending RS (95/112, 84% versus 88/127, 70%, p=0.005).

5.1.2 Retention rate

Six of the participating women miscarried between eight and 35 weeks gestation and six failed to return at least one of the questionnaires scheduled in pregnancy. The postpartum questionnaires were scheduled for 3, 8 and 18 months postpartum. The return rates of the three postpartum questionnaires for the 171 women remaining in the study are shown in Table 5.1.2.1.
Table 5.1.2.1 Return rates for the three postpartum questionnaires

<table>
<thead>
<tr>
<th>Time</th>
<th>Number mailed</th>
<th>Number (%) returned</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>171</td>
<td>166 (97)</td>
<td></td>
</tr>
<tr>
<td>8 months</td>
<td>169</td>
<td>162 (96)</td>
<td>The second postpartum questionnaire was sent to three women who returned the two pregnancy questionnaires but not the first postpartum questionnaire</td>
</tr>
<tr>
<td>18 months</td>
<td>159</td>
<td>153 (96)</td>
<td>Three participants returned the second postpartum questionnaire but declined the invitation to complete the third additional questionnaire</td>
</tr>
</tbody>
</table>

Of the eight participants who completed two postpartum questionnaires, seven completed the first and second questionnaires but either did not consent to receive the third questionnaire (n=2) or failed to return it (n=5). One participant completed the second and third questionnaires without having returned the first. Of those who only returned one of the three postpartum questionnaires, seven returned the first and two returned the second questionnaire. One of the seven women who returned only the first questionnaire had a child with severe cerebral palsy and one of those who returned only the second did not consent to receive the third questionnaire. In all, 152 participants (89%) returned all three postpartum questionnaires, 8 (5%) returned two, 9 (5%) returned one and 2 (1%) did not complete any of the postnatal questionnaires.

5.1.3 Proportion of singletons and twins and age of babies

The mean age in months of the children when the mothers completed the three questionnaires was 3.4 (range 2 to 6), 9 (range 8 to 15) and 19 (range 17 to 24) respectively. The number of mothers of singletons and twins who responded to each of the three postnatal questionnaires and the number of singleton and twin babies are described in Table 5.1.3.1.
Table 5.1.3.1 Numbers of singletons and twins for the three postpartum questionnaires

<table>
<thead>
<tr>
<th></th>
<th>3 months postpartum</th>
<th>8 months postpartum</th>
<th>18 months postpartum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total participants</td>
<td>166</td>
<td>162</td>
<td>153</td>
</tr>
<tr>
<td>Mothers of singletons n (%)</td>
<td>136 (82)</td>
<td>133 (82)</td>
<td>125 (82)</td>
</tr>
<tr>
<td>Mothers of twins n (%)</td>
<td>30 (18)</td>
<td>29 (18)</td>
<td>28 (18)</td>
</tr>
<tr>
<td>Total number of babies</td>
<td>196</td>
<td>190</td>
<td>180</td>
</tr>
<tr>
<td>Singleton babies n (%)</td>
<td>136 (69)</td>
<td>133 (70)</td>
<td>125 (69)</td>
</tr>
<tr>
<td>Twin babies n (%)</td>
<td>60 (31)</td>
<td>57* (30)</td>
<td>55* (30)</td>
</tr>
</tbody>
</table>

*One twin was hospitalised from birth and died at age 10 months

5.2 REPRESENTATIVE ADEQUACY AND CHARACTERISTICS

AND OF THE STUDY SAMPLE

The representative adequacy of the sample was ascertained in a number of ways.

5.2.1 Comparison of treatment information between participants and non-participants

Treatment related information from the medical records of all women who conceived during the recruitment period allowed comparison between those who agreed to participated and those who declined (Table 5.2.1.1). There were no significant differences in the treatment characteristics between those who agreed to take part in the study and those who declined. As socio-demographic information was not systematically recorded in the medical records, it was not possible to make a similar comparison for socio-demographic variables.
Table 5.2.1.1 Treatment information of participants and non-participants

<table>
<thead>
<tr>
<th></th>
<th>Agreed to participate N=183</th>
<th>Declined participation N=56</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of initiated treatments cycles</td>
<td>2.08</td>
<td>2.39</td>
<td>-0.78 to 0.15</td>
<td>NS</td>
</tr>
<tr>
<td>Mean number of initiated thaw cycles</td>
<td>1.97</td>
<td>2.05</td>
<td>-0.70 to 0.58</td>
<td>NS</td>
</tr>
<tr>
<td>Mean number of embryo transfers</td>
<td>3.53</td>
<td>4.03</td>
<td>-1.34 to 0.33</td>
<td>NS</td>
</tr>
<tr>
<td>Used ICSI %</td>
<td>54</td>
<td>63</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Used donor gametes %</td>
<td>9</td>
<td>7</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Previous ART birth %</td>
<td>16</td>
<td>25</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Multiple pregnancy %</td>
<td>20</td>
<td>19</td>
<td>NS</td>
<td></td>
</tr>
</tbody>
</table>

Comparisons between participants who returned all five questionnaires and those who returned four or fewer questionnaires were also made to determine whether there were differences between them. There were few differences on the available measures between participants who returned all five questionnaires (n=149), the two antenatal and three postnatal, and those who returned four or fewer questionnaires (n=28). No significant differences were observed between the groups on number of started treatment cycles, number of embryo transfers, number of months spent on the program, health insurance status or hospital attended, proportion using ICSI, proportion with existing children or proportion with more than one fetal heart beat at six weeks gestation. However, those who returned all five questionnaires were slightly older than those who returned fewer than five (34.7 years versus 33.0 years, 95% CI for the difference 0.03 to 3.37, p=0.05) and more likely to have tertiary education (59% versus 39%, p=0.05). These comparisons support the assumption that those who did not complete all five questionnaires were similar, in most respects for which data were available, to those who were retained throughout the study period. However, there was an over representation of more highly educated participants among those who returned all five questionnaires.

5.2.2 Sociodemographic and reproductive characteristics of participants

To establish the ways in which the study sample differed or was similar to population norms, data for participants were compared to the perinatal data describing all Victorian
(Riley and King 2003) and Australian women (Laws and Sullivan 2004) who gave birth in 2001, and selected groups of the whole female Australian population (ABS 1997, 1999). Furthermore, to ascertain whether the study population was representative of Australian and New Zealand women who give birth after ART, their characteristics were compared with those of all Australian and New Zealand women who gave birth after undergoing ART in 2001 (Dean and Sullivan 2003; Bryant et al. 2004).

5.2.2.1 Age, country of birth and marital status

Sociodemographic data and reproductive information were obtained at a telephone interview conducted after women had consented to participate in the study. Two women miscarried during the time between consenting to participate and the telephone interview, which reduced the number of women where sociodemographic and reproductive information is available to 181. The mean age of participants was 34.3 years (range 22 to 46) and of their partners 36.6 years (range 21 to 59). Most (n=146, 81%) were born in Australia or New Zealand. Of the remainder, 21 (12%) were born in Europe, ten (5%) in Asia, three (1.5%) in Africa, and one in Canada. The proportion of women born in Australia and Oceania (including New Zealand) was significantly higher in the study population than for all women who gave birth in Victoria in 2001 (81% versus 79% respectively, p<0.01) (Riley and Halliday 2001). Most participants were partnered; 161 (89%) were married and 15 (8%) were in de facto relationships, one of whom was in a lesbian relationship. Five (3%) participants were single. The proportion of women who were in a permanent relationship was significantly higher among the participants than for all women who gave birth in Victoria in 2001 (97% versus 87%, p<0.0001) (Riley and Halliday 2001). The partnered women had been in the relationship for an average of 9.9 years (range 3 to 23 years). Sixty-five (35%) participants already had children in their care. Mostly these were the woman’s own children, either from the current (n=48) or from a previous relationship (n=7). Ten women were caring for the partner’s children from a previous relationship.

5.2.2.2 Education and occupation

The highest levels of education completed by the study sample are shown in Table 5.2.2.2.1. Over half (n=101, 56%) had an undergraduate or postgraduate university degree. Compared with all Australians aged 25-64, the participants were almost twice as likely to have a tertiary degree (56% versus 29%).

190
Table 5.2.2.1 Educational level of participants

<table>
<thead>
<tr>
<th>Highest level of education</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some secondary school</td>
<td>29</td>
<td>(16)</td>
</tr>
<tr>
<td>Completed secondary school</td>
<td>39</td>
<td>(21)</td>
</tr>
<tr>
<td>Post secondary/ Trade training</td>
<td>12</td>
<td>(7 )</td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>49</td>
<td>(27)</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>52</td>
<td>(29)</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>(100)</td>
</tr>
</tbody>
</table>

Most participants were either employed (n=150, 83%) or studying (n=2, 1%). Of the 29 participants who were not employed, 21 (12%) were providing full time care for children at home and only a very small group (n=8, 4%) were neither employed nor caring for children. At the time of the interview, employed participants were doing an average of 28 hours per week paid work. Childless participants spent on average 33.5 hours per week and participants with children on average 17.5 hours per week in paid work. Their occupations were categorised according to the Australian Standard Classification of Occupations (ASCO) (ABS 1997) and the distribution of occupational categories is summarised in Table 5.2.2.2.

Table 5.2.2.2 Occupational status of participants

<table>
<thead>
<tr>
<th>Occupational status</th>
<th>N</th>
<th>% of all</th>
<th>% of employed women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers and administrators, Professionals, and Associate professionals (ASCO 1-3)</td>
<td>101</td>
<td>56</td>
<td>67</td>
</tr>
<tr>
<td>Tradespersons and Advanced clerical and service workers (ASCO 4-5)</td>
<td>24</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Intermediate and elementary clerical, sales and service workers (ASCO 6-8)</td>
<td>24</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Unskilled work (ASCO 9)</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Home makers (Not in ASCO classification)</td>
<td>29</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Student (Not in ASCO classification)</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

ASCO=Australian Standard Classification of Occupations (ABS 1997)
Compared with all Australian women aged 34 to 44 who are in the paid workforce, participants were more likely to have occupations in the three highest ASCO levels (ASCO 1-3, Managers and Administrators, Professionals, and Associate professionals) (67% versus 51.5% respectively, p<0.0001) (ABS 2003).

5.2.2.3 Housing and rate of private health insurance

Details about housing and health insurance status were ascertained in the first postpartum questionnaire. Information about housing and health insurance status was provided by 166 and 164 participants respectively. Most participants were living in a house or a flat that they owned or were purchasing (89%), 9% were in rented accommodation and 2% reported that they were living with parents or parents-in-law. Compared with all Australians, a higher proportions of the couples in the study owned or were purchasing their house or flat (66% versus 88%) and fewer lived in rented accommodation (26% versus 9%) (ABS 2003). Almost all (n=154, 93%) stated that the accommodation was suitable for their family.

Compared with all Australian women aged 35 to 44 years participants were almost twice as likely to be covered by private health insurance (approximately 40% versus 79% respectively) (ABS 1999).

5.2.2.4 Comparison of socioeconomic measures between Melbourne IVF and Reproductive Services participants

The only significant difference on the available socioeconomic measures between participants from MIVF and RS was that a higher proportion of participants from RS were born in a non-English speaking country (see Table 5.2.2.4.1). This might explain the lower participation rate among women treated at RS compared with MIVF (70% versus 84%, p=0.005).
Table 5.2.4.1 Socio economic characteristics of participants from MIVF and RS

<table>
<thead>
<tr>
<th></th>
<th>MIVF</th>
<th>RS</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>(%)</td>
<td>N</td>
</tr>
<tr>
<td>University degree</td>
<td>58/93</td>
<td>(62)</td>
<td>43/88</td>
</tr>
<tr>
<td>Occupation in ASCO 1-3</td>
<td>56/93</td>
<td>(60)</td>
<td>45/88</td>
</tr>
<tr>
<td>Born in non-English speaking country</td>
<td>5/93</td>
<td>(5)</td>
<td>15/88</td>
</tr>
<tr>
<td>Private health insurance*</td>
<td>73/86</td>
<td>(85)</td>
<td>57/78**</td>
</tr>
<tr>
<td>Owing or purchasing home*</td>
<td>78/86</td>
<td>(91)</td>
<td>69/80</td>
</tr>
</tbody>
</table>

* Insurance status and housing details available only for participants who returned the first postpartum questionnaire.
** In two cases health insurance status was not declared.

5.2.3 Reproductive history

5.2.3.1 Previous pregnancies

Over half of the participants had been pregnant at least once prior to the current pregnancy (n=102, 56%). This was not significantly different from all women who gave birth after ART in 2001 (51.4%) (Dean and Sullivan 2003) but significantly lower than for all Victorian women who gave birth in 2001 (69.5%, p<0.0001) (Riley and King 2003). Almost one third of participants (n=55, 30%) had given birth before. Of these, 45 had one child, four had two, four had three, and two had four children. Parity of women who give birth following ART is not included in the annual Assisted Reproductive Technology report issued by the AIHW NPSU. However, it is estimated that approximately 24% of Australian women who gave birth after ART treatment in 2002 were multiparous (1363/5693, excluding those where parity was not stated, n=158) (Dr E Sullivan, Director NPSU, Personal communication, March 3 2006). This was not statistically different from the proportion in this sample, (1353/5693, 24% versus 54/181, 30% p=0.07). But, the rate of multiparous women in this study was significantly lower than for all Victorian women who gave birth in 2001 (30% versus 58% respectively, p<0.0001) (Riley and King 2003). Seventy-two (40%) participants had experienced a previous pregnancy loss or termination. The number of losses ranged from 1 to 6 with the majority reporting one (n=49) and the remainder (n=23) more than one pregnancy loss. The reported outcomes of previous pregnancies are shown in Table 5.2.3.1.1.
Table 5.2.3.1.1 Outcomes of previous pregnancies

<table>
<thead>
<tr>
<th>Outcome</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>One or more spontaneously conceived live born child</td>
<td>26*</td>
<td>14</td>
</tr>
<tr>
<td>One or more spontaneously conceived miscarriages</td>
<td>39</td>
<td>22</td>
</tr>
<tr>
<td>One or more spontaneously conceived terminations</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>One or more ART conceived live born child</td>
<td>30*</td>
<td>17</td>
</tr>
<tr>
<td>One or more ART conceived miscarriages</td>
<td>26</td>
<td>14</td>
</tr>
<tr>
<td>One or more ART conceived terminations</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>No previous conception</td>
<td>79</td>
<td>44</td>
</tr>
</tbody>
</table>

* One participant had one spontaneously conceived and one ART conceived child.

5.2.3.2 Infertility and ART history

Where it was possible to compare study participants with all Australian women who conceived with ART in 2000 there were few differences. This is demonstrated in Table 5.2.3.2.1.

Table 5.2.3.2.1 Comparison between study participants and the 2000 cohort of Australian ART conceptions

<table>
<thead>
<tr>
<th></th>
<th>Study sample (n=181)</th>
<th>Australian and NZ ART conceptions in 2000 (n=5466)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female cause of infertility (%)</td>
<td>31</td>
<td>30</td>
<td>NS</td>
</tr>
<tr>
<td>Male cause of infertility (%)</td>
<td>31</td>
<td>30</td>
<td>NS</td>
</tr>
<tr>
<td>Multiple causes of infertility (%)</td>
<td>8</td>
<td>25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Unexplained cause of infertility (%)</td>
<td>30</td>
<td>15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Used ICSI (%)</td>
<td>54</td>
<td>48</td>
<td>NS</td>
</tr>
<tr>
<td>Primigravida (%)</td>
<td>44</td>
<td>51</td>
<td>NS</td>
</tr>
<tr>
<td>Nulliparous (%)</td>
<td>70</td>
<td>76 (2)</td>
<td>NS</td>
</tr>
<tr>
<td>Multiple birth (%)</td>
<td>18*</td>
<td>19**</td>
<td>NS</td>
</tr>
</tbody>
</table>

(1) (Dean and Sullivan 2003)
(2) (Parity of women delivering babies of at least 20 weeks gestation following ART in 2002, Dr E Sullivan, Director NPSU, Personal communication, March 6 2006)
* Proportion of the 166 reported births
** Refers to the multiple birth rate in the 2002 ART cohort (Bryant et al. 2004)

Some discrepancies were noted between study participants and all women who conceived with ART for reported proportions of multiple causes and unexplained cause of infertility. These differences may reflect classification differences: study participants
reported their own understanding of the cause of infertility, whereas causes for all ART conceptions are provided by the ART clinics. In spite of the relatively high proportion who reported that the cause of infertility was unexplained, most participants (n=155, 86%), described feeling adequately informed by their health professionals about the cause of infertility.

Over half of the participants (n=96, 53%) had undergone one or more other fertility treatments before joining the ART program. These included ovulation induction where oral or injected hormonal medications are taken to stimulate ovulation (n=64, 35%), intrauterine insemination where sperm is placed in the uterus via a fine tube (n=33, 18%) or surgical treatment for the woman or her partner (n=6, 3%). Some had tried complementary therapies, such as herbal preparations and acupuncture, to assist conception (n=14, 8%). Eighteen couples (10%) had had ART treatment elsewhere before joining MIVF or RS.

Participants underwent an average of 2.08 stimulated treatment cycles and 1.97 treatment cycles where the intention was to transfer stored frozen embryos, resulting in an average of 3.53 cycles where embryos were transferred. Over half of the participants (n=101, 55%) had ICSI for the index pregnancy and 17 (9%) used donor gametes.

5.2.3.3 The Burden of Infertility and Treatment scale

To enable evaluation of the impact of infertility and treatment on postnatal adjustment, the Burden of Infertility and Treatment (BIT) scale was constructed. This is a composite scale including seven infertility and treatment related items, which was developed to quantify the degree of difficulty involved in conceiving. BIT scores can range from 4 to 14 with higher scores indicating greater burden of infertility and treatment. The BIT is a continuous variable. Scores for participants were normally distributed and the mean (SD) recorded was 7.37 (1.39).

5.3 Physical and emotional well-being during pregnancy

Participants completed questionnaires in the first and last trimesters of the pregnancy. These gauged pregnancy physical and psychological health using standardised measures.
to assess mood and antenatal attachment to the fetus. The findings regarding participants’ physical and emotional well being during pregnancy will be reported elsewhere. A summary is reported here.

Study participants’ pregnancies were closely monitored. On average participants attended 16 antenatal visits. This is twice as many as suggested in guidelines based on the best available evidence on antenatal care for low risk women (Three Centres Consensus Guidelines on Antenatal Care Project 2001). Thirty-six participants (21%) underwent an invasive test for detection of chromosomal abnormality (Chorion Villi Sampling (CVS) or amniocentesis). This was a significantly higher proportion than for all Victorian pregnant women in 2002 (21% versus 8% respectively, p<0.0001). For women aged 37 or older there was no difference between participants and all Victorian women in the proportions who chose invasive prenatal testing by CVS or amnioscentesis (41% versus 43%, NS). However, among younger women (<37 years), the take-up rate of prenatal diagnostic testing among study participants was significantly higher than for all Victorian women in that age group (13% versus 3.6%, p<0.0001) (Muggli and Halliday 2003).

Almost all (86%) reported feeling “very well in every way” or “mostly well” throughout the pregnancy. One in seven (24/169, 14%) experienced one or more serious pregnancy complications such as bleeding, pre-eclampsia, premature uterine contractions and placenta praevia. This was similar to the rate of reported pregnancy complications among all Australian and New Zealand women who conceived with ART in 2002 (13.2%, NS) (Bryant et al. 2004). In addition, 25 (15%) participants reported minor complications such as hyperemesis, abdominal pain and backache.

As measured by the Profile of Mood States (POMS) (McNair et al. 1971) in late pregnancy, participants were less likely than a group of 320 Australian multiparous pregnant women who had conceived spontaneously to report anxiety, depressive symptoms and irritability (Kermode et al. 2000). Furthermore, they were much less likely than women in recent large population based longitudinal cohort studies (Evans et al. 2001; Buist et al. 2005) to report depressive symptoms or to score in the clinical range (over 12) on the Edinburgh Depression Scale (EDS) (Cox et al. 1987) as shown in Table 5.3.1.
Table 5.3.1 Comparison of EDS scores in study sample with relevant samples

<table>
<thead>
<tr>
<th>Study and country of study</th>
<th>N</th>
<th>Time measured</th>
<th>Mean (SD)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
<th>% &gt;12</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study sample Australia</td>
<td>160</td>
<td>32 weeks gestation</td>
<td>6.0 (3.8)</td>
<td></td>
<td></td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Buist et al. 2005 Australia</td>
<td>40,333</td>
<td>26-32 weeks gestation</td>
<td>6.9 (4.4)</td>
<td>-1.41 to -0.26</td>
<td>0.005</td>
<td>8.9</td>
<td>0.02</td>
</tr>
<tr>
<td>Evans et al. 2001 UK</td>
<td>12,059</td>
<td>32 weeks gestation</td>
<td>7.1 (5.1)</td>
<td>-1.61 to -0.46</td>
<td>0.001</td>
<td>15.2</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

There were no differences between primigravida and multigravida participants on any of the mood measures. In late pregnancy participants expecting twins felt less vigorous (“Vigour-Activity” scores 11.1 versus 14.0 respectively, 95% CI for the difference -5.08 to -0.74, p=0.009) and less able to think clearly (“Confusion-Bewilderment” scores 8.8 versus 7.1 respectively, 95% CI for the difference 0.32 to 3.16, p=0.02) than those expecting a singleton baby. These differences are likely to be attributable to the added physical and emotional demands of a multiple pregnancy.

The intensity of participants’ emotional attachment to the fetus was assessed with the Antenatal Attachment Questionnaire (AAQ) (Condon 1993). The AAQ measures two dimensions of the attachment on separate subscales, time and quality. The time dimension represents the intensity of preoccupation with the fetus and the amount of time spent thinking about, talking to, or dreaming about it. The quality dimension represents the degree of tenderness, affection and protectiveness expressed in the woman’s thoughts about the fetus. The scores recorded for the two subscales are added to produce a total attachment score. The mean gestational age when the AAQ was administered was 32 weeks both for participants in this study and the women in the validation study (Condon 1993). Compared with the normative sample participants recorded significantly higher scores indicating more intense and protective emotional attachment to the unborn baby. The mean AAQ scores for participants and the normative sample are shown in Table 5.3.2.
### Table 5.3.2 Comparison of AAQ scores

<table>
<thead>
<tr>
<th></th>
<th>Study sample Mean (SD) (n=166)</th>
<th>Comparison Mean (SD) (n=112)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAQ Quality mean</td>
<td>51.4 (3.05)</td>
<td>49.2 (4.9)</td>
<td>1.76 to 2.69</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>AAQ Time mean</td>
<td>29.9 (4.03)</td>
<td>26.5 (4.8)</td>
<td>2.78 to 4.02</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>AAQ Total mean</td>
<td>81.3 (6.1)</td>
<td>75.7 (8.1)</td>
<td>4.69 to 6.56</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

(1) Condon et al. (1993)

### 5.4 Obstetric and Perinatal Outcomes

In the study population 116 women (70%) gave birth to a first baby and 50 (30%) to a second or subsequent child. Of the 196 babies born, 136 (69%) were singletons and 60 (31%) twins. Of the 136 women who gave birth to a singleton baby 94 (69%) were primiparous and 43 (31%) had at least one previous child. Of the 30 participants who had twins 22 (73%) were first time mothers and 8 (27%) were multiparous. Five pregnancies where two fetal heartbeats had been detected at six weeks gestation resulted in the birth of only one baby as one of the two fetuses had miscarried during the pregnancy. One of the two participants with three fetal heartbeats at the early ultrasound examination lost the pregnancy at 21 weeks. The other triplet pregnancy was lost after an invasive procedure to attempt to reduce it to a singleton pregnancy was carried out.

The obstetric and perinatal outcomes as reported by the participants and comparison data of all Victorian and Australian parturient women who gave birth in 2002 and 2001 respectively are summarised in Table 5.4.1. It should be noted that the Australian and Victorian comparative population data include women who give birth after ART and that ART births accounted for approximately 2% of all births in 2002.
Table 5.4.1 Comparison of obstetric and perinatal outcomes with those of the general parturient population

<table>
<thead>
<tr>
<th></th>
<th>Study sample (n=166)</th>
<th>Victorian births 2002 (n=63,069) (1)</th>
<th>Australian births 2001 (n=250,758) (2)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean age of mother (years)</strong></td>
<td></td>
<td>35.0</td>
<td>30.0 (1)</td>
<td>4.35 to 5.63</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Mean age of first time mothers (years)</strong> (n=116)</td>
<td>34.7</td>
<td>28.4 (1)</td>
<td>5.53 to 7.11</td>
<td>&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td><strong>Primigravida (%)</strong></td>
<td>44.0</td>
<td></td>
<td></td>
<td></td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Nullipara (%)</strong></td>
<td>69.8</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Sets of twins (%)</strong></td>
<td>18.1</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Treated in private care (%)</strong></td>
<td>87.0</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Total spontaneous vaginal births (%)</strong></td>
<td>32.5</td>
<td>61.3 (1)</td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>-Singleton spontaneous vaginal births (%)</td>
<td>38.9</td>
<td>60.9 (1)</td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>-Twins spontaneous vaginal births (%)</td>
<td>3.3</td>
<td>19.5 (1)</td>
<td></td>
<td></td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Total assisted vaginal births (%)</strong></td>
<td>16.9</td>
<td>13.4 (1)</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>-Singleton assisted vaginal births (%)</td>
<td>19.1</td>
<td>13.3 (1)</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>-Twins assisted vaginal births (%)</td>
<td>6.7</td>
<td>18.3 (1)</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td><strong>Elective caesarean births without labour (%)</strong></td>
<td>25.9</td>
<td>13.0 (1)</td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Emergency caesarean births (%)</strong></td>
<td>24.7</td>
<td>12.3 (1)</td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Total caesarean births (%)</strong></td>
<td>50.6</td>
<td>25.3 (1)</td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>-Singleton caesarean birth (%)</td>
<td>41.9</td>
<td>25.7 (1)</td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>-Twins caesarean birth (%)</td>
<td>90.0</td>
<td>62.2 (1)</td>
<td></td>
<td></td>
<td>0.002</td>
</tr>
<tr>
<td><strong>Mean gestational age at birth (Weeks)</strong></td>
<td>38.4</td>
<td>39.0 (2)</td>
<td></td>
<td>-0.93 to -0.23</td>
<td>0.001</td>
</tr>
<tr>
<td>-Mean gestational age singletons (Weeks)</td>
<td>38.9</td>
<td>39.1 (2)</td>
<td></td>
<td>-0.54 to 0.12</td>
<td>NS</td>
</tr>
<tr>
<td>-Mean gestational age twins (Weeks)</td>
<td>36.1</td>
<td>35.4 (2)</td>
<td></td>
<td>-0.14 to 1.76</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Mean birth weight (g)</strong></td>
<td>3156</td>
<td>3375 (2)</td>
<td></td>
<td>-322 to -116</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>-Mean birth weight singletons n=136 (g)</td>
<td>3421</td>
<td>3408 (2)</td>
<td></td>
<td>-91 to 118</td>
<td>NS</td>
</tr>
<tr>
<td>-Mean birth weight twins n=60 (g)</td>
<td>2554</td>
<td>2418 (2)</td>
<td></td>
<td>-22 to 296</td>
<td>NS</td>
</tr>
</tbody>
</table>

(1) (Riley and King 2003)
(2) (Laws and Sullivan 2004)

* Treated in private care, not insurance status as this information is not available in the report. Most women treated in private care are privately insured but a small minority elect to self-fund.

Compared with all Victorian parturient women, study participants were older, more likely to be first time mothers, to have a multiple birth and an operative birth. Over half of the women in the study experienced a caesarean section and those who were having
their first child were more likely than women who had given birth before to be delivered by caesarean section (56% versus 38% respectively, p=0.03). Compared with all Australian women who gave birth in 2001 the mean gestation was shorter and the mean birth weight of the babies was lower for participants. The higher proportion of twins in the study population explains this.

There were more favourable perinatal outcomes in the study sample than in the population of women in Australia and New Zealand women who gave birth after ART in 2002 (Bryant et al. 2004). For both singleton and twin pregnancies, gestations were slightly longer and the mean birth weight of babies was slightly higher among study participants than for all ART births in Australia and New Zealand (Table 5.4.2). This is likely to be because the ART report includes all babies of ≥20 weeks gestation of which some are stillborn or die in the neonatal period due to prematurity.

| Table 5.4.2 Comparison of obstetric and perinatal outcomes with all Australian and New Zealand ART births |
|--------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|-------------------|
| Study sample (n=166) | Australian & NZ ART births 2002 (n=6,816) (1) | 95% CI for the difference | p-value |
| Mean age of mother (years) | 35.0 | 34.4 | -0.05 to 1.23 | NS |
| Total caesarean births (%) | 50.6 | 48.0 | NS |
| -Singleton caesarean birth n=136 (%) | 41.9 | 42.4 | NS |
| -Twins caesarean birth n=60 (%) | 90.0 | 71.1 | 0.02 |
| Mean gestational age at birth (Weeks) | 38.4 | 37.2 | 0.87 to 1.57 | <0.0001 |
| -Mean gestational age singletons n=136 (Weeks) | 38.9 | 38.4 | 0.16 to 0.82 | 0.004 |
| -Mean gestational age twins n=60 (Weeks) | 36.1 | 35.0 | 0.26 to 2.16 | 0.02 |
| Mean birth weight (grams) | 3156 | 2985 | 68 to 274 | 0.001 |
| -Mean birth weight singletons n=136 (grams) | 3421 | 3279 | 38 to 247 | 0.008 |
| -Mean birth weight twins n=60 (grams) | 2554 | 2397 | -1 to 317 | 0.05 |

(1) (Bryant et al. 2004)

In summary, there were a number of important differences between participants and comparison population groups. First, on the available indicators, participants’ socioeconomic circumstances were significantly better than those of comparison groups. Participants were more likely than other Australian women to have a university degree, be employed in professional occupations, have private health insurance and live in
accompanying that they owned or were purchasing. They were less likely to be from a non-English speaking background and more likely to be partnered than all Victorian parturient women (Riley and Halliday 2001). Second, the study sample differed from all Australian and Victorian women who gave birth in 2001 and 2002 on several obstetric and perinatal indicators. They were almost five years older when they gave birth, were more likely to be first-time mothers, to have twins and to experience an operative birth (Riley and Halliday 2001; Laws and Sullivan 2004).

Hence, some of the established risk factors for postnatal mood disturbance, such as being single (Webster et al. 1994; Johanson et al. 2000), having low socioeconomic and occupational status (O'Hara and Swain 1996; Bernazzani et al. 1997; Cooper and Murray 1998; Righetti-Veltema et al. 1998; Johnstone et al. 2001; Scottish Intercollegiate Guidelines Network 2002; Gale and Harlow 2003), and having an unwanted or unplanned pregnancy (Scottish Intercollegiate Guidelines Network 2002; Gale and Harlow 2003) were not present or were rare in this cohort. However, other risk factors, such as having an operative birth (Astbury et al. 1994; Fisher et al. 1997; Gale and Harlow 2003) and having twins (Thorpe et al. 1991; Fisher and Stocky 2003) were more common among participants than among other parturient women.

There were also important similarities between participants and all Australian and New Zealand women who gave birth after ART in 2002. In most respects, participants were similar to the whole ART population, which suggests that the sample represents Australian women who give birth following assisted conception accurately (Bryant et al. 2004).

5.5 POSTNATAL ADJUSTMENT

Postnatal psychological adjustment is influenced by multiple factors including socioeconomic circumstances, mood in pregnancy, the experience of the birth, the quality of the relationship with the partner, available practical and emotional support, physical health, coincidental circumstances, personality factors and infant temperament and behaviour.
5.5.1 Experience of the birth and postnatal care

There is evidence that provision of adequate support during the birth and experience of choice about intrapartum decisions are protective of postpartum emotional well-being (Green and Baston 2003). A number of questions in the first postpartum questionnaire therefore addressed participants’ experience of the birth and postnatal care.

Most participants (89%) described feeling “very well supported” during the birth, rated the care during the birth as “very kind and understanding” (87%) and felt that they were “always” or “mostly given an active say about what happened during the birth” (81%). However, one third (34%) reported that the pain or discomfort they experienced during the birth was “much worse” or “worse than expected” and an approximately equal number (31%) felt “undecided”, “disappointed” or “very disappointed” with the birth experience.

There were no statistical differences between those who rated the pain during birth as “much worse” or “worse than expected” and those who described the pain as “as expected”, “better” or “much better” in the proportions who felt that they were “always” or “mostly given an active say about what happened during the birth” (87% versus 79% respectively, p=0.17), described the intrapartum care as “very kind and understanding” (84% versus 88% respectively, p=0.45), felt “pleased” or “very pleased” with the birth (64% versus 73% respectively, p=0.22) or rated their overall satisfaction with the hospital stay as “very satisfied” (62% versus 67% respectively, p=0.54). However, mode of delivery and parity influenced satisfaction with some aspects of the birth. Participants who had a caesarean section were significantly less likely than those who had a vaginal birth to report “always” or “mostly” having an active say about what happened during the birth (66% versus 95% respectively, p<0.001) and less likely to be feeling “pleased” or “very pleased” with the birth (55% versus 83% respectively, p<0.001). One quarter of participants (25%) rated the pain they experienced after the birth as “severe” or “very severe”. Those who had a caesarean section were significantly more likely than those who had a vaginal birth to report severe postnatal pain (32% versus 17% respectively, p=0.02).
Multiparous women were more likely than first time mothers to report “always” or “mostly” having had an active say about what happened during the birth (90% versus 76% respectively, $p=0.04$) and to be “very satisfied with the hospital stay” (78% versus 59% respectively, $p=0.02$). There were no significant differences between mothers of singletons and mothers of twins in their ratings of their involvement in decisions during the birth, feelings about the birth, or satisfaction with care during and after the birth.

Of participants who had a vaginal birth ($n=82$) 16 (19%) had no analgesia during labour, 31 (38%) used nitrous, some in combination with pethidine, and 35 (43%) had epidural analgesia. Compared with women who gave birth in public care in 2002, participants in this study were more than four times more likely to have epidural analgesia during labour (43% versus 10% respectively, $p<0.0001$). Compared with women who gave birth in private care in Victoria that year, participants were twice as likely to be administered epidural analgesia (43% versus 21% respectively, $p<0.0001$) (Riley et al. 2005).

The length of hospital stay after birth was longer for participants than for all Victorian women who gave birth in 2002. Of participants who had a vaginal birth ($n=82$) fewer stayed 1-2 days (10% versus 38%, $p<0.0001$) and a higher proportion stayed five days or longer (39% versus 10%, $p<0.0001$) than other Victorian women (Riley et al. 2005). The majority of participants who had a caesarean section delivery stayed in hospital five days or longer (71/84, 85%), a significantly higher proportion than among all Victorian women who had a caesarean birth in 2002 (56%) ($P<0.0001$) (Riley et al. 2005). Hospital stay after childbirth is longer in private than public care. Comparing participants with Victorian women who gave birth in private care the proportion staying five days or longer was significantly higher (62% versus 42%, $p<0.001$) (Riley et al. 2005).

Some of the questions relating to the intra- and postpartum care were drawn from the Victorian Survey of Recent Mothers (VSRM) (Brown et al. 2001; Bruinsma et al. 2001). Responses to these questions and comparisons with women in private care who participated in the Victorian survey are shown in Table 5.5.1.1.
Table 5.5.1.1 Experience of intra- and postpartum care, comparison with privately insured women who participated in the VSRM

<table>
<thead>
<tr>
<th>Study sample</th>
<th>Victorian mothers in 2000 (1)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always had an active say in decisions about the care during the birth (%)</td>
<td>47</td>
<td>58</td>
</tr>
<tr>
<td>Very satisfied with postnatal care (%)</td>
<td>65</td>
<td>62</td>
</tr>
<tr>
<td>Satisfied with length of stay in hospital (%)</td>
<td>71</td>
<td>75</td>
</tr>
</tbody>
</table>

1) (Brown et al. 2001; Bruinsma et al. 2001)

The high proportion of caesarean section deliveries among participants is likely to explain the smaller proportion of women who reported feeling that they always had an active say in decisions about care during the birth.

Thus, the findings regarding the childbirth experience demonstrate that participants were significantly more likely to experience medical interventions in childbirth and spent significantly longer time in hospital after birth than other parturient women.

5.5.1.1 Participants’ comments about the experience of the birth

Space was provided in all questionnaires where participants were able to make their own comments if they wished. Many participants used this opportunity to comment on the experience of the birth. For some the birth was traumatic and painful.

“I found the birth very traumatic, pain of labour and recovery afterwards and got quite emotional feeling sorry for myself – maybe ‘postnatal blues’? For at least 4 weeks things / life felt very surreal and I couldn’t get a grip on reality, forgetful, dreamy…” [Primiparous woman aged 40, delivered singleton vaginally at term]

“I began bleeding and the decision was made to deliver the babies. We had ½ hour to prepare for this mentally and it was very scary.” [Primiparous woman aged 35, delivered twins by caesarean section at 30 weeks gestation]

“Due to my fear of the Caesar I did not feel a big rush of love when they took [son] out. I was just relieved that he was in one piece and breathing.” [Primiparous woman aged 33, delivered singleton by caesarean section at term]
Others expressed disappointment and feelings of failure, often in relation to having had a caesarean section.

“Now having two healthy wonderful babies I can’t help feeling I really missed something with having the emergency C-section, I don’t know anything about their birth and didn’t get to see them until the next day. A very surreal experience.”
[Primiparous woman aged 35, delivered twins by caesarean section at 30 weeks gestation]

“I felt a little disappointed at having had a C-section and couldn’t do it naturally, but was extremely happy with our result – [daughter]. I’m not good with pain but I think if I go back and have another child I would want to try it again as naturally as possible.”
[Primiparous woman aged 38, delivered singleton by caesarean section at term]

“I felt cheated by having a Caesarean but was very happy it went well and my baby was well after.”
[Primiparous woman aged 45, delivered singleton by caesarean section at 36 weeks gestation]

“Overall the conception to birth has been so clinical I feel a bit of a failure. If it was not for the medical/scientific interventions our son would not be with us.”
[Primiparous woman aged 33, delivered singleton by caesarean section at term]

“Poor bonding to baby first week, so disappointed didn’t experience him being born.”
[Primiparous woman aged 35, delivered singleton by caesarean section under general anaesthesia at term]

There were also several comments relating positive experiences.

“[Daughter] was born by emergency C-section after my membranes ruptured at 34 weeks. I was prepared for the Caesar as the baby had been breech throughout the pregnancy and the obstetrician had outlined all possible birth options. We knew she only had one kidney but did not know the implications of this so we were fully prepared for her stay in special care. I think that being educated and prepared on all the possible eventualities helped us to cope at the birth and in the days following her arrival.”
[Primiparous woman aged 31, delivered singleton by caesarean section at 34 weeks]

“This birth was an amazing experience thanks to the kindness of all the staff involved and the post-op care given.”
[Multiparous woman aged 34, delivered singleton by caesarean section at term]
“I had a wonderful midwife that was known to myself and our family both through working together and our continuity of antenatal visits. This made the experience very satisfying for us.” [Multiparous woman aged 36, delivered singleton vaginally at term]

“I was very pleased with the birth – I had excellent care and both husband and I were extremely elated when we heard baby’s first lusty cry.” [Primparous woman aged 41, delivered singleton by caesarean section at 36 weeks]

### 5.5.2 First encounter with the baby and feeding advice

Almost all participants were able to see (97%) and hold (84%) their baby immediately or within a few minutes of the birth. Those who had a caesarean birth were less likely than those who had a vaginal birth to be able to hold their baby at birth (73% versus 96% respectively, p<0.001). In total 45 (23%) babies were admitted to an intensive or special care nursery. The most common reasons were prematurity (n=17, 38%) and respiratory distress (n=12, 27%). Babies born by caesarean section were more likely to be admitted to special care than babies born vaginally (39% versus 15% respectively, p<0.0001). A higher proportion of twins than singletons were admitted to special care nursery (50% versus 22% respectively, p=0.002).

Almost all women initiated breastfeeding (89%). This was a slightly lower proportion than among women who participated in the Victorian Survey of Recent Mothers in 2000 (92%) (Brown et al. 2001). Over two thirds of participants (67%) reported that they needed “quite a lot” of help or advice with feeding the baby while they were in hospital. Those who had a caesarean section were more likely than those who had a vaginal birth to report that they needed “quite a lot” of advice (79% versus 55% respectively, p=0.01), and first-time mothers were more likely than those who already had children to agree that they needed “quite a lot” of help or advice (82% versus 32% respectively, p<0.001). Furthermore, mothers of twins were more likely than mothers of singletons to report needing “quite a lot” of advice with feeding the babies while in hospital (83% versus 63% respectively, p=0.03). Only 43% of women regarded the advice as “very clear and working well” whereas 57% rated the advice as only “fairly clear” or as “confusing and not working well”. Women who stated that they needed “quite a lot” of advice were less likely than women who needed only a little advice to rate the advice they received as “very clear” (32% versus 66% respectively, p<0.001).
5.5.2.1 Participants’ comments about the first encounter with the baby

Most comments in relation to the first encounter with the baby related to being separated from the baby due to the need for the baby to stay in intensive care or special care nursery. Universally these comments reflected distress and frustration about the separation or the experience of being discharged from hospital without the baby.

“Both girls (twins) remained in hospital for 2 weeks after I was discharged and wanting to see them each day and care for them, I was travelling in and out each day and I think my own recovery from the C-Sect and difficult pregnancy was hindered.” [31 year old mother of twins born at 34 weeks who spent 21 days in hospital]

I was only able to hold [daughter] for approximately 15 seconds, as she needed to be admitted to SCN. Very stressful time after the birth with [daughter] having respiratory distress. Not being able to have her with me was a big disappointment, but as long as she was OK I could cope with it. Not much support from the staff during this time. Looking back, my husband and I needed someone to come and talk to us right away about what was wrong with [daughter], we didn’t understand about her condition until the third day.” [38 year old mother of a baby born at term with respiratory distress]

“Baby was on another floor – I was bottle-feeding him and expressing milk – not much time between activities. I would have preferred to stay in hospital with baby (went home, baby stayed in another 9 days). It was a little tiring and draining travelling back and forth for the remaining days.” [41 year old mother of a baby born at 36 weeks who spent 12 days in hospital]

“I had to go home before my baby which was very distressing. Expressing at home and travelling to the hospital everyday was very tiring.” [32 year old mother of a baby born at 36 weeks who spent 10 days in hospital]

Several participants expressed concern that they felt unprepared and poorly informed about how to care for the baby when they left the hospital.

“Not enough assistance was given re: settling your baby and what to expect when you go home. I felt the nurse could have assisted me more in discussions. I felt that after the birth and initial care i.e.: breastfeeding and first bath, no real preparation was done for when you go home.” [Primiparous woman aged 29 who delivered a singleton at term]
“There wasn’t enough time to learn about settling techniques once the baby was home and a few weeks older. It would have been beneficial to know about what to expect in the following weeks at home and to be given some guidance in how to look after and settle a newborn baby.” [Primiparous woman aged 32 who delivered a singleton at term]

“Lacked confidence in looking after the baby.” [Primiparous woman aged 41 who delivered a singleton at term]

### 5.5.3 Relationship with partner

There is extensive evidence that early postnatal adjustment and emotional well-being are linked to the quality of the relationship with the partner. Boyce et al. (1991) for example demonstrated that postnatal depression is associated with a woman’s perception of her spouse as uncaring and over controlling. Conversely, a supportive and caring partner can reduce the risk of maternal postnatal distress. In this study the quality of the relationship with the partner was assessed in a number of ways.

The Intimate Bonds Measure (IBM) (Wilhelm and Parker 1988) is a measure of the perceived quality of the relationship with the partner. The mean IBM scores for participants in this study were significantly higher on the “care” dimension and lower on the “control” dimension than for the normative sample (Wilhelm and Parker 1988) (see Table 5.5.3.1). This indicates that study participants perceived their partners as more caring and considerably less dominating, intrusive and authoritarian than average.

Table 5.5.3.1 Comparison of IBM subscale scores with female population norms

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Study sample (n=161)</th>
<th>Female population norms (n=148) (1)</th>
<th>95% CI of the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Mean (SD)</td>
<td>28.4 (7.3)</td>
<td>27.1 (6.1)</td>
<td>0.15 to 2.43</td>
<td>0.03</td>
</tr>
<tr>
<td>Control Mean (SD)</td>
<td>5.4 (5.9)</td>
<td>9.6 (5.4)</td>
<td>-5.1 to -3.27</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

(1) (Wilhelm and Parker 1988)

In the early postpartum period more than one in five (n=37, 23%) of the 163 partnered participants stated that their relationship with their partner was better than before the birth. Of the remainder, 48 (29%) reported that the relationship was unchanged, 65 (40%) that the relationship was different from what it had been before the birth and 13
(8%) that it was worse than before the birth. This is a different pattern from that observed in a study of 107 women who had conceived spontaneously where a significant decrease in satisfaction with spouse between the third trimester of pregnancy and three months after the birth was reported (Wilkinson 1995).

Of the 118 participants who had attempted to have sexual intercourse in the interval between the birth and three months postpartum 82 (70%) enjoyed the sexual relationship while the remainder reported feeling disappointed. Of those who responded to the question about their sexual relationship (n=156) at eight months, over half (n=86, 55%) described it as the same as before. Sixteen (10%) participants reported that their sexual relationship was worse than before the birth of the baby, while 30 (19%) rated it as better. The remainder (n=24, 15%) described their intimate relationship as different from what it had been before the birth.

At eight months postpartum participants were asked if they felt that they could confide in their partner. Of the 157 partnered participants who responded, the majority (n=117, 75%) reported being able to talk to their partner as much as they needed. Primiparous participants were less likely than multiparous to report that they were able to talk to their partner as much as they needed (70% versus 85% respectively, p=0.05). Others have also found that the change in the quality of the relationship with the partner after the birth of a baby is more pronounced for first time mothers than for multiparous women (Wilkinson 1995).

When the children were 18 months old almost all participants stated that they were as able or better able to confide in their partner than before (n=135, 92%). This improvement may be due to an increase in responsiveness from the male partners over time or to a decrease in participants’ need to confide in their partner.

Overall it appears that most participants perceived their partner as caring and supportive and felt able to confide in their partner.
5.5.4 Personality characteristics

The Vulnerable Personality Style Questionnaire (VPSQ) (Boyce et al. 2001) was completed by study participants in the early postpartum period. The mean (SD) score for participants on the “Vulnerability” sub-scale of the VPSQ was 14.55 (4.05). This was higher than the mean score reported in the normative postnatal sample (13.46, 95% CI for the difference 0.47 to 1.71, p=0.001). Analysis of the six individual items, measuring dimensions of personality, which constitute the “Vulnerability” subscale revealed that, compared with the normative postnatal sample, participants described themselves as less timid but more sensitive and prone to worrying. There were no differences between participants and the normative sample in the mean scores of the items describing nervousness, obsessiveness and volatility. The mean scores for each item and comparison with the normative postnatal sample are shown in Table 5.5.4.1.

Table 5.5.4.1 Comparison of mean scores on items on the vulnerability sub-scale of the VPSQ

<table>
<thead>
<tr>
<th>Personality dimension</th>
<th>Study sample (n=166)</th>
<th>Postnatal normative sample (n=475) (1)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nervous</td>
<td>2.1</td>
<td>2.1</td>
<td>-0.17 to 0.17</td>
<td>NS</td>
</tr>
<tr>
<td>Timid</td>
<td>1.8</td>
<td>2.0</td>
<td>-0.29 to 0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>Sensitive</td>
<td>3.1</td>
<td>2.6</td>
<td>0.30 to 0.67</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Worrier</td>
<td>3.0</td>
<td>2.7</td>
<td>0.11 to 0.50</td>
<td>0.002</td>
</tr>
<tr>
<td>Obsessive</td>
<td>2.4</td>
<td>2.4</td>
<td>-0.17 to 0.17</td>
<td>NS</td>
</tr>
<tr>
<td>Volatile</td>
<td>2.1</td>
<td>2.2</td>
<td>-0.23 to 0.10</td>
<td>NS</td>
</tr>
</tbody>
</table>

(1) (Boyce et al. 2001)

5.5.5 Physical health

In the early postpartum period two-thirds (66%) of participants rated their health as “excellent” (28%) or “very good” (38%). When asked whether they were experiencing any of the common postnatal health problems 27 (17%) stated that they had none. This was a significantly higher proportion than among new mothers in Victoria (n=1326) who participated in a large population-based survey six to seven months postpartum (5.6%) (p<0.0001) (Brown and Lumley 2000). Of those who reported having health
problems (n=135) 32% had one, and 27% had two, and 41% had three or more problems. The most common health complaints were back pain (51%), fatigue (36%), hemorrhoids (25%), headaches (24%) and breast problems such as mastitis and cracked nipples (12%). Eight and eighteen months after the birth over two thirds of participants (70% and 72% respectively) still suffered from one or more than one health problem of which the most commonly reported were backache (41% at eight months, 45% at 18 months), fatigue (34% at eight months, 31% at 18 months), headaches (23% at eight months, 28% at eighteen months) and urinary incontinence (17% at eight months, 18% at 18 months). Postpartum bladder problems are frequently attributed to pelvic floor muscle damage during vaginal birth (Goer 2001). However in this sample, there were no significant differences in rates of bladder problems between those who had a vaginal or a caesarean birth.

Disrupted sleep patterns caused by frequent night-time waking to attend to the needs of the baby are common among new mothers and can lead to serious fatigue. In this sample 23% of the babies woke more than three times every night when they were aged 3 months. By the time the children were 18 months old, over one fifth (22%) were still waking more than 3 times every night. Mothers of children waking frequently at night were significantly more likely than others to report that they never or only sometimes had adequate sleep at night (63% versus 34% respectively, p=0.004).

5.5.6 Social circumstances

The work involved in caring for a new baby is physically and emotionally demanding. The amount and quality of the practical and emotional support available to a new mother is an important determinant of postnatal psychological adjustment (Brugha et al. 1998). At all three time points in this study, questions relating to participants’ paid and unpaid work and their perception of the practical and emotional support that they received were asked.

5.5.6.1 Grandparents’ reaction

Over half of the participants (54%) reported that all four grandparents were living. Of the remainder 35% reported that three grandparents were living, 6% that two, 4% that 1
and 1% that none of the grandparents were still living. It would appear that grandparents in most cases reacted very positively to the birth of the baby. Of those who reported that all grandparents were alive (n=90), almost half (44%) stated that all four grandparents were “very delighted and enthusiastic” about the birth of the baby. Most participants (n=132, 80%) reported that two or more grandparents were “very delighted and enthusiastic” about the birth of the new baby. Of the 162 participants who had at least one grandparent who was still living 49% reported that all grandparents were “very delighted and enthusiastic” about the baby.

### 5.5.6.2 Unpaid work and employment

Three months after the birth of their baby 77% of participants were caring for their children at home full-time. The remainder (23%) were employed in addition to being a mother. Of the fathers, 90% were in full-time and 6% in part-time paid employment. Five fathers were caring for the baby full-time and one was described as a father and a volunteer. Over time more women returned to the paid workforce. The reported number of hours in the workforce and number of hours of independent leisure time for participants and their partners eight months after the birth are shown in Table 5.5.6.2.1.

Table 5.5.6.2.1 Work and leisure time for participants and their partners at 8 months postpartum

<table>
<thead>
<tr>
<th>Work/Leisure time</th>
<th>Participants (n=150 for work and n=129 for leisure)</th>
<th>Partners (n=155 for work and n=129 for leisure)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean number of hours in employment/week (range)</td>
<td>10 (0-60)</td>
<td>47 (0-75)</td>
<td>-39.12 to -34.50</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Not employed (%)</td>
<td>54</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed 1-20 hours/week (%)</td>
<td>25</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed 21-40 hours/ week (%)</td>
<td>18</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed &gt;40 hours/ week (%)</td>
<td>3</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean number of hours of independent leisure/week (range)</td>
<td>2.9 (0-14)</td>
<td>5.5 (0-20)</td>
<td>-3.15 to -2.05</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No independent leisure time (%)</td>
<td>29</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 hours leisure time/week (%)</td>
<td>29</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-5 hours leisure time/week (%)</td>
<td>23</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;5 hours leisure time/week (%)</td>
<td>18</td>
<td>38</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As most participants provided primary care for the baby, partners on average spent more time in paid work. However, women reported their partners as having significantly more independent leisure time than they themselves had. Twenty two percent of men spent 60 hours or more per week away from home at work and an average four hours on independent leisure activities, leaving little time available to share domestic work and infant care.

By the time the children were 18 months old 40% of participants were still caring for the child or children fulltime, 36% were employed up to 20 hours per week, 17% between 21 and 40 hours and 7% were employed more than 40 hours per week. The proportion of participants who were employed when their youngest child was 18 months old (60%) was higher than that of all Australian women whose youngest child was aged 0 to 4 years in 2000 (49%) (McDonald 2001). Of the 92 women who were in paid employment, most (72%) described the time they spent working as “about right”, 26% as “too long” and 2% as “too short”. Participants who were employed more than 20 hours per week were more likely than those who spent less than 20 hours per week in paid employment to state that the time spent in paid work was “too long” (58% versus 6%, p<0.0001). When participants employed in the three highest levels of the Australian Standard Classification of Occupations (ASCO 1-3, Managers and administrators, Professionals and Associate professionals) were compared with participants employed in other occupations, there were no differences in the proportion who described the time spent working as “about right” or “too long”.

At 18 months, the mean number of working hours for the partners was still 47 hours per week. The most common childcare arrangements for mothers in paid employment was care provided by a family member or a nanny (45%), centre or family-based childcare organised by the private sector or a local council (24%) or a combination of the two (31%). Most participants (87%) regarded their childcare arrangements as satisfactory. Of the 61 participants who were not currently in the paid workforce 41 (67%) were not planning to return in the foreseeable future. There was no statistically significant difference in workforce participation rate between primiparous and multiparous mothers but mothers of twins were less likely than mothers of singletons to have returned to paid employment 18 months after the birth (43% versus 64% respectively, p=0.04).
5.5.6.3 Domestic work including childcare

Questions about how domestic and childcare work was shared in the household revealed that in the early postpartum almost one in five women (19%) did all the work and that 42% did most of the work. Only 13% shared the work equally with their partner and 26% stated that they were helped by family or were using paid help. Most women agreed that these arrangements were satisfactory (87%) but in spite of this, almost one in five (18%) perceived that they had not had enough help since coming home from hospital. No differences were noted between primiparous and multiparous women or between mothers of twins and mothers of singletons in their responses to questions about domestic and childcare work. When the children were eight months old, 63% of participants stated that the amount of domestic and infant care work contributed by their partner was the same as in the early postpartum period, 26% reported that partners had increased involvement and 10% that they contributed less than at three months postpartum. Similarly, the amount of practical support received from others was the same (60%) for most or more (24%) and in a few cases less (15%) than at three months. Employed participants were more likely than those caring for children at home full-time to have the same amount or more support from others at eight months as they had been at three months (91% versus 77%, p=0.02).

When the children were 18 months of age the mothers were asked to reflect on the amount of practical support they had received from a range of people since the child or children were born. The range of scores for each potential provider of practical support was 0 (“no support” or “not applicable”) to 4 (“considerable support”) and the range of total scores for the composite item “Practical support” was 0 to 36. The mean (SD) score for “Practical Support” for the 147 participants who completed the questions was 11.2 (5.7). The mean (SD) of the three most important providers of practical support were participants’ partner 3.09 (1.09), own mother 2.12 (1.61) and their friends 1.36 (1.29).

The frequency of fathers’ participation in childcare activities was also assessed at this time. This section was completed by 146 partnered participants and the results are shown in Table 5.5.6.3.1.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Daily (%)</th>
<th>Sometimes (%)</th>
<th>Occasionally/Never (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding</td>
<td>51</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>Changing</td>
<td>57</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Bathing</td>
<td>51</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Playing at home</td>
<td>77</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>Taking out for walk/play</td>
<td>42</td>
<td>40</td>
<td>18</td>
</tr>
<tr>
<td>Settling</td>
<td>39</td>
<td>35</td>
<td>26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity</th>
<th>Daily (%)</th>
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<th>Occasionally/Never (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding</td>
<td>51</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>Changing</td>
<td>57</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>Bathing</td>
<td>51</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Playing at home</td>
<td>77</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>Taking out for walk/play</td>
<td>42</td>
<td>40</td>
<td>18</td>
</tr>
<tr>
<td>Settling</td>
<td>39</td>
<td>35</td>
<td>26</td>
</tr>
</tbody>
</table>

Eighteen to 26% of fathers never or only occasionally took part in childcare activities, apart from playing with the baby at home. As more than one in five fathers (22%) spent more than 60 hours away from home at work, this may explain the low participation rate in some of the childcare activities.

### 5.5.6.4 Emotional support

Women sometimes report feeling isolated and lonely in the postpartum period (Small et al. 1994; Beck 2002). In the early postpartum assessment participants were therefore asked to rate how frequently they experienced feelings of loneliness. The majority (62%) responded that this rarely occurred. Of the remainder, 33 (20%) reported feeling lonely “occasionally”, 26 (16%) “sometimes” and 4 (2%) “very often”.

When the children were 18 months old, participants were asked to recall and rate the emotional support they had received from a range of people since the birth. The range of scores for each potential provider of emotional support was 0 (“no support” or “not applicable”) to 4 (“considerable support”) and the range of total scores for the composite item “Emotional support” was 0 to 48. The mean (SD) score for “Emotional Support” for the 147 participants who completed the questions was 21.03 (7.12). The mean (SD) of the three most important providers of emotional support were participants’ partner (mean 3.18, SD 1.14), friends (mean 2.96, SD 1.05) and own mother (mean 2.61, SD 1.47). The highest possible rating for partner emotional support was reported by a significantly higher proportion of participants in this study than of participants in a population based study conducted by Green and Kafetsios (1997) (55% versus 30%, p<0.0001).
When the babies were eight and 18 months old, participants were asked whether they spent time with groups of mothers of babies of comparable age to their own and if they did, how much they enjoyed this (see Table 5.5.6.4.1).

<table>
<thead>
<tr>
<th>Frequency of attending mothers group</th>
<th>At 8 months (n mothers=161)</th>
<th>At 18 months (n mothers=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Never spend time in mothers’ group</td>
<td>15 (9)</td>
<td>16 (10)</td>
</tr>
<tr>
<td>Occasionally spend time in mothers group</td>
<td>59 (37)</td>
<td>58 (38)</td>
</tr>
<tr>
<td>Regularly spend time in mothers group</td>
<td>87 (54)</td>
<td>79 (52)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enjoyment of mothers group</th>
<th>At 8 months (n participating mothers=146)</th>
<th>At 18 months (n participating mothers=137)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Not very enjoyable</td>
<td>0</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Somewhat enjoyable</td>
<td>67 (46)</td>
<td>56 (41)</td>
</tr>
<tr>
<td>Extremely enjoyable</td>
<td>79 (54)</td>
<td>79 (58)</td>
</tr>
</tbody>
</table>

First-time mothers were more likely than mothers who already had children to meet regularly with other mothers (60% versus 39% respectively, p=0.02). Although there was no statistically significant difference in age between primiparous and multiparous mothers in the study population, regular mothers’ group participants were younger than were those who never or only occasionally attended (33.75 versus 35.42, 95% CI for the difference -2.92 to -0.40, p=0.01).

5.5.6.4.1 Participants’ comments about mothers group participation

A large number of participants volunteered information about their interactions with other mothers. Women frequently met regularly with groups of mothers who had been brought together by the local Maternal and Child Health Nurse. However, some were meeting regularly with friends or family members who had babies of a similar age. Interacting with other women was for the most part described as helpful and rewarding.
“I find it really helps to put your problems as a mother in perspective by talking to other mothers – they all go through similar things. It always makes me feel better.” [Primiparous woman aged 32 with 8 months old baby]

“Mothers group and Kindermusic are two of the most important things I do at this time. They allow me to put a realistic framework around life with baby.” [Primiparous woman aged 42 with 8 months old baby]

“At times it [mothers group] has been my life saver.” [Multiparous woman aged 32 with 8 months old baby]

“ I thoroughly enjoy ‘parent group’. I find these meetings a place to talk openly with other mothers about their/our experiences and a place to realize your feelings, thoughts and actions are totally ‘normal’.” [Primiparous woman aged 34 with 8 months old baby]

“It has been very reassuring to spend time with other mothers and has made me more confident in my parenting decisions.” [Primiparous woman aged 33 with 8 months old baby]

Some however were critical about their mothers group and expressed frustration about being compared with others.

“I have found that women can make issues regarding their children a competition. I have no time for this kind of behaviour. Our children grow and do things in their own time and when it comes time for children to start school most are at a similar stage.” [Multiparous woman aged 39 with 18 months old child]

“I feel you are compared and judged as a new mum. It puts more stress on you and undermines your feelings as a new mum.” [Primiparous woman aged 30 with 8 months old baby]

“I feel pressured by other mothers regarding my parenting style.” [Primiparous woman aged 37 with 8 months old baby]

Mothers of twins preferred meeting with other mothers of twins as they were better able to understand the difficulties involved in caring for more than one baby.
“My local mothers group is a bit tedious as they don’t understand what it is like to have twins whereas the local multiple birth group I attend monthly is just fantastic.” [Primiparous woman aged 36 with 8 months old twins]

“Having twins I find other mothers in my mothers group do not really understand.” [Primiparous woman aged 28 with 8 months old twins]

“The singleton mothers in my local mothers group just don’t get it! I prefer to spend time with mums of twins I have become friendly with.” [Primiparous woman aged 36 with 18 months old twins]

Some commented on the fact they were older than other women in their mothers group.

“My mothers group are 5-8 years younger than myself but I find despite the age difference our 3-4 times weekly get-togethers have been invaluable.” [Multiparous woman aged 40 with 8 months old baby]

“Would like to join a group of older mothers please!!!” [Multiparous woman aged 44 with 8 months old baby]

“Although I am the eldest in the group (by approximately 10 years) and they are not necessarily the sort of girls I would immediately gravitate to normally, our motherhood experiences bring us all to the same level.” [Primiparous woman aged 37 with 8 months old baby]

5.5.6.5 Coincidental demanding life events

At three months 70 (42%) participants were experiencing concurrent distressing life events in addition to the arrival of the new baby. These included financial difficulties or problems related to work or accommodation (n=30, 43%), illness in or death of a family member (n= 13, 18%) and difficulties in the relationship with the partner (n=2, 3%) or other member of the family (n=5, 7%). One in five of these (n=14) reported having more than one concurrent distressing problem.

At eight months one quarter of participants (n=40, 25%) reported the occurrence of a distressing life event since the previous assessment. The most commonly reported problems were the participant’s own sickness or sickness in the family or death of a
family member (n=21, 53%). Two participants reported financial or work related worries and two were experiencing problems in the relationship with the partner. Four had experienced spontaneous loss of a subsequent pregnancy and one a pregnancy termination after an unexpected spontaneous conception. One other participant who had conceived unexpectedly and decided to continue the pregnancy categorised this as a stressful life event.

At 18 months almost one third of participants (n=47, 30%) reported having experienced a distressing life event since completing the previous questionnaire. Their own sickness and sickness in the family or death of a family member were again the most common sources of distress (n=21, 45%). Four participants had financial or employment concerns and two were experiencing relationship problems. Six participants reported having experienced pregnancy loss and five were currently pregnant or had recently had another baby.

Through the course of the study, only 64 of the 152 participants (42%) who responded to the three postnatal questionnaires did not report experiencing a coincidental distressing life event. Forty-one participants (27%) reported a coincidental distressing life event on one occasion, 34 (22%) on two occasions and 13 (9%) on all three occasions which suggests chronic life difficulties.

5.5.7 Caring for the new baby

5.5.7.1 Mother-infant emotional attachment

The emotional bond that develops between a mother and her child has two interrelated fundamental elements: the mother-to-infant attachment and the infant-to-mother attachment. A mother’s emotional attachment to her new baby is described as “an emotional tie or bond of affection experienced by the parent towards the infant” (Condon and Corkindale 1998).

When the babies were 8 months old, participants completed the Maternal Postnatal Attachment questionnaire (MPA) (Condon and Corkindale 1998) which measures mother-to-infant attachment. Some participants were unable to complete all the items of
the MPA. Four did not complete an item that asked how they felt when they left the baby, as this had never occurred. The item that asked whether participants usually tried to prolong or usually tried to shorten the time they spent with their baby was not completed by 14 participants.

The mean (SD) “Global Attachment” score for the 153 participants who completed the MPA was 83.5 (6.6). This was not statistically different from the mean (84.1) and SD (6.7) recorded in the normative sample of 202 mothers of 8 month-old infants (Condon and Corkindale 1998).

Three factors representing different dimensions of attachment can be derived from the MPA: “Quality of attachment”, “Absence of hostility” and “Pleasure in interaction”. Higher scores on these subscales indicate higher quality of attachment, less hostility and more pleasure in interaction. The development study did not include normative data for these three subscales. However, in an Australian study of mothers of four months old babies who were born after ART the scores for these subscales were reported (McMahon 1997) and are compared with those of participants in this study in Table 5.5.7.1.1.

<table>
<thead>
<tr>
<th></th>
<th>Study sample (n=153)</th>
<th>Comparison (n=59) (1)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of attachment</td>
<td>41.9</td>
<td>41.8</td>
<td>-0.44 to 0.60</td>
<td>NS</td>
</tr>
<tr>
<td>Absence of hostility</td>
<td>19.8</td>
<td>20.9</td>
<td>-1.52 to –0.59</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pleasure in interaction</td>
<td>21.9</td>
<td>22.0</td>
<td>-0.45 to 0.25</td>
<td>NS</td>
</tr>
</tbody>
</table>

Table 5.5.7.1.1 Comparison of attachment subscale scores between participants and a comparison group of IVF mothers

(1) (McMahon 1997)

The comparison group excluded multiparous women and mothers of twins. It is possible that the lower score observed for “Absence of hostility” (indicating more hostility) among participants in this study may be explained by the additional strain inherent in caring for more than one child in 41% of the current study sample.

There were no statistically significant differences in attachment scores between first-time mothers and women who had other children. However, mothers of twins reported
lower “Pleasure in interaction” and “Global attachment” scores. The lower score on the “Absence of hostility” scale for mothers of twins indicate that these mothers felt more irritable when caring for the children than mothers of singletons (see Table 5.5.7.1.2).

**Table 5.5.7.1.2 Comparison of attachment scores between mothers of singletons and twins**

<table>
<thead>
<tr>
<th></th>
<th>Singletons</th>
<th>Twins</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of attachment</td>
<td>41.9</td>
<td>41.7</td>
<td>-1.18 to 1.50</td>
<td>NS</td>
</tr>
<tr>
<td>Absence of hostility</td>
<td>20.0</td>
<td>18.6</td>
<td>0.30 to 2.61</td>
<td>0.02</td>
</tr>
<tr>
<td>Pleasure in interaction</td>
<td>22.2</td>
<td>20.5</td>
<td>0.81 to 2.50</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Global attachment score</td>
<td>84.0</td>
<td>80.8</td>
<td>0.61 to 5.93</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**5.5.7.2 Maternal confidence**

At three months postpartum, over half the sample (52%) recalled feeling “very anxious” or “occasionally anxious” when first bringing the baby home from hospital. The proportion of participants who reported feeling “very” or “occasionally anxious” about baby care when leaving the hospital was almost double that of women of all parities in the Victorian Survey of Recent Mothers (VSRM) where 28% reported feeling anxious (p<0.001) (Brown et al. 2001). Study participants with twins were more likely than those with single babies to recall feeling anxious about caring for their babies when leaving the hospital (69% versus 48% respectively, p=0.03) and participants who were first time mothers were more likely than those who had other children to recall feeling anxious about baby care (65% versus 20% respectively, p<0.0001). Compared with first time mothers in an Australian population based survey (Brown and Lumley 1997) participants who were first time mothers were more likely to recall feeling anxious about baby care when leaving the hospital (47% versus 65% respectively, p<0.001).

By three months postpartum over half the participants (56%) felt “very confident” about baby care while 44% reported feeling “fairly confident” or “occasionally anxious”. First-time mothers were significantly more likely than women with previous experience to report feeling less than “very confident” about caring for the baby at three months (51% versus 28% respectively, p=0.006). No difference in confidence at three months was noted between mothers of twins and mothers of singletons. Although more women
described feeling “very confident” about baby care as the children grew older, about one third still reported feeling “occasionally anxious” or only “fairly confident” about baby care, when the children were 8 and 18 months old.

Two thirds of participants (66%) reported enjoying “all aspects” of caring for the baby when the children were 8 months and 61% when they were 18 months old. This is similar to the proportion who scored the maximum for “looking after the baby” on a five-point scale six weeks after the birth in a study of 1,285 women’s experience of early motherhood (66%) (Green and Kafestios 1997). The remainder enjoyed “some” or “most aspects” of baby care. At both time points there was a significant association between confidence in and enjoyment of baby care. Participants who reported feeling “very confident” about baby care at 8 months were more likely than those who were “occasionally anxious” or only “fairly confident” about baby care to state that they enjoyed “all aspects” of caring for the baby (78% versus 40% respectively, p<0.0001). The corresponding figures at 18 months were 76% versus 31% respectively (p<0.0001).

Women who reported being very confident about caring for the baby at eight and 18 months were more likely to have higher scores on the “Quality of attachment” and “Absence of hostility’ subscales of the MPA. However, the level of self-rated maternal confidence did not affect the degree of pleasure reported by participants in their interaction with the baby. The relationship between maternal confidence and the MPA subscales are shown in Table 5.5.7.2.1.
Table 5.5.7.2.1 Relationship between maternal confidence and MPA subscale scores at 8 and 18 months

<table>
<thead>
<tr>
<th>MPA subscale</th>
<th>Mean score</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of attachment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Very confident (8 mths) n=106</td>
<td>42.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Fairly confident/Occasionally anxious (8 mths) n=48</td>
<td>39.5</td>
<td>2.51 to 4.47</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>-Very confident (18 mths) n=101</td>
<td>42.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Fairly confident/Occasionally anxious (18 mths) n=45</td>
<td>39.8</td>
<td>1.8 to 3.96</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Absence of hostility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Very confident (8 mths) n=106</td>
<td>20.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Fairly confident/Occasionally anxious (8 mths) n=47</td>
<td>18.3</td>
<td>1.20 to 3.09</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>-Very confident (18 mths) n=100</td>
<td>20.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Fairly confident/Occasionally anxious (18 mths) n=45</td>
<td>18.4</td>
<td>0.85 to 2.82</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pleasure in interaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Very confident (8 mths) n=108</td>
<td>22.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Fairly confident/Occasionally anxious (8 mths) n=49</td>
<td>21.5</td>
<td>-0.24 to 1.27</td>
<td>NS</td>
</tr>
<tr>
<td>-Very confident (18 mths) n=103</td>
<td>22.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Fairly confident/Occasionally anxious (18 mths) n=46</td>
<td>21.4</td>
<td>-0.10 to 1.47</td>
<td>NS</td>
</tr>
</tbody>
</table>

Enjoying “all aspects” of the baby at eight and 18 months was associated with higher scores on all three MPA subscales as shown in Table 5.5.7.2.2.
Table 5.5.7.2.2 Relationship between enjoyment of baby care and MPA scores at 8 months

<table>
<thead>
<tr>
<th>MPA subscale</th>
<th>Mean score</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality of attachment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying all aspects of baby care (8 mths) n=101</td>
<td>43.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying most/some aspects of baby care (8 mths) n=53</td>
<td>39.7</td>
<td>2.28 to 4.21</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>-Enjoying all aspects of baby care (18 mths) n=90</td>
<td>43.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying most/some aspects of baby care (18 mths) n=56</td>
<td>39.8</td>
<td>2.24 to 4.21</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Absence of hostility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying all aspects of baby care (8 mths) n=101</td>
<td>20.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying most/some aspects of baby care (8 mths) n=52</td>
<td>18.3</td>
<td>1.34 to 3.17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>-Enjoying all aspects of baby care (18 mths) n=90</td>
<td>20.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying most/some aspects of baby care (18 mths) n=55</td>
<td>18.0</td>
<td>1.94 to 3.68</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Pleasure in interaction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying all aspects of baby care (8 mths) n=103</td>
<td>22.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying most/some aspects of baby care (8 mths) n=54</td>
<td>20.8</td>
<td>0.91 to 2.30</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>-Enjoying all aspects of baby care (18 mths) n=92</td>
<td>22.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Enjoying most/some aspects of baby care (18 mths) n=57</td>
<td>21.2</td>
<td>0.27 to 1.74</td>
<td>0.008</td>
</tr>
</tbody>
</table>

The direction of these relationships cannot be ascertained but it may be that diminished maternal confidence reduces the enjoyment of caring for the baby and the intensity of the emotional bond with the baby. It is also plausible that third element relative to baby behaviour mediates the relationship. A baby, who is difficult to soothe, settle and satisfy, may erode maternal confidence and reduce enjoyment of baby care.

The degree of difficulty involved in conceiving as measured by the Burden of Infertility and Treatment score was associated with self-reported maternal confidence in the early postpartum. Higher mean BIT score, indicating greater degree of difficulty conceiving, was observed in participants who stated that they felt “occasionally anxious” or only “fairly confident” than those who were “very confident” about baby care at three months postpartum (7.63 versus 7.16 respectively, 95% CI for the difference 0.05 to 0.89, p=0.03). However, there were no statistically significant relationships between BIT scores and self-reported maternal confidence when babies were older.
5.5.7.3 Anxiety about separation from the baby

In order to return to the paid workforce or to pursue other activities a mother needs to transfer the care and responsibility for her child to a child care centre or other caregiver. This may arouse sadness in the mother and worry about the child’s well-being when not cared for by her (Hock 1984). Study participants completed the Maternal Separation Anxiety Scale (MSAS) when the children were 18 months old (Hock et al. 1989a). The MSAS has three independent subscales: “Maternal separation anxiety”, “Perception of separation effect on the child” and “Employment-related separation concerns” where higher scores indicate greater anxiety and more concern. In the validation study maternal separation anxiety was measured at birth and when the child was seven weeks, eight and 14 months. Worry, sadness and guilt in relation to separation from the infant decreased in a linear fashion, as the child grew older. Comparison of 14 months scores and this study sample are shown in Table 5.5.7.3.1.

Table 5.5.7.3.1 Comparison of means on the three MSAS subscales

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Study sample</th>
<th>Comparison (n=130) (1)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean “Maternal separation anxiety” score (n=150)</td>
<td>20.7</td>
<td>19.5</td>
<td>0.55 to 1.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean “Perception of separation effect on the child” score (n=150)</td>
<td>15.6</td>
<td>13.8</td>
<td>1.26 to 2.43</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean “Employment-related separation concerns” score (n=148)</td>
<td>25.0</td>
<td>24.5</td>
<td>-0.28 to 1.28</td>
<td>NS</td>
</tr>
</tbody>
</table>

The children of participants were on average five months older than the children of the women in the normative sample and therefore maternal anxiety might be expected to have been lower. However, participants reported higher scores on the “Maternal separation anxiety” and “Perception of separation effect on the child” subscales than the comparison sample suggesting greater separation anxiety and stronger beliefs about the importance of exclusive maternal care.

When participants who were employed (n=91) were compared with those who were not employed (n=59) there were no differences in their mean scores on the “Maternal separation anxiety” and “Perception of separation effect on the child” subscales.
However, participants who were not employed had significantly higher scores on the “Employment-related separation concerns” subscale (26.6 versus 23.9 respectively, 95% CI for the difference 1.17 to 4.25, p=0.001). This subscale taps into the mother’s attitudes about balancing her maternal and work roles in relation to mother-child separation. The higher scores among mothers who were not employed suggest that they were more anxious about leaving their child in order to work outside the home than those who were employed.

A comparison of participants who were satisfied with the amount of time they spent in employment (n=65) with those who reported that they felt the time they worked outside the home was too long (n=23) revealed that those who were satisfied with their working hours experienced less separation anxiety than those who thought their working hours were too long (19.5 versus 22.3 respectively, 95% CI for the difference –4.33 to –1.14, p=0.001).

There were no differences on any of the subscales between mothers of singletons and mothers of twins. First time mothers (n=108) were slightly less concerned about the child’s welfare when cared for by others than mothers with more than one child (n=42) (mean scores on the “Perception of separation effect on the child subscale”: 15.28 versus 16.55 respectively, 95% CI for the difference –2.57 to 0.02, p=0.05).

5.5.7.4 Infant feeding

Although almost all participants (89%) initiated breastfeeding, the proportion who were still exclusively breastfeeding their infants at three months was smaller than that of the women in the 1995 Australian National Health Survey (Donath and Amir 2000) (45% versus 62% respectively). Also, compared with women who participated in the Victorian Survey of Recent Mothers (VSRM) (Brown et al. 2001) a smaller proportion of this sample was fully or partly breastfeeding their infants at three months (64% versus 72%, p=0.02). However, of those who did breastfeed, many continued this for a relatively long time. Fifty-four percent of all participants continued to breastfeed for more than six months and 27% were breastfeeding beyond one year. The proportion breastfeeding beyond one year was higher than among the women in the 1995 Australian National Health Survey (27% versus 14.6%) (Donath and Amir 2000).
Participants who reported that they needed “quite a lot” of advice about infant feeding when they were in hospital were significantly less likely to breastfeed at three months than those who needed “a little” or “none at all” (57% versus 78% respectively, \( p=0.01 \)). Participants who felt that the advice they received was “very clear and worked well” were more likely to breastfeed at three months than those who perceived the advice as “confusing” or only “fairly clear” (75% versus 55% respectively, \( p=0.01 \)).

The proportion of mothers of twins who were fully or partly breastfeeding at three months was significantly lower than for mothers of singletons (33% versus 71% respectively, \( p<0.0001 \)). No differences were observed in breastfeeding rates between primiparous and multiparous women. Although most women agreed that feeding was progressing very well, 67 (40%) reported one or more feeding difficulties in the early postpartum. The most common problems were low supply of breast milk (n=25, 37%), oversupply of breast milk (n=20, 30%), baby refusing the breast (n=12, 18%) and bottle feeding problems (n=8, 12%).

When mean eight months attachment scores (MPA) (Condon and Corkindale 1998) for participants who did not initiate breastfeeding (n=16) were compared with those who breastfed for at least six weeks (n=132) there was no difference in “Global attachment”. However, a significantly lower score, indicating less pleasure, was recorded on the “Pleasure in interaction” subscale for the group who never breastfed than for those who initiated breastfeeding (21.70 versus 23.25 respectively, 95% CI for the difference –2.71 to –0.40, \( p=0.009 \)).

5.5.7.4.1 Participants’ comments about breastfeeding advice

Many participants commented on the quality of the advice about breastfeeding that they had received while they were in hospital. Almost all these comments centered around lack of consistency about the advice given and the disadvantage of being discharged too soon from hospital.

“With each changing shift a new nurse would come in and assist with breastfeeding. Each nurse had their own techniques and feelings about it so I was left more confused about how to do it than I would have liked to be.” [Primiparous woman aged 35 with singleton baby]
“Breastfeeding advice varied dramatically between nurses – seemed no policy or guideline, difficult for first time mum.” [Primiparous woman aged 34 with singleton baby]

“Felt lack of care and continuity in education on breastfeeding. Gave up breastfeeding after 11 weeks after lots of problems, lots started in hospital.” [Primiparous woman aged 36 with singleton baby]

“Breastfeeding advice confusing. Different opinions confused me somewhat and I found this affected my confidence in feeding for the first few weeks.” [Primiparous woman aged 37 with singleton baby]

“I would have answered ‘very satisfied’ (re satisfaction with care in hospital) if it weren’t for the vast number of different opinions and advice we received from each midwife/nurse. Even on basic items like how to burp a baby. It would be nice if there was a ‘best practice’ advice/information giving consistent advice.” [Primiparous woman aged 34 with singleton baby]

“My milk did not come in for another couple of days and that brought about major feeding problems which could have been rectified quickly if I was still in hospital.” [Primiparous woman aged 35 with singleton baby]

“Hospital stay was disgracefully short. Sent home just as milk was coming in. No chance for really understanding how to feed properly.” [Primiparous woman aged 42 with singleton baby]

Two participants, both multiparous, commented positively on the help and advice about breastfeeding that they had received in hospital.

“I cannot speak more highly of the nursing staff who assisted in helping me with feeding and care of my second baby.” [Multiparous woman aged 34 with singleton baby]

“The staff were wonderful and really helped me get the breastfeeding going. I didn’t have much success with my first child breastfeeding – thanks to my determination and good start in hospital I was able to successfully breastfeed my son.” [Multiparous woman aged 34 with singleton baby]
5.5.7.5  Utilisation of early parenting services

A range of early parenting services is available in Victoria as described in Chapter 3. A total of 40% of participants accessed one or more early parenting services such as one-day lactation programs (18%), other day-stay mother-baby programs (13.5%) and residential mother-baby units (8.4%) within the first three months of the birth. Participants mothering first babies were significantly more likely than multiparous women to access day-stay early parenting services (38% versus 16%, p=0.005) but there was no difference between primiparous and multiparous participants in the rate of admission to residential services (11/116, 9.5% versus 3/50, 6% p=0.46). There were no differences between mothers of twins and mothers of singletons in the proportion utilising day-stay or residential early parenting services.

In the first 18 months of their child’s life 68/153 (44%) participants utilised one or more early parenting services. Mostly these were day-stay lactation or infant settling programs but 26/153 (17%) mothers were admitted with their infant to residential mother-baby programs. Compared with the admission rate of approximately 6% among all Victorian parturient women as shown in Chapter 3, this represents a threefold higher rate of admission to residential mother-baby programs after ART than after spontaneous conception. This apparent elevated rate of utilisation of residential mother-baby services confirms earlier reports of heightened risk of early parenting difficulties among women who conceive with ART (Fisher et al. 2002 a; Fisher et al. 2005; Fisher and Rowe 2005). First time mothers were more likely than those who had given birth before to utilise a residential service in the first 18 months (23/110, 21% versus 3/43, 7%, p=0.04) There was no difference in the rate of admission between mothers of singletons and mothers of twins. Some commented on the benefits of attending an early parenting service as illustrated by the following comments:

“We were totally sleep deprived for eight months. I felt I had no control over my life and was quite depressed and teary on my own. [Son] rarely slept during the day and constantly wanted to be held making my days very long and tiring with no relief at night. After waiting six weeks for an appointment I went to a settling program. There we went through some heartbreak letting him cry himself to sleep, but also learning all the sleep signs in him that we had missed and following a feed, play, sleep routine so
that he didn’t need to be fed to go to sleep. [Son] took to sleep like a duck to water
doing three day sleeps of 1.5 to 2 hours and 14 hours over night. It changed all our lives
for the better.” [Primiparous woman aged 38 with 8 months old baby]

“I am more relaxed, confident and have established a good routine of sleeping and
feeding for [daughter], largely as a result of attending a sleep/settling program.”
[Primiparous woman aged 41 with 8 months old baby]

5.6 INFANT HEALTH, TEMPERAMENT AND BEHAVIOUR

5.6.1 Infant health and development

Almost all participants rated their baby’s health and development as “excellent” or
“very good” when the baby was newborn (95%), eight months (95%) and 18 months old
(96%).

5.6.2 Infant temperament and behaviour

Infant temperament and behaviour are known to influence maternal mood and the
experience of caring for the baby (Astbury 1994; Hiscock and Wake 2001). Age-
appropriate standardised self-report measures of infant temperament were included at
each time point in this study. In addition, composite items were calculated by adding the
scores of questions about infant behaviour as described in the Methods. These were
labelled Infant Sleep, Cry and Feeding Patterns 1 and 2 (ISCFP1 and ISCFP2) for three
and eight months old babies respectively and Toddler Sleep Pattern (TSP) for the 18
months old child.

5.6.2.1 Early Infant Temperament Questionnaire

The Early Infant Temperament Questionnaire (EITQ) (Medoff-Cooper et al. 1993) was
completed by participants when their babies were aged three months. In the first part of
the EITQ nine subscales representing different temperament characteristics are
calculated. In the second part, the General Impression (GI) scale of the EITQ,
participants are asked to rate how they perceive their own infant’s temperament
compared with other infants of a similar age.
The total number of infants in this study was 196, including 30 sets of twins. Three mothers of twins only completed the EITQ for one of the twins and for one of these mothers this was due to serious illness requiring hospitalisation of the other twin. The mean scores for the nine subscales of the EITQ and comparisons with published norms are shown in Table 5.6.2.1.1. There were some differences between the study sample and the normative sample. Participants in this study rated the behaviour of their infants as significantly more irregular than the comparison group. However, they also described their babies as significantly less intense and as having greater persistence and attention span, and to be easier to distract and less likely to be disturbed by stimuli, such as sounds or light, than the normative sample.

Table 5.6.2.1.1 EITQ subscale scores and comparison with normative sample

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Study sample Mean (SD)</th>
<th>Norm for 3-4 month olds (n=142) (1) Mean (SD)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity * (n=191)</td>
<td>3.87 (0.76)</td>
<td>3.79 (0.73)</td>
<td>-0.03 to 0.19</td>
<td>NS</td>
</tr>
<tr>
<td>Rhythmicity (irregular)* (n=190)</td>
<td>3.11 (0.74)</td>
<td>2.90 (0.71)</td>
<td>0.10 to 0.32</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Approach (withdrawing)* (n=189)</td>
<td>2.81 (0.92)</td>
<td>2.84 (0.79)</td>
<td>-0.16 to 0.10</td>
<td>NS</td>
</tr>
<tr>
<td>Adaptability (low)* (n=166)</td>
<td>2.41 (0.75)</td>
<td>2.39 (0.63)</td>
<td>-0.09 to 0.14</td>
<td>NS</td>
</tr>
<tr>
<td>Intensity (intense)* (n=186)</td>
<td>3.82 (0.80)</td>
<td>3.96 (0.68)</td>
<td>-0.25 to -0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>Mood (negative)* (n=191)</td>
<td>2.76 (0.73)</td>
<td>2.79 (0.62)</td>
<td>-0.13 to -0.07</td>
<td>NS</td>
</tr>
<tr>
<td>Persistence (low)* (n=188)</td>
<td>2.23 (0.74)</td>
<td>2.49 (0.54)</td>
<td>-0.36 to -0.15</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Distractibility (low)* (n=177)</td>
<td>2.19 (0.74)</td>
<td>2.41 (0.58)</td>
<td>-0.33 to -0.11</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Threshold (low)* (n=190)</td>
<td>4.12 (0.69)</td>
<td>4.32 (0.56)</td>
<td>-0.29 to -0.10</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

(1) (Medoff-Cooper et al. 1993)
*Higher numerical score denotes tendency toward the characteristics in parentheses

The responses to the GI where participants were rating their own baby compared with other babies of similar age are shown in Table 5.6.2.1.2.
Table 5.6.2.1.2 Scores on the General Impression (GI) scale of EITQ

<table>
<thead>
<tr>
<th>Temperament characteristics</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity level - the amount of physical motion during daily routine (n=184)</td>
<td>4.72 (1.10)</td>
</tr>
<tr>
<td>1=Very inactive – 6=Very active</td>
<td></td>
</tr>
<tr>
<td>Rhythmicity – regularity of bodily functions in sleep, hunger and bowel movements etc (n=189)</td>
<td>2.72 (1.10)</td>
</tr>
<tr>
<td>1=Very regular – 6=Very irregular</td>
<td></td>
</tr>
<tr>
<td>Approach – responses to new persons, places, events (n=189)</td>
<td>2.05 (1.14)</td>
</tr>
<tr>
<td>1=Not hesitant – 6=Very hesitant</td>
<td></td>
</tr>
<tr>
<td>Adaptability – the ease/difficulty with which infant can change to socially acceptable behaviour (n=187)</td>
<td>2.00 (0.78)</td>
</tr>
<tr>
<td>1=Very quick to adapt – 6=Very slow to adapt</td>
<td></td>
</tr>
<tr>
<td>Intensity – the amount of energy in a response whether negative or positive (n=189)</td>
<td>4.01 (1.20)</td>
</tr>
<tr>
<td>1=Very mild – 6=Very intense</td>
<td></td>
</tr>
<tr>
<td>Mood – general amount of pleasant or unpleasant feelings (n=188)</td>
<td>1.67 (0.81)</td>
</tr>
<tr>
<td>1=Very pleasant – 6=Very unpleasant</td>
<td></td>
</tr>
<tr>
<td>Persistence/Attention span – how long the infant stays on task or activity (n=189)</td>
<td>2.59 (0.86)</td>
</tr>
<tr>
<td>1=Very persistent – 6=Very non persistent</td>
<td></td>
</tr>
<tr>
<td>Distractibility – the effect of external stimuli (sounds, persons, etc) on ongoing behaviour (n=189)</td>
<td>3.06 (1.06)</td>
</tr>
<tr>
<td>1=Very often distracted – 6=Rarely distracted</td>
<td></td>
</tr>
<tr>
<td>Threshold – general sensitivity or insensitivity to stimuli (sound, odour, taste, light, etc) (n=189)</td>
<td>4.43 (0.98)</td>
</tr>
<tr>
<td>1=Very non-reactive – 6=Very sensitive</td>
<td></td>
</tr>
<tr>
<td>How manageable is the infant (N=189)</td>
<td>2.09 (.097)</td>
</tr>
<tr>
<td>1=Very easy – 6=Very difficult</td>
<td></td>
</tr>
</tbody>
</table>

There are no published normative data for the ten GI items. However, scores on the last item on the GI for the normative sample were grouped into those who perceived the manageability of their infant in comparison with other infants of similar age as “easier than average” (responses 1 and 2), “average” (responses 3 and 4), and “more difficult than average” (responses 5 and 6) (Medoff-Cooper et al. 1993). The proportion in each of these groups group for the study sample and the normative sample are shown in Table 5.6.2.1.3.
### Table 5.6.2.1.3 Perception of infant manageability

<table>
<thead>
<tr>
<th>Perception of infant manageable</th>
<th>Study sample (n=189)</th>
<th>Normative sample (n=142) (1)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easier than average (%)</td>
<td>67</td>
<td>56</td>
<td>0.04</td>
</tr>
<tr>
<td>Average (%)</td>
<td>32</td>
<td>39</td>
<td>NS</td>
</tr>
<tr>
<td>More difficult than average (%)</td>
<td>0.5</td>
<td>5</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

(1) (Medoff-Cooper et al. 1993)

Compared with the normative sample, a significantly higher proportion of participants rated their infants as easier to manage and a significantly smaller proportion rated them as more difficult to manage than average. This finding is perplexing considering that the EITQ subscale scores indicated that the infants had more irregular sleeping and feeding behaviour than the comparison group. A possible interpretation is that at this age mothers in this study tended to idealise their baby.

Similar mean scores were recorded on all temperament dimensions on the GI for singletons and twin infants except that twins were perceived as less active than singletons (“Activity” score 4.48 versus 4.83, 95% CI for the difference -0.71 to -0.02, p=0.04) and as being more irritable (“Mood” score 1.89 versus 1.58, 95% CI for the difference 0.07 to 0.57, p=0.01). There were no differences between primiparous and multiparous mothers in their general impression of their infant’s temperament.

#### 5.6.2.2 Infant Sleep, Cry and Feeding Patterns at age three months

At age three months the twelve questions relating to infant behaviour were combined in a composite item called the Infant Sleep, Cry and Feeding Patterns (ISCFP1). A higher score on the ISCFP1 indicates more disturbed day and night time sleep patterns, longer periods of crying, and more settling and feeding difficulties. The mean (SD) score obtained on the ISCFP1 for the 191 (97%) infants where complete data were available was 3.04 (2.29). Infant behaviour was linked to infant temperament. Mothers who reported more disturbed sleep, cry and feeding patterns on the ISCFP1 were significantly more likely to rate their babies as being less regular (r=0.31, p<0.0001), having more intense responses to stimuli (r=0.20, p<0.007) and more disagreeable mood (r=0.31, p<0.0001), and as being more difficult to manage (r=0.53, p<0.0001) than other babies.
There were no statistically significant differences on reported mean ISCFP1 scores for singleton and twin infants or in the mean scores of primiparous and multiparous women. This suggests that the observed ISCFP1 scores were independent of the additional work involved in caring for two newborns and primiparous women’s inexperience in caring for a new baby.

5.6.2.3 Short Temperament Scale for Infants

At age eight months postpartum participants completed the 30 item Short Temperament Scale for Infants designed for babies aged between four and eight months (STSI) (Sanson et al. 1987). This measure identifies five temperament characteristics that are represented by five subscales and the “Easy-Difficult Scale” score provides an overall assessment of the infant’s temperament. The STSI was completed by 161 mothers for 189 (99%) babies, including 132 singletons and 57 twins. Study participants perceived their infants as significantly more shy, more uncooperative and difficult to manage, and more active and reactive than the normative sample. However, they also reported that their infants were significantly more rhythmical and less irritable than the comparison population. On the overall “Easy-Difficult Scale” there was no difference between participants and the normative sample. Mean scores for the five subscales and the “Easy-Difficult Scale” and comparisons with the normative sample are shown in Table 5.6.2.3.1.

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Study sample Mean (SD)</th>
<th>Norm for 4-8 months old babies (n=2443) (1) Mean**</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach (shy)* n=188</td>
<td>2.29 (0.79)</td>
<td>2.04</td>
<td>0.12 to 0.36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Rhythmicity (irregular)* n=189</td>
<td>2.19 (0.81)</td>
<td>2.69</td>
<td>-0.62 to -0.38</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Cooperation-Manageability (uncooperative-difficult to manage)* n=189</td>
<td>2.86 (0.85)</td>
<td>2.66</td>
<td>0.08 to 0.33</td>
<td>0.001</td>
</tr>
<tr>
<td>Activity-Reactivity (active-reactive)* n=187</td>
<td>4.42 (0.72)</td>
<td>4.09</td>
<td>0.23 to 0.44</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Irritability (irritable)* n=189</td>
<td>2.62 (0.91)</td>
<td>2.81</td>
<td>-0.32 to -0.06</td>
<td>0.004</td>
</tr>
<tr>
<td>Easy-Difficult Scale (difficult temperament)* n=188</td>
<td>2.59 (0.66)</td>
<td>2.50</td>
<td>-0.01 to 0.18</td>
<td>NS</td>
</tr>
</tbody>
</table>

(1) (Sanson et al. 1987)
*Higher numerical score denotes tendency toward the characteristics in parentheses
** SD not available
When the babies were eight months old primiparous women rated their infants as more difficult to care for than multiparous women (“Easy-Difficult Scale” score 2.65 versus 2.37, 95% CI for the difference 0.06 to 0.50, p=0.01). Mothers of twins perceived their babies as slightly more difficult to manage than mothers of singletons (“Easy-Difficult Scale” score 2.73 versus 2.52, 95% CI for the difference 0.01 to 0.42, p=0.04).

The relationship between infant temperament and maternal-infant attachment was similar among study participants as in the normative sample for the Maternal Postnatal Attachment questionnaire (MPA) (Condon and Corkindale 1998). Higher scores, indicating more difficulty, on the measure of infant manageability (Easy-Difficult Scale on the STSI) was associated with lower attachment scores (r=-0.50, p<0.0001).

5.6.2.4 Infant Sleep, Cry and Feeding Patterns at age eight months

At age eight months the ten questions assessing infant behaviour were combined in a composite item labelled the Infant Sleep, Cry and Feeding Patterns (ISCFP2) where a higher score indicates more disturbed day and night time sleep patterns, longer periods of crying, and more settling and feeding difficulties. The mean (SD) score obtained for the ISCFP2 for the 185 (97%) babies whose mothers completed all the questions was 3.45 (2.20). As expected, more unsettled behaviour as measured by the ISCFP2 was associated with the baby being less regular (r=0.29, p< 0.0001), less cooperative (r=0.30, p<0.0001), more irritable (r=0.49, p<0.0001) and more difficult to manage (r=0.44, p 0.0001). There was also a significant positive correlation between the ISCFP1 and ISCFP2 (r=0.34, p<0.0001), which suggests stability in infant behaviour over time.

As with ISCFP1, there were no detectable differences in mean ISCFP2 scores between singleton and twin infants or in the mean scores reported by primiparous and multiparous participants.

5.6.2.5 Short Temperament Scale for Toddlers

When the children were 18 months old their temperament was assessed using the Short Temperament Scale for Toddlers (STST), a 30 item measure of mothers’ perception of
toddlers’ temperament (Prior et al. 1989). Six subscales are derived from the 30 items and an overall measure of the degree of difficulty involved in caring for the child is provided by the “Easy-Difficult Scale”. The mean scores recorded and comparisons with normative data are shown in Table 5.6.2.5.1.

Table 5.6.2.5.1 STST scores and comparison with normative sample

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Study sample Mean (SD)</th>
<th>Norm for 1-2 year old children (n=1280) Mean**</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach (shy)* n=178</td>
<td>2.99 (1.11)</td>
<td>3.07</td>
<td>-0.24 to 0.09</td>
<td>NS</td>
</tr>
<tr>
<td>Cooperation-Manageability (uncooperative-difficult to manage)* n=178</td>
<td>3.38 (0.92)</td>
<td>3.64</td>
<td>-0.40 to -0.12</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Persistence (not persistent)* n=178</td>
<td>3.06 (0.87)</td>
<td>3.35</td>
<td>-0.41 to -0.16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Rhythmicity (irregular)* n=178</td>
<td>2.39 (0.74)</td>
<td>2.82</td>
<td>-0.54 to -0.32</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Distractibility (not distractible)* n=177</td>
<td>4.03 (0.62)</td>
<td>4.13</td>
<td>-0.19 to -0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>Reactivity (irritable)* n=178</td>
<td>3.63 (0.66)</td>
<td>3.58</td>
<td>-0.05 to 0.15</td>
<td>NS</td>
</tr>
<tr>
<td>Easy-Difficult Scale (difficult temperament)* n=176</td>
<td>3.34 (0.68)</td>
<td>3.46</td>
<td>-0.22 to -0.02</td>
<td>0.02</td>
</tr>
</tbody>
</table>

(1) (Dr A Sanson, Investigator on The Australian Temperament Project, Personal communication, June 2003)

*Higher numerical score denotes tendency toward the characteristics in parentheses

*SD not available

At this time participants rated their children as more cooperative and manageable, more persistent, more regular and soothable, and easier to manage than the normative sample. There was a strong positive correlation between the “Easy-Difficult Scale” scores at eight and 18 months (r=0.56, p<0.0001) which suggests stability in temperament over time.

There were no differences on any of the subscales between the ratings of primiparous and multiparous participants but, as at eight months, mothers of twins found their babies more difficult to care for than mothers of singletons (“Easy-Difficult Scale” score 3.49 versus 3.27, 95% CI for the difference 0.01 to 0.44, p=0.04). The greater reported difficulty in caring for twin children than singletons may be a function of the added strain inherent in caring for two children simultaneously.
5.6.2.6 Toddler sleep pattern

At 18 months four questions about the child’s sleep and settling behaviours were combined in a composite item called Toddler Sleep Pattern (TSP). Higher scores on the TSP suggest that the child has a more disturbed sleep pattern and is more difficult to settle. The mean (SD) score obtained for the TSP for the 177 (99%) children whose mothers completed the questions was 2.33 (1.76). There was a significant positive correlation between the TSP score and the “Easy-Difficult Scale” score of the STST (r=0.22, p=0.003). There was also a significant positive correlation between the TPS and the ISCFP2 scores (r=0.38, p<0.0001).

There were no differences in TSP scores between primiparous and multiparous women or between mothers of twins and mothers of singletons in their rating on the TSP.

5.6.3 Changes in mothers’ perception of infant manageability over time

Participants’ perception of the manageability of the child appeared to change over time. The proportion scoring in the “easy”, “average” and “difficult” range at the three time points are shown in Table 5.6.3.1.

<table>
<thead>
<tr>
<th>Manageability</th>
<th>3 months (n=189)</th>
<th>8 months (n=188)</th>
<th>18 months (n=176)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (% )</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>“Easy”</td>
<td>127 (67)</td>
<td>27 (15)</td>
<td>43 (24)</td>
</tr>
<tr>
<td>“Average”</td>
<td>61 (32)</td>
<td>127 (67)</td>
<td>110 (62)</td>
</tr>
<tr>
<td>“Difficult”</td>
<td>1 (0.5)</td>
<td>34 (18)</td>
<td>23 (13)</td>
</tr>
</tbody>
</table>

Although the EITQ is not directly comparable with the STSI and STST it appears that on average, participants had a more idealised view of their infants at three months than at eight and 18 months. While at three months over two thirds of participants perceived their infant as easier than other babies of comparable age, a considerably smaller proportion scored in the “easy” range at eight and 18 months. The extremely high proportion of participants who perceived their newborn baby as easier to manage than
other infants may reflect elation at the arrival of the long awaited baby and a wish to attribute positive characteristics to the baby. Furthermore, only one participant rated her baby as more difficult than other babies at three months whereas at eight and 18 months a considerably higher proportion rated their children in the “difficult” range. It may be that over time, the initial idealisation of the baby is replaced by a more realistic appraisal of infant temperament and behaviour.

In summary, throughout the first 18 months there was no discernable pattern in the differences detected between participants and normative samples on the standardised measures of infant temperament. However, it would appear that the initial irregular sleeping and feeding patterns as measured by “Rhythmicity” improved over time. This may be an effect of the high proportion (44%) that attended day-stay or residential early parenting services for unsettled infant feeding and sleeping behaviour, or simply that baby behaviour settles into a more predictable pattern as part of normal child development.

5.6.4 Participants’ comments about infant health, temperament and behaviour

Many participants made very positive comments about their baby and some described them as advanced in their development as exemplified by the following quotes:

“He’s quite a happy little soul, he doesn’t cry unless he has a problem and he’s very responsive to us all. He laughed and giggled at 5-6 weeks and now at 14 weeks he is very knowing and alert.” [Baby aged 14 weeks]

“Baby is very happy and alert and smiles a lot and gives the occasional laugh and is very vocal and will experiment with a wide range of sounds quite often. Loves to reach and touch familiar faces and seems to enjoy playing with toys by hand.” [Baby aged three months]

“[Daughter] keeps excellent health and is cruising along the upper level of the height and weight chart. She is crawling and walking around furniture, is very inquisitive, energetic and knowing in regard to her surroundings. She has a calm, fun loving personality but loves to be a sticky nose. Shows lots of affection to all family members and seems to know all by name. Very alert to conversation and babbles a lot. Enjoys
meal times and eats almost anything and has six teeth.” [Baby aged eight months]

“The baby has been wonderful - all we could have dreamed of and more. He is so healthy happy and has always fed well and put on great weight from the breastmilk.”
[Baby aged three months]

There were also comments about difficulties regarding sleeping and feeding patterns.
For example:

“My baby is more demanding now at 4 months old than early on. He sleeps less in the day and is not as content to entertain himself. Wants more attention and seems to get bored easily especially at home.” [Baby aged four months]

“[Daughter] feeds every 2 hours and always has done so, so is quite difficult sometimes to get a break or time out, or even to get domestic chores done.” [Baby aged three months]

“Some nights she will wake up after 4-5 hours sleep. She gets a bottle feed then falls back asleep but will wake up every hour till 6 am. She will only settle when I pick her up then once put in her cot repeats her waking continuously till dawn. Overall her sleep patterns are not yet consistent.” [Baby aged eight months]

“I find that I am still rather stressed about the whole baby thing. My baby has trouble sleeping and now doesn’t want to eat or drink her milk which is becoming increasingly frustrating.” [Baby aged eight months]

Worry and concern about the baby’s health was expressed and one mother related this to the fact that the baby had been conceived with ART:

“My baby has been sick a few times: colds, coughs, viruses (he’s had to have Ventoline and cortisone for wheezing twice) and also has a very bad dose of chickenpox! He’s been through a lot for such a small person. I know he is a strong little boy (look how far he’s come!!!) but I do worry a lot about his health and become quite anxious at times. He’s a very happy little boy with a lovely nature but I can’t help but be a little paranoid and not so relaxed as I would like. I worry because he was 8 weeks early (and small) and as an IVF baby he may be a little disadvantaged - but then I think this is silly thinking too!!! It’s not all consuming but it is always in the back of my mind. I guess this is the only area where the ‘stigma’ of being an IVF baby is a concern.” [Baby aged eight months]
“Intense feelings about something happening to my baby (e.g. SIDS) and how devastating it would be.” [Baby aged three months]

5.7 POSTNATAL MATERNAL MOOD

Recent population based studies conducted in Australia, the UK, Denmark and Finland suggest prevalence rates of postnatal depression ranging from 5.5% to 10.2% (Nielsen Forman et al. 2000; Thompson et al. 2000; Evans et al. 2001; Luoma et al. 2001; Buist et al. 2005). Most longitudinal studies report higher prevalence rates of depression during pregnancy than postnatally (Evans et al. 2001; Luoma et al. 2001; Seimyr et al. 2004). However, dichotomising pregnant and postpartum women’s mood into depressed and non-depressed limits understanding of the variations in emotional well-being that often occur throughout the course of pregnancy, and postnatally. These changes may not manifest as clinical depression but may nevertheless impact on emotional well-being and adjustment to early parenting. Furthermore, fatigue and moderate distress, which are common consequences of the constant demands inherent in caring for a baby, are sometimes mis-labelled as depression (Fisher et al. 2002 b).

In this study, measures of mood that allow examination of variations in mood over time, the impact of fatigue and anxiety, and comparison with other groups of parturient women were used. Antenatally and at all three postnatal time points maternal mood was assessed by two validated and widely used self-report measures, the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al. 1987) and the Profile of Mood States (POMS) (McNair et al. 1971). The scores obtained on these measures at three and eight months postpartum and comparison with scores reported in other large studies of community samples of parturient women using the same measures at similar times are reported here (Kermode et al. 2000; Thompson et al. 2000; Evans et al. 2001; Hayes et al. 2001; Buist et al. 2005). Participants’ scores at 18 months are compared with their own scores at eight months postpartum.
To account for life events, which had a potential impact on postnatal mood, participants were also asked at each time point to describe any co-incidental distressing or worrying life events, in addition to caring for the baby.

There were no differences at any of the time points in the mean EPDS and POMS scores between primiparous and multiparous mothers or between mothers of twins and mothers of singletons and scores for all participants are therefore pooled in the tables.

5.7.1 Maternal mood in the early postpartum

5.7.1.1 Edinburgh Postnatal Depression Scale

Higher scores on the EPDS suggest greater emotional distress and a score over 12 indicates possible depression and need for further professional assessment. The mean EPDS score recorded three months after the birth and the proportion scoring over 12 for participants and three comparison community samples are shown in Table 5.7.1.1.1. Differences in these measures between the study sample and the three comparison samples were tested for statistical significance.

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>N</th>
<th>Mean (SD)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
<th>% &gt;12</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study sample</td>
<td>Australia</td>
<td>166</td>
<td>5.5 (4.6)</td>
<td></td>
<td>8.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buist et al. 2005*</td>
<td>Australia</td>
<td>12,535</td>
<td>5.4 (4.4)</td>
<td>-0.62 to 0.78</td>
<td>NS</td>
<td>7.6</td>
<td>NS</td>
</tr>
<tr>
<td>Thompson et al. 2000**</td>
<td>Australia</td>
<td>1252</td>
<td>5.3 (4.6)</td>
<td>-0.52 to 0.88</td>
<td>NS</td>
<td>8.0</td>
<td>NS</td>
</tr>
<tr>
<td>Evans et al. 2001***</td>
<td>UK</td>
<td>11,579</td>
<td>6.1 (5.8)</td>
<td>-1.32 to 0.08</td>
<td>NS</td>
<td>10.2</td>
<td>NS</td>
</tr>
</tbody>
</table>

* EPDS administered 6-8 weeks postpartum
** EPDS administered 4 months postpartum
*** EPDS administered 2 months postpartum

The mean EPDS score in the early postpartum for participants in this study and the proportion with probable depression were not significantly different from scores and proportions reported in the comparison populations.
5.7.1.2 Profile of Mood States

From the 65 items of the POMS six subscales are calculated. These represent different dimensions of mood. On all dimensions except the “Vigour-Activity” higher scores indicate poorer emotional well-being. Mean scores of the study sample are compared with two Australian longitudinal studies of postpartum community samples in Table 5.7.1.2.1.

Table 5.7.1.2.1 POMS sub-scale comparisons 3 months postpartum

<table>
<thead>
<tr>
<th>Sub-scales</th>
<th>Study sample Mean (SD) (N=162)</th>
<th>Postpartum sample (1) Mean (N=95)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
<th>Postpartum sample (2) * Mean (N=175)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension – Anxiety</td>
<td>6.6 (5.7)</td>
<td>7.0</td>
<td>-1.27 to 0.49</td>
<td>NS</td>
<td>7.6</td>
<td>-1.87 to -0.11</td>
<td>.03</td>
</tr>
<tr>
<td>Depression – Dejection</td>
<td>6.1 (9.4)</td>
<td>4.0</td>
<td>0.69 to 3.60</td>
<td>0.004</td>
<td>6.5</td>
<td>-1.81 to 1.10</td>
<td>NS</td>
</tr>
<tr>
<td>Anger – Hostility</td>
<td>5.7 (7.8)</td>
<td>5.0</td>
<td>-0.56 to 1.87</td>
<td>NS</td>
<td>7.3</td>
<td>-2.86 to 0.43</td>
<td>0.01</td>
</tr>
<tr>
<td>Vigour – Activity</td>
<td>16.3 (6.3)</td>
<td>17.0</td>
<td>-1.68 to 0.27</td>
<td>NS</td>
<td>13.6</td>
<td>1.72 to 3.67</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fatigue – Inertia</td>
<td>10.9 (6.9)</td>
<td>8.0</td>
<td>1.83 to 3.98</td>
<td>&lt;0.001</td>
<td>11.8</td>
<td>-1.97 to 0.18</td>
<td>NS</td>
</tr>
<tr>
<td>Confusion - Bewilderment</td>
<td>6.5 (4.7)</td>
<td>5.0</td>
<td>0.74 to 2.19</td>
<td>&lt;0.001</td>
<td>7.0</td>
<td>-1.26 to 0.19</td>
<td>NS</td>
</tr>
<tr>
<td>Total POMS</td>
<td>19.5 (34.1)</td>
<td>14.0</td>
<td>0.19 to 10.78</td>
<td>0.04</td>
<td>27.0</td>
<td>-12.21 to -2.22</td>
<td>0.005</td>
</tr>
</tbody>
</table>

(1) (Hayes et al. 2001) primiparous women 8-12 weeks postpartum
(2) (Kermode et al. 2000) multiparous women 2 months postpartum
* Privately insured women.

The statistically significant differences between participants and the comparison groups may be due to the parity of the women in the comparison groups. Hayes et al. (2001) only included primiparous women and all women in the study by Kermode et al. (2000) were multiparous. In broad terms participants’ POMS scores were similar to the primiparous comparison group and this may be because the majority of participants (70%) were primiparous. The lower “Vigour-Activity” and higher “Fatigue-Inertia” scores in the multiparous comparison group is likely to reflect more exhaustion among new mothers who have other children to care for in addition to the newborn.
Few participants scored in the clinical range on the POMS subscales with the exception of the “Fatigue–Inertia” subscale as might be expected for mothers of a newborn (Table 5.7.1.2.2.)

Table 5.7.1.2.2 POMS scores in the clinical range 3 months postpartum

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Score</th>
<th>Study sample N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension - Anxiety</td>
<td>&gt;19</td>
<td>8 (5)</td>
</tr>
<tr>
<td>Depression - Dejection</td>
<td>&gt;22</td>
<td>10 (6)</td>
</tr>
<tr>
<td>Anger - Hostility</td>
<td>&gt;13</td>
<td>15 (9)</td>
</tr>
<tr>
<td>Vigour - Activity</td>
<td>&lt;11</td>
<td>26 (16)</td>
</tr>
<tr>
<td>Fatigue - Inertia</td>
<td>&gt;12</td>
<td>59 (36)</td>
</tr>
<tr>
<td>Confusion - Bewilderment</td>
<td>&gt;12</td>
<td>15 (9)</td>
</tr>
<tr>
<td>Total POMS</td>
<td>&gt;72</td>
<td>10 (6)</td>
</tr>
</tbody>
</table>

5.7.2 Maternal mood when caring for older infants

5.7.2.1 Edinburgh Postnatal Depression Scale

The mean EPDS scores of the study sample recorded at eight months after the birth and the proportion with probable depression are compared with the comparison populations in Table 5.7.2.1.1.

Table 5.7.2.1.1 EPDS comparisons 8 months postpartum

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>N</th>
<th>Mean (SD)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
<th>% &gt;12</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study sample</td>
<td>Australia</td>
<td>160</td>
<td>5.2 (3.8)</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Thompson et al. 2000*</td>
<td>Australia</td>
<td>1252</td>
<td>5.0 (4.6)</td>
<td>-0.38 to 0.82</td>
<td>NS</td>
<td>8</td>
<td>NS</td>
</tr>
<tr>
<td>Evans et al. 2001**</td>
<td>UK</td>
<td>9028</td>
<td>5.3 (4.6)</td>
<td>-0.68 to 0.52</td>
<td>NS</td>
<td>8.1</td>
<td>NS</td>
</tr>
</tbody>
</table>

* EPDS administered 6 months postpartum
** EPDS administered 8 months postpartum

The mean EPDS score for participants in this study was similar to that of the comparison groups. The proportion with probable depression was lower but not statistically significantly different from those reported in the comparison samples.
5.7.2.2 Profile of Mood States

The mean scores recorded on the POMS at eight months postpartum for participants and the primiparous and multiparous comparison groups are shown in Table 5.7.2.2.1.

Table 5.7.2.2.1 POMS sub-scale comparisons 8 months postpartum

<table>
<thead>
<tr>
<th>Sub-scales</th>
<th>Study sample Mean (SD) (N=155)</th>
<th>Postpartum sample (1) Mean (N=95)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
<th>Postpartum sample (2) * Mean (N=175)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension – Anxiety</td>
<td>5.7 (4.1)</td>
<td>6.0</td>
<td>-0.92 to 0.35</td>
<td>NS</td>
<td>8.3</td>
<td>-3.12 to -1.85</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Depression – Dejection</td>
<td>5.0 (5.9)</td>
<td>4.0</td>
<td>0.05 to 1.90</td>
<td>0.04</td>
<td>9.0</td>
<td>-4.95 to -3.10</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Anger – Hostility</td>
<td>5.1 (5.3)</td>
<td>6.0</td>
<td>-1.71 to -0.07</td>
<td>0.03</td>
<td>9.5</td>
<td>-5.21 to -3.57</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Vigour – Activity</td>
<td>16.5 (5.6)</td>
<td>17.0</td>
<td>-1.39 to 0.35</td>
<td>NS</td>
<td>13.7</td>
<td>1.91 to 3.65</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fatigue – Inertia</td>
<td>10.8 (6.4)</td>
<td>7.0</td>
<td>2.82 to 4.81</td>
<td>&lt;0.001</td>
<td>12.3</td>
<td>-2.48 to -0.49</td>
<td>0.004</td>
</tr>
<tr>
<td>Confusion - Bewilderment</td>
<td>5.4 (4.2)</td>
<td>5.0</td>
<td>-0.28 to 1.02</td>
<td>NS</td>
<td>6.8</td>
<td>-2.08 to -0.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total POMS</td>
<td>15.1 (24.6)</td>
<td>11.0</td>
<td>0.16 to 7.98</td>
<td>0.04</td>
<td>31.2</td>
<td>-20.04 to -12.22</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

(1) (Hayes et al. 2001) primiparous women 16-24 weeks postpartum  
(2) (Kermode et al. 2000) multiparous women 8 months postpartum  
* Privately insured women.

As measured by the POMS, participants’ psychological symptomatology was low. Similar to the findings at three months, participants’ mean POMS subscale scores at eight months were similar to those in the primiparous comparison group. However, compared with the multiparous comparison group, participants in this study had lower psychological symptomatology on all subscales.

The proportions of participants scoring in the clinical range on the POMS subscales at eight months are shown in Table 5.7.2.2.2.
Table 5.7.2.2 POMS scores in the clinical range 8 months postpartum

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Score</th>
<th>Study sample N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension - Anxiety</td>
<td>&gt;19</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Depression - Dejection</td>
<td>&gt;22</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Anger - Hostility</td>
<td>&gt;13</td>
<td>14 (9)</td>
</tr>
<tr>
<td>Vigour - Activity</td>
<td>&lt;11</td>
<td>24 (15)</td>
</tr>
<tr>
<td>Fatigue - Inertia</td>
<td>&gt;12</td>
<td>55 (34)</td>
</tr>
<tr>
<td>Confusion - Bewilderment</td>
<td>&gt;12</td>
<td>11 (7)</td>
</tr>
<tr>
<td>Total POMS</td>
<td>&gt;72</td>
<td>7 (5)</td>
</tr>
</tbody>
</table>

There were no statistically significant differences in the proportions of participants scoring in the clinical range at three and eight months except for the “Depression-Dejection” subscale. A higher proportion of participants scored in the clinical range on this subscale at three months than at eight months (6% versus 2%, p=0.02).

5.7.3 Maternal mood when caring for toddlers

5.7.3.1 Edinburgh Postnatal Depression Scale

At 18 months the mean EPDS score for participants (n=151) was 5.6 and the proportion scoring over 12 (n=11) was 7.3%. Comparison data is scarce, as studies about maternal postnatal mood generally do not extend beyond the first postpartum year. However, the mean EPDS score and the proportion scoring above 12 at this time point were not statistically different from the mean and proportion observed when the babies were eight months old.

5.7.3.2 Profile of Mood States

Consistent with the findings at three and eight months, at 18 months after the birth participants’ (n=151) POMS scores indicated generally low psychological distress. The mean total POMS score and the six subscales scores at this time were not statistically different from those recorded at eight months.
5.7.4 Changes in mood over time

Depressive symptomatology, anxiety and fatigue are common in the postnatal period. In order to measure whether these aspects of mood changed over time since the birth the mean EPDS scores and the POMS “Tension-Anxiety” and “Fatigue-Inertia” subscale scores at each time point were compared for the 151 participants where complete data was available. The means scores for these three measures are shown in Table 5.7.4.1.

<table>
<thead>
<tr>
<th>Measure</th>
<th>3 months</th>
<th>8 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPDS mean (sd)</td>
<td>5.5 (4.6)</td>
<td>5.2 (3.8)</td>
<td>5.6 (4.7)</td>
</tr>
<tr>
<td>“Tension-Anxiety” mean (sd)</td>
<td>6.6 (5.7)</td>
<td>5.7 (4.1)</td>
<td>6.5 (5.3)</td>
</tr>
<tr>
<td>“Fatigue-Inertia” mean (sd)</td>
<td>10.9 (6.9)</td>
<td>10.8 (6.4)</td>
<td>10.5 (6.3)</td>
</tr>
</tbody>
</table>

Mood as measured by the EPDS and the two POMS subscales remained very stable over the postpartum 18 months. Consistent with other findings, this demonstrates that prior mood is a strong predictor for later mood. The only significant difference was a slightly lower anxiety score at eight months than at three and 18 months. Although the difference in anxiety scores recorded at three and eight months reached statistical significance (p=0.04) it is unlikely that this was clinically important as the mean scores observed at all three time points were well below the cut off for clinically significant anxiety (>19).

In summary, the scores recorded at three, eight and 18 months postpartum indicate that postnatal mood among study participants were similar to the mood of mothers who have conceived spontaneously as measured by the two standardised measures. It is noteworthy that at all three postnatal time points significant fatigue was experienced by a considerable proportion of participants. At three, eight and 18 months the proportion who reported fatigue in the clinical range was 36%, 34% and 31% respectively.
5.8 EXPERIENCE OF MOTHERHOOD

5.8.1 The Experience of Motherhood Questionnaire

The Experience of Motherhood Questionnaire (EMQ) (Astbury 1994) was completed by participants when their children were 18 months old. Higher EMQ scores indicate greater distress and less satisfaction in relation to motherhood. The mean score obtained for participants was significantly lower than for the 87 mothers of two year old children in the validation study (Astbury 1994), indicating that participants were less distressed by and more satisfied with the experience of motherhood (36.88 versus 40.18 respectively, 95% CI for the difference –4.50 to –2.10, p<0.001). However, the validation sample was not representative of all new mothers as it included 50% mothers who had scored as probably depressed (EPDS score >12) at 8-9 months postpartum. In the development study EMQ scores for mothers who scored as probably depressed (EPDS >12) at the time of the study and for those who scored 12 or less were reported separately. The EMQ scores for participants who scored below the cut-off for probable depression and for those who scored above are compared with scores recorded in the development study in Table 5.8.1.1.

Table 5.8.1.1 EMQ scores for non-depressed and depressed mothers

<table>
<thead>
<tr>
<th>EPDS group</th>
<th>Study sample Mean (n)</th>
<th>Comparison (1) Mean (n)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤12</td>
<td>36.0 (138)</td>
<td>38.9 (70)</td>
<td>–4.0 to –1.7</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>&gt;12</td>
<td>48.5 (11)</td>
<td>45.6 (17)</td>
<td>–2.1 to 7.8</td>
<td>NS</td>
</tr>
</tbody>
</table>

(1) (Astbury 1994)

Non-depressed participants in this study had lower EMQ scores, indicating a more satisfying experience of motherhood, than non-depressed women in the comparison group. The reverse was found in the depressed group, but this did not reach statistical significance due to the small sample sizes.

There were no measurable differences in mean EMQ scores between primiparous and multiparous mothers or between mothers of twins and mothers of singletons.
As the experience of motherhood was central to this study it was considered important to explore the relationship between the EMQ and other measures. In the original study the EMQ was positively correlated with the EPDS and the degree of difficulty of the toddler’s temperament and inversely related to social support, partner support and satisfaction with support. Table 5.8.1.2 shows the correlations between the EMQ and the measures used in this study.

### Table 5.8.1.2 Correlation coefficients for EMQ scores

<table>
<thead>
<tr>
<th>Measure</th>
<th>r-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intimate Bonds Measure (Care subscale)</td>
<td>-0.36</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Intimate Bonds Measure (Control subscale)</td>
<td>0.33</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>VPSQ (Vulnerability subscale)</td>
<td>0.45</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Emotional support score</td>
<td>-0.18</td>
<td>0.03</td>
</tr>
<tr>
<td>Practical support score</td>
<td>-0.30</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>EPDS score at 18 months</td>
<td>0.63</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Easy-Difficult Scale on the Short Temperament Scale for Toddlers</td>
<td>0.33</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Toddler Sleep Pattern</td>
<td>0.30</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Quality of attachment at 8 months (Maternal Postnatal Attachment subscale)</td>
<td>-0.46</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Absence of hostility at 8 months (Maternal Postnatal Attachment subscale)</td>
<td>-0.56</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Pleasure in interaction at 8 months (Maternal Postnatal Attachment subscale)</td>
<td>-0.19</td>
<td>0.02</td>
</tr>
</tbody>
</table>

In addition, there was a significant association between reported maternal confidence at 18 months and EMQ scores. Participants who reported feeling “Very confident” (n=103) about caring for the baby had lower EMQ scores than those who were “Occasionally anxious” or only “Fairly confident” (n=48) about baby care (35.1 versus 40.8, 95% CI for the difference –8.09 to –3.26, p<0.0001).

It would appear that, similar to the development study, factors associated with a more positive and less distressing experience of motherhood for participants in this study were better mood, a more caring and less controlling partner, a more manageable child, and the availability of more practical and emotional support. Furthermore, a more positive experience of motherhood was associated with a more assertive and less sensitive personality, less feelings of resentment and hostility towards the baby, greater attachment to the baby, and more confidence in relation to caring for the baby.
5.8.2 Participants’ comments about motherhood

Many participants used the opportunity to comment about their life since having the baby. For some the work involved in caring for a newborn was unanticipated.

“I thought I knew how things might be once we all came home but I really had no idea. Its taken weeks to work out!” [Primiparous woman aged 35 with 3 months old twins]

“The job is a lot harder and more tiring than I expected. I get bored, but in between it all I love my beautiful boy dearly.” [Primiparous woman aged 41 with 3 months old baby]

“Looking after the baby is a lot harder and more time consuming than I expected. The tiredness is difficult to manage at times.” [Primiparous woman aged 32 with 3 months old baby]

For others motherhood was less rewarding as well as more demanding than they had expected.

“I feel trapped in the nicest possible way. I would occasionally like to go and enjoy adult company rather than just that of other mothers. I can’t do this because I am breastfeeding and trying to get my child into a pattern. Because of this I am restricted considerably. I realise that in about 10 months this will change, it is a little bit of a shock / awakening for me that I can’t do as I like.” [Primiparous woman aged 43 with 3 months old baby]

“I find it difficult to bond with my baby. When my first son was born, it was the same – it took nearly 2 years for me to really truly love him. I don’t know whether this ‘failure to bond’ is an effect of IVF or not. Sometimes I think that it is because they were created outside my body in a lab. I don’t really feel as though they were made from me and my husband even though it was his sperm and my eggs. At least with this second baby, I know I will eventually bond and love her.” [Multiparous woman aged 32 with 3 months old baby]

“I expected my life to be happier and motherhood was meant to be better than what it is now.” [Primiparous woman aged 32 with 3 months old baby]

“Very exhausting just dealing with life on a day to day basis. Having no family in Australia or nearby to help has not made it very easy. I therefore have this as a 24-7 job with no off-time and I do find it much more exhausting than expected. I do feel guilty
as I feel I should be more appreciative that at least I have been blessed with a child.”
[Primiparous woman aged 31 with 3 months old baby]

Some indicated ambivalence about the baby and this was often coupled with feelings of
guilt as the baby had been much wanted and conceived with ART.

“Looking after a baby is very tiring and there may have been many days when you
think you would prefer to be at work as it was easier. Certainly these last few weeks
have been much easier. I think getting over the first 6-8 weeks is the biggest challenge.
Also the guilt of how you should feel given the time and effort it has taken to have a
baby.” [Primiparous woman aged 32 with 3 months old baby]

“We tried for nearly five years to have our baby so I suppose in some ways I expected
that excitement of ourselves and friends and families in the first weeks of his life to
continue. But of course life goes on and everyone goes back to work and it’s just me
and the baby home all day.” [Multiparous woman aged 35 with 3 months old baby]

“I’ve felt extremely frustrated at times due to being unable to be away from home for
more than a couple of hours by myself. I’m still breastfeeding and I need to be around
to feed my child. I want to breastfeed him until he is 12 months old so I sacrifice my
freedom. Generally I can cope with this but there are times I feel I need to escape. Since
the birth of my baby I initially had frequent dreams about losing my baby. They have
become less frequent, perhaps once a month. I believe they were indicating the huge
responsibility I had but also I think I was still thinking about the fear I had about not
conceiving and not ever having a baby.” [Primiparous woman aged 35 with 8 months
old baby]

“I would like to comment on how I think IVF-assisted parenthood differs from others.
Two things are very different and can add pressure in the crazy early days of
parenthood. 1. When things are getting on top of you especially in the early days of a
new baby overwhelming feelings of guilt also descend because ‘I really wanted this’,
‘I’m one of the lucky ones – I got a child’ etc. 2. Husbands have already put in a major
effort in supporting wives through IVF and pregnancy so I think they are a little ‘worn
out’ by the time the baby arrives and we need more support. Partners have to be very
giving for much longer without too much in return.” [Multiparous woman aged 40 with
18 months old child]

“I think it is important that women who become pregnant after assisted conception
(especially those with multiples) understand that once they are a mother, they are
entitled to feel like any other mother. By this I mean that they are allowed to admit its hard and not all roses. There is often an attitude that because this pregnancy is everything you ever hoped for that you should just be grateful and not get upset, tired etc. I myself struggled with guilt. On the hard days when I was struggling to cope ‘I should just be grateful to have these two beautiful babies’. This put extreme pressure on me and it wasn’t until I admitted it was hard that I felt the pressure release.” [Primiparous woman aged 28 with 18 months old twins]

“Being a first-time mum I had absolutely no idea how time consuming and at times difficult having a baby would be. My baby was very ‘sickly’ and worse, screamed every time he was breastfed, which killed any nurturing feelings I should have felt during this time. I really felt a terrible failure and felt terrible when I had thoughts of ‘why did I have a baby, I want my old life back’ when I had so wanted a baby and tried for so long. I expressed the difficulties I was having to the Maternal and Child Health Nurse but basically she was too busy to listen/offer suggestions or support” [Primiparous woman aged 33 with 8 months old baby]

Elation about being a new mother was also expressed.

“My life at present is very fulfilled, I wanted this baby more than anything and he is all I expected and hoped for.” [Primiparous woman aged 30 with 3 months old baby]

“Life is pretty great, we are so happy and have a well-settled baby. For an old woman (45) I feel remarkably fit and young.” [Multiparous woman aged 45 with 3 months old baby]

“I’ve been very happy since the birth of our daughter. We’ve been lucky that she is a good baby. In fact 4 weeks after the birth I was prepared to fall pregnant again. I enjoy being a mum.” [Primiparous woman aged 30 with 3 months old baby]

“I love motherhood, the best thing I could be doing!” [Primiparous woman aged 32 with 3 months old baby]

“I love being a mum and generally every day seems busy and fulfilling.” [Primiparous woman aged 31 with 3 months old baby]

“Life is good, in fact life is great. I have the most wonderful child in the whole world and I thank God every day for the fabulous man who was our donor and for the skills that are with our wonderful IVF teams. Without them my life would be very sad!” [Primiparous single woman aged 40 with 18 months old child]
5.9 SATISFACTION WITH LIFE

The Satisfaction With Life Scale (SWLS) is a very brief measure of general life satisfaction (Diener et al. 1985). Higher scores indicate greater overall satisfaction with life. The mean (SD) score recorded for participants on the SWLS 18 months postpartum was 27.5 (5.5). This was higher, indicating greater satisfaction with life, than the mean in three studies of adult non-clinical populations using SWLS (27.5 versus 24.1, 95% CI for the difference 2.55 to 4.31, p<0.001) reviewed by Pavot and Diener (1993). However, compared with scores recorded for 51 women (27.2) who had had a child as a result of ART and who participated in a previous study there was no statistically significant difference (Hammarberg et al. 2001).

The SWLS consists of five statements which responders are asked to rate, on a seven-point scale, their degree of agreement with. On inspection of the mean score for each of the five individual statements, the score for the statement “So far I have got the important things I want in life” was significantly higher than the mean of the other items (6.12 versus 5.35, 95% CI for the difference 0.59 to 0.96, p<0.0001). The realisation of motherhood after the experience of infertility and ART may have contributed to the high degree of agreement with this statement and to the overall high degree of satisfaction with life.

Taken together with the low prevalence of measurable psychological distress, the apparent high degree of overall satisfaction with life suggest that 18 months after the birth, most participants were well-adjusted and contented with their lives.

5.10 MOTHERING TWINS

In the last questionnaire a section was devoted to issues relating to being a mother of twins. This was completed by the 27 participants who responded to the questionnaire and who had two surviving children. Of these 26 had fraternal and one identical twins. Fifteen participants had same sex twins and 12 had a girl and a boy. Seven (25%) mothers were multiparous and the remainder primiparous.
5.10.1 Antenatal preparation

All participants had used one or more sources of information antenatally in preparation for a multiple birth. Twelve (44%) participants used one or two sources and the remainder three or four sources of information. The sources used and the proportion using them are shown in Table 5.10.1.1.

Table 5.10.1.1 Antenatal utilisation of sources of information about multiple birth

<table>
<thead>
<tr>
<th>Source of information</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books and other written information</td>
<td>23</td>
<td>85</td>
</tr>
<tr>
<td>Twin antenatal classes</td>
<td>16</td>
<td>59</td>
</tr>
<tr>
<td>Multiple birth association</td>
<td>15</td>
<td>56</td>
</tr>
<tr>
<td>Talked to friends</td>
<td>12</td>
<td>44</td>
</tr>
<tr>
<td>Other sources of information</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

5.10.2 Twins’ health and development

The health and development of most children was rated as “Excellent” (36/54, 67%) or “Very good” (13/54, 24%) at 18 months. Two children’s health and development was rated as “Good” and three as “Fair” (5/54, 9%).

5.10.3 Practical aspects of mothering twins

Participants were asked to rate the degree of perceived difficulty in a number of daily tasks involved in caring for twins and managing domestic work. The responses were grouped into “No difficulty”, “Somewhat difficult”, and “Quite difficult” or “Extremely difficult” and the proportions for each group are shown in Table 5.10.3.1.

Table 5.10.3. Degree of difficulty involved in caring for twins (n=27)

<table>
<thead>
<tr>
<th>Task</th>
<th>No difficulty N (%)</th>
<th>Somewhat difficult N (%)</th>
<th>Quite/Extremely difficult N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding the children</td>
<td>9 (33)</td>
<td>12 (44)</td>
<td>6 (22)</td>
</tr>
<tr>
<td>Settling the children</td>
<td>8 (30)</td>
<td>16 (59)</td>
<td>3 (11)</td>
</tr>
<tr>
<td>Finding time to play</td>
<td>5 (19)</td>
<td>16 (59)</td>
<td>6 (22)</td>
</tr>
</tbody>
</table>
Surprisingly, for almost a third of the sample, most aspects of caring for twins were perceived as not difficult at all. These questions were asked when the children were 18 months old and mothers at this time may have established good routines and become accustomed to the work involved in caring for two children.

5.10.4 Interaction with the twins

One of the difficulties in caring for twins is finding time to interact with each twin individually. Two participants stated that they never spent time with only one of the twins, 17 (63%) found time to do this one to three times per week and 8 (30%) more than three times per week. Only two participants rated their children’s personalities as “Similar” while the remainder rated them as “Not very similar” (14/27, 52%) or “Not similar at all” (11/27, 41%). Most participants met occasionally (16/27, 59%) or regularly (6/27, 22%) with other mothers of twins. Of the 22 participants who were seeing other twin mothers, most rated this as “Extremely enjoyable” (16, 73%) or “Somewhat enjoyable” (5, 23%).

The financial impact of having had twins was regarded as ‘Minimal” by six (22%) participants. However, for the majority the birth of twins had had “Some” (19, 70%) or “Significant” (2, 8%) financial impact.

5.10.5 Participants’ comments about mothering twins

The comments about mothering twins all indicated that although the work associated with caring for two babies can be overwhelming and isolating, the pleasures outweigh the difficulties.
“I’m very lucky to have my twins and I am very proud of them. I feel that I have enough love, hugs, kisses for both, and I show them every day. But it is hard work and I’m tired most of the time.” [Primiparous woman aged 39 with 18 months old twins]

“Nothing can prepare you for the hard work involved in having twins but at the same time nothing is more rewarding than two smiles, two giggles and two hugs. The work is double but so are the rewards.” [Primiparous woman aged 28 with 18 months old twins]

“Very difficult when they are both ill. But so rewarding to watch them enjoying each other. Wouldn’t have it any other way.” [Primiparous woman aged 36 with 18 months old twins]

### 5.11 Mothering after Gamete Donation

Some participants (n=16, 9%) had conceived with donor gametes and the baby was therefore not genetically related to the mother in the case of oocyte donation, the father in the case of sperm donation or either parent when donor embryos were used. To explore if this influenced the experience of the birth, emotional attachment to the baby, maternal mood, perception of infant temperament and behaviour, experience of motherhood, separation anxiety, use of postnatal residential services or maternal confidence, participants who had conceived with donor gametes were compared with those who had conceived with their own gametes. On most measures there were only minor differences between the groups. On the measures where there were greater differences and where these were in the same direction at all three time points these did not reach statistical significance in most instances (see Table 5.11.1). Small numbers with donor conceived babies limit the interpretation of these results.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Donor conceived baby (n=16)</th>
<th>Non-donor conceived baby (n=136)</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age</td>
<td>37.4</td>
<td>34.2</td>
<td>1.14 to 5.39</td>
<td>0.03</td>
</tr>
<tr>
<td>Feeling ‘pleased’ or ‘very pleased’ with the birth</td>
<td>50%</td>
<td>71%</td>
<td></td>
<td>0.09</td>
</tr>
<tr>
<td>Infant sleep, cry and feeding pattern at 3 months (ISCFP1 Score)</td>
<td>3.38</td>
<td>3.06</td>
<td>-0.87 to 1.5</td>
<td>0.60</td>
</tr>
<tr>
<td>Infant sleep, cry and feeding pattern at 8 months (ISCFP2 Score)</td>
<td>5.13</td>
<td>3.34</td>
<td>0.65 to 2.93</td>
<td>0.02</td>
</tr>
<tr>
<td>Toddler sleep pattern (TSP score)</td>
<td>2.81</td>
<td>2.31</td>
<td>-0.36 to 0.36</td>
<td>0.25</td>
</tr>
<tr>
<td>Feeling ‘very confident’ about baby care at 3 months</td>
<td>37%</td>
<td>58%</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>Feeling ‘very confident’ about baby care at 8 months</td>
<td>56%</td>
<td>69%</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Feeling ‘very confident’ about baby care at 18 months</td>
<td>56%</td>
<td>69%</td>
<td>0.30</td>
<td></td>
</tr>
</tbody>
</table>

As expected, mothers of donor conceived children were significantly older than those who had conceived with their own gametes. It is noteworthy that, although not statistically significant, at all three time points those who had conceived with donor gametes rated their child’s behaviour as more difficult and the proportion that reported feeling ‘very confident’ about baby care was lower than in mothers who had not used donor gametes.

### 5.12 Reproductive Events and Decisions

In the questionnaire administered when the babies were eight months old, a single question about whether participants were hoping to have more children was included. Of those who completed the question (n=160) 88 (55%) responded yes, 33 (21%) no and 28 (17%) were undecided. Eight participants (5%) stated that they were unable to have any more children and three (2%) were pregnant at the time of completing the questionnaire. Primiparous participants were more likely than multiparous to be hoping for more children (73/113 (65%) versus 15/47 (32%), p<0.001). When the same question was asked at 18 months 76/153 (50%) participants were hoping to have more children 39 (26%) were not, 30 (20%) were undecided, and 8 (5%) stated that they were unable to have more children. Most participants provided the same answer at both time points (110/150, 73%) but the remainder had changed their mind over time. Of the 11 participants who were wishing to have more children at 8 months but responded no at 18 months, 3 had experienced a miscarriage and 5 had already had another baby.

At 18 months, participants were asked whether they had conceived again since having the baby. Most (109/153, 71%) had not, 13 (8%) had experienced pregnancy loss, and 31 (20%) were either currently pregnant or had already had another baby, as a result of spontaneous conception (n=17) or ART (n=14).
Participants were also asked if they still had frozen embryos in storage and what they intended to do with any frozen embryos. Ninety-six (63%) participants had stored cryopreserved embryos and of these 39 (41%) were planning to use them in the hope of having more children. Thirteen participants (13%) were planning to donate the surplus embryos to research, five (5%) intended to donate them to another infertile couple and three (3%) were going to discard the embryos. Of those who were not intending to use their frozen embryos to try to have more children (n=57) 63% were unsure about what to do with the embryos. There is evidence that deciding the fate of surplus frozen embryos is a complex process which can be emotionally arousing (Hammarberg and Tinney 2006; Lyerly et al. 2006). Participants in this study were not asked about their feelings in relation to deciding the fate of surplus frozen embryos, but it can be presumed that for some arriving at a decision will be distressing.

5.13 DETERMINANTS OF MATERNAL MOOD, MATERNAL CONFIDENCE, AND UTILISATION OF POSTNATAL RESIDENTIAL SERVICES

One of the aims of this study was to identify the determinants of postnatal mood, lower self-rated maternal confidence and utilisation of residential postnatal services in the first 18 months after the birth among women who conceive after infertility and ART. To do this, a two-stage statistical procedure was carried out. Firstly univariate measures of association were undertaken to identify significant relationships between variables and the outcomes of interest (p-value of 0.05 or less). Secondly, in order to determine the factors that made significant independent contributions to these outcomes, regression analyses were carried out using the factors that in univariate analyses showed significant association at the 0.01 level with the three outcomes.

5.13.1 Univariate measures of association

5.13.1.1 Factors associated with maternal mood

Table 5.13.1.1.1 lists the variables that showed a significant association with higher EPDS scores at three, eight and 18 months.
Table 5.13.1.1.1 Variables associated with higher EPDS scores at 3, 8 and 18 months postpartum (p<0.05)

<table>
<thead>
<tr>
<th></th>
<th>3 months</th>
<th>8 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>More severe postnatal pain</td>
<td>Less confidence about caring for the baby</td>
<td>Less confidence about caring for the baby</td>
<td></td>
</tr>
<tr>
<td>Dissatisfaction with length of hospital stay after childbirth</td>
<td>Less enjoyment of baby care</td>
<td>Less enjoyment of baby care</td>
<td></td>
</tr>
<tr>
<td>Less confidence about caring for the baby</td>
<td>Lower ‘Quality of attachment’ and ‘Absence of hostility’ MPA subscale scores</td>
<td>Lower ‘Quality of attachment’ and ‘Absence of hostility’ MPA subscale scores</td>
<td></td>
</tr>
<tr>
<td>More temperamenteally difficult infant (higher GI score)</td>
<td>More temperamenteally difficult infant (higher Easy-Difficult Score on the STSI)</td>
<td>More temperamenteally difficult toddler (higher Easy-Difficult Score on the STST)</td>
<td></td>
</tr>
<tr>
<td>More unsettled infant behaviour (higher ISCFP1 score)</td>
<td>More unsettled infant behaviour (higher ISCFP2 score)</td>
<td>More unsettled toddler behaviour (higher TSP)</td>
<td></td>
</tr>
<tr>
<td>Experiencing health problems</td>
<td>Experiencing health problems</td>
<td>Experiencing health problems</td>
<td></td>
</tr>
<tr>
<td>Experiencing a concurrent distressing life events</td>
<td>Experiencing a concurrent distressing life events</td>
<td>Higher ‘Maternal separation anxiety’ and ‘Employment related separation concerns’ MSAS subscale scores</td>
<td></td>
</tr>
<tr>
<td>Dissatisfaction with domestic and infant care work arrangements</td>
<td>Not getting enough sleep at night</td>
<td>Not getting enough sleep at night</td>
<td></td>
</tr>
<tr>
<td>Feeling isolated</td>
<td>Less ability to confide in partner</td>
<td>Less ability to confide in partner</td>
<td></td>
</tr>
<tr>
<td>Higher EPDS score in late pregnancy</td>
<td>Higher EPDS score at 3 months</td>
<td>Higher EPDS score at 8 months</td>
<td></td>
</tr>
<tr>
<td>Higher VPSQ (vulnerability) score</td>
<td>Higher VPSQ (vulnerability) score</td>
<td>Higher VPSQ (vulnerability) score</td>
<td></td>
</tr>
<tr>
<td>Lower IBM ‘Care’ and higher IBM ‘Control’ scores</td>
<td>Lower IBM ‘Care’ and higher IBM ‘Control’ scores</td>
<td>Lower IBM ‘Care’ and higher IBM ‘Control’ scores</td>
<td></td>
</tr>
<tr>
<td>Higher POMS ‘Anxiety’ and ‘Fatigue’ subscale scores</td>
<td>Higher POMS ‘Anxiety’ and ‘Fatigue’ subscale scores</td>
<td>Higher POMS ‘Anxiety’ and ‘Fatigue’ subscale scores</td>
<td></td>
</tr>
<tr>
<td>Use of residential services in the first 3 months</td>
<td>Use of residential service in the first 18 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Higher EMQ score</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower SWLS score</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower Emotional Support score</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower Practical Support score</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.13.1.2 Factors associated with maternal confidence

In Table 5.13.1.2.1 the variables that were significantly associated with self-rating of confidence about caring for the baby as ‘Occasionally anxious’ or ‘Fairly confident’ rather than ‘Very confident’ at three, eight and 18 months are shown.

Table 5.13.1.2.1 Variables associated with lower maternal confidence 3, 8 and 18 months postpartum (p<0.05)

<table>
<thead>
<tr>
<th>3 months</th>
<th>8 months</th>
<th>18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being a first time mother</td>
<td>Less enjoyment of baby care</td>
<td>Less enjoyment of baby care</td>
</tr>
<tr>
<td>Less satisfaction with care provided during the birth</td>
<td>Lower ‘Quality of attachment’ and ‘Absence of hostility’ MPA subscale scores</td>
<td>Lower ‘Quality of attachment’ and ‘Absence of hostility’ MPA subscale scores</td>
</tr>
<tr>
<td>Less satisfaction with infant feeding advice provided in hospital</td>
<td>More temperamentally difficult infant (higher Easy-Difficult Score on the STSI)</td>
<td>More temperamentally difficult toddler (higher Easy-Difficult Score on the STST)</td>
</tr>
<tr>
<td>Use of residential services in the first 3 months</td>
<td>Use of residential services in the first 8 months</td>
<td>Use of residential services in the first 18 months</td>
</tr>
<tr>
<td>Less confidence about baby care when leaving the hospital</td>
<td>Higher EPDS score at 8 months</td>
<td>Higher EPDS score at 18 months</td>
</tr>
<tr>
<td>More temperamentally difficult infant (higher GI score)</td>
<td>Higher VPSQ (vulnerability) score re</td>
<td>Higher VPSQ (vulnerability) score</td>
</tr>
<tr>
<td>More unsettled infant behaviour (higher ISCFP1 score)</td>
<td>Higher POMS ‘Anxiety’ and ‘Fatigue’ subscale scores</td>
<td>Higher POMS ‘Anxiety’ and ‘Fatigue’ subscale scores</td>
</tr>
<tr>
<td>Feeling isolated</td>
<td></td>
<td>Higher EMQ score</td>
</tr>
<tr>
<td>Dissatisfaction with domestic and infant care work arrangements</td>
<td>Not getting enough sleep at night</td>
<td></td>
</tr>
<tr>
<td>Higher BIT score</td>
<td></td>
<td>Less ability to confide in partner</td>
</tr>
<tr>
<td>Higher VPSQ (vulnerability) score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher EPDS score at 3 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher POMS ‘Anxiety’ and ‘Fatigue’ subscale scores</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.13.1.3 Factors associated with admission to a residential mother-baby unit

The proportion of participants who were admitted to a residential mother-baby service in the first 18 postpartum months was 17% (26/153). The variables that were significantly associated with utilisation of these services are shown in Table 5.13.1.3.1.
Table 5.13.1.3.1 Variables associated with admission to a residential mother-baby service in the first 18 months (p<0.05)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being a first time mother</td>
<td></td>
</tr>
<tr>
<td>Needing a lot of infant feeding advice in the neonatal period</td>
<td></td>
</tr>
<tr>
<td>Rating the infant feeding advice given in hospital as confusing or only fairly clear</td>
<td></td>
</tr>
<tr>
<td>Less confidence about caring for the baby when leaving the hospital and at 3, 8 and 18 months</td>
<td></td>
</tr>
<tr>
<td>Not getting enough help and being dissatisfied with domestic and infant care work arrangements at 3 months</td>
<td></td>
</tr>
<tr>
<td>Experiencing loneliness at 3 months</td>
<td></td>
</tr>
<tr>
<td>Higher EPDS score at 3 and 18 months</td>
<td></td>
</tr>
<tr>
<td>Higher POMS ‘Anxiety’ subscale scores at 3 months and 18 months</td>
<td></td>
</tr>
<tr>
<td>More temperamentally difficult infant (higher GI score)</td>
<td></td>
</tr>
<tr>
<td>More unsettled infant behaviour (higher ISCFP1 score)</td>
<td></td>
</tr>
<tr>
<td>Higher VPSQ (vulnerability) score</td>
<td></td>
</tr>
<tr>
<td>Less enjoyment of baby care at 8 and 18 months</td>
<td></td>
</tr>
<tr>
<td>Less intense attachment to the baby (lower MPA score)</td>
<td></td>
</tr>
<tr>
<td>Perceiving the experience of motherhood as more distressing and less satisfying (higher EMQ score)</td>
<td></td>
</tr>
</tbody>
</table>

5.13.2 Modelling of outcome measures in regression analyses

5.13.2.1 Determinants of maternal postnatal mood as measured by EPDS

The putative explanatory variables for maternal mood as measured by participants EPDS scores at three, eight and 18 months (p<0.01) were entered into a general linear regression model. For binary categorical explanatory variables, the parameter estimate corresponds to the average difference in EPDS between the indicated categories. For continuous scales, the parameter estimate represents the average change in EPDS corresponding to the interquartile difference in the explanatory variable. This way of reporting estimated change in EPDS for continuous potential explanatory variables is a clinically meaningful interpretation of the differences. In all tables the first listed category is the reference for the comparison.

The parameter estimates for the possible explanatory variables for the EPDS score at three months are shown in Table 5.13.2.1.1.
Table 5.13.2.1.1 Parameter estimates for the potential explanatory variables for EPDS score at three months (n=148)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>95% CI for the difference</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling about the length of stay in hospital after the birth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About right</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too long/Too short</td>
<td>0.43</td>
<td>-0.67 to 1.55</td>
<td>0.45</td>
</tr>
<tr>
<td>Rating of own general health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No health problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One or more health problems</td>
<td>0.69</td>
<td>-0.52 to 1.89</td>
<td>0.26</td>
</tr>
<tr>
<td>Feeling lonely</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasionally/Rarely</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes/Very often</td>
<td>2.06</td>
<td>0.58 to 3.53</td>
<td>0.007</td>
</tr>
<tr>
<td>Domestic and infant care work arrangements satisfactory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.67</td>
<td>0.15 to 3.19</td>
<td>0.03</td>
</tr>
<tr>
<td>Experiencing a concurrent distressing life event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.28</td>
<td>0.25 to 2.31</td>
<td>0.02</td>
</tr>
<tr>
<td>EPDS in late pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 6 (50th percentile)</td>
<td>0.97</td>
<td>0.41 to 1.53</td>
<td>0.001</td>
</tr>
<tr>
<td>Score of 9 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM Care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 31 (50th percentile)</td>
<td>-0.05</td>
<td>-0.38 to 0.28</td>
<td>0.77</td>
</tr>
<tr>
<td>Score of 34 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 4 (50th percentile)</td>
<td>-0.41</td>
<td>-0.86 to 0.04</td>
<td>0.07</td>
</tr>
<tr>
<td>Score of 7 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VPSQ (Vulnerability subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 14 (50th percentile)</td>
<td>0.94</td>
<td>0.41 to 1.46</td>
<td>0.001</td>
</tr>
<tr>
<td>Score of 18 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant manageability (GI scale on the EITQ)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 2 (50th percentile)</td>
<td>2.97</td>
<td>0.76 to 5.19</td>
<td>0.009</td>
</tr>
<tr>
<td>Score of 3 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue (POMS Fatigue-Inertia subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 10 (50th percentile)</td>
<td>0.60</td>
<td>0.26 to 0.94</td>
<td>0.001</td>
</tr>
<tr>
<td>Score of 16 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the early postpartum a range of factors, some of which preceded the birth, made a significant independent contribution to higher EPDS scores. Having a sensitive and timid personality and experiencing more depressive symptoms in late pregnancy were preexisting factors that increased the risk of postnatal mood disturbance. After the birth, experiencing a concurrent distressing life event, feeling lonely, unsupported and fatigued, and having an unsettled baby increased the risk of more depressed mood. The constellation of variables explained 55% of the variance in EPDS scores (adjusted R square 0.55).

The same statistical procedure was used for the EPDS at eight and 18 months postpartum. Table 5.13.2.1.2 shows the parameter estimates for the potential explanatory variables for EPDS scores at eight months.
Table 5.13.2.1.2 Parameter estimates for the potential explanatory variables for EPDS score at eight months (n=139)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>95% CI for the difference</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to talk to partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As much as needed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than would like to</td>
<td>2.04</td>
<td>0.93 to 3.15</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Experiencing a concurrent distressing life event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.74</td>
<td>-0.34 to 1.83</td>
<td>0.18</td>
</tr>
<tr>
<td>Rating of own general health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No health problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One or more health problems</td>
<td>0.14</td>
<td>-0.90 to 1.18</td>
<td>0.79</td>
</tr>
<tr>
<td>EPDS at 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 4 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 8 (75th percentile)</td>
<td>0.74</td>
<td>0.23 to 1.25</td>
<td>0.005</td>
</tr>
<tr>
<td>IBM Care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 31 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 34 (75th percentile)</td>
<td>0.18</td>
<td>-0.10 to 0.45</td>
<td>0.21</td>
</tr>
<tr>
<td>VPSQ (Vulnerability subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 14 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 18 (75th percentile)</td>
<td>0.57</td>
<td>0.07 to 1.07</td>
<td>0.03</td>
</tr>
<tr>
<td>Infant manageability (Easy Difficult Scale of STSI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 2.5 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 3 (75th percentile)</td>
<td>0.25</td>
<td>-3.23 to 3.66</td>
<td>0.89</td>
</tr>
<tr>
<td>Fatigue (POMS Fatigue-Inertia subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 9 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 15 (75th percentile)</td>
<td>0.49</td>
<td>0.16 to 0.82</td>
<td>0.004</td>
</tr>
<tr>
<td>Quality of attachment (MPA subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 42 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 44 (75th percentile)</td>
<td>-0.60</td>
<td>-0.98 to – 0.23</td>
<td>0.002</td>
</tr>
<tr>
<td>Absence of hostility (MPA subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 20 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 22 (75th percentile)</td>
<td>-0.38</td>
<td>-1.18 to 0.41</td>
<td>0.34</td>
</tr>
</tbody>
</table>
The variables included in the model at eight months explained 51% of the variance in EPDS (adjusted R square 0.51). Having a more sensitive and timid personality, not being able to talk to the partner as much as needed, having more depressive mood at three months postpartum, being more fatigued and having a less intense attachment to the baby all made a significant independent contribution to higher EPDS scores at eight months.

The parameter estimates for the potential explanatory variables for 18 months EPDS scores are shown in Table 5.13.2.1.3.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>95% CI for the difference</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to talk to partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About the same as before/ More than before</td>
<td>3.58</td>
<td>1.19 to 5.96</td>
<td>0.004</td>
</tr>
<tr>
<td>Less than before</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of own general health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No health problems</td>
<td>-0.33</td>
<td>-1.76 to 1.10</td>
<td>0.65</td>
</tr>
<tr>
<td>One or more health problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPDS at 8 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 4.5 (50th percentile)</td>
<td>0.62</td>
<td>-0.10 to 1.35</td>
<td>0.10</td>
</tr>
<tr>
<td>Score of 8 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 37 (50th percentile)</td>
<td>0.40</td>
<td>-0.13 to 0.94</td>
<td>0.14</td>
</tr>
<tr>
<td>Score of 40 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM Care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 31 (50th percentile)</td>
<td>0.23</td>
<td>-0.17 to 0.62</td>
<td>0.26</td>
</tr>
<tr>
<td>Score of 34 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VPSQ (Vulnerability subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 14 (50th percentile)</td>
<td>0.68</td>
<td>-0.02 to 1.38</td>
<td>0.06</td>
</tr>
<tr>
<td>Score of 18 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant manageability (Easy Difficult Scale of the STST)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 3.2 (50th percentile)</td>
<td>-0.63</td>
<td>-5.00 to 3.74</td>
<td>0.78</td>
</tr>
<tr>
<td>Score of 3.8 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue (POMS Fatigue-Inertia subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 9 (50th percentile)</td>
<td>1.14</td>
<td>0.50 to 1.77</td>
<td>0.001</td>
</tr>
<tr>
<td>Score of 14 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Support score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 5.25 (50th percentile)</td>
<td>-0.22</td>
<td>-0.67 to 0.24</td>
<td>0.35</td>
</tr>
<tr>
<td>Score of 6.5 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical support score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 2.5 (50th percentile)</td>
<td>-0.14</td>
<td>-0.73 to 0.44</td>
<td>0.64</td>
</tr>
<tr>
<td>Score of 4 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of attachment (MPA subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 42 (50th percentile)</td>
<td>-0.22</td>
<td>-0.70 to 0.25</td>
<td>0.36</td>
</tr>
<tr>
<td>Score of 44 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absence of hostility (MPA subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 20 (50th percentile)</td>
<td>-0.04</td>
<td>-1.22 to 1.13</td>
<td>0.94</td>
</tr>
<tr>
<td>Score 22 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At 18 months postpartum the variables included accounted for 52% of the variance in EPDS (adjusted R square 0.52). Only two variables made a significant independent contribution to higher EPDS score at this time; not being able to talk to the partner as much as needed, and being more fatigued.

In summary, at three, eight and 18 months postpartum, a number of factors related to participants’ relationship with her partner, social circumstances, personality and infant temperament determined maternal mood as measured by the EPDS. Two factors made significant independent contributions to higher EPDS at all three time points. In the first 18 months after the birth, feeling lonely and not able to talk to the partner as much as needed and experiencing fatigue appear to be strong predictors of lower maternal emotional well-being in this sample.

5.13.2.2 Determinants of maternal confidence about baby care

For analyses of maternal confidence, a logistic regression model was fitted with maternal confidence dichotomised into “Very confident” and “Occasionally anxious/Fairly confident” as the outcome variable. The results are represented by the odds ratio for lower self-rated maternal confidence for the indicated categories and the first listed category is the reference for the comparison.

The potential explanatory variables for lower self-rated maternal confidence (p<0.01 in univariate analyses) at three months are presented in Table 5.13.2.2.1.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Care during the birth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairly kind/Not very kind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very kind</td>
<td>0.20</td>
<td>0.05 to 0.83</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Feeling about baby care when leaving the hospital</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairly/Very confident</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasionally/Very anxious</td>
<td>0.35</td>
<td>0.15 to 0.82</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>VPSQ (Vulnerability subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 14 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 18 (75th percentile)</td>
<td>1.69</td>
<td>1.03 to 2.76</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Feeling lonely</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes/Very often</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasionally/Rarely</td>
<td>0.26</td>
<td>0.06 to 1.11</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Domestic and infant care work arrangements satisfactory</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.68</td>
<td>0.18 to 2.59</td>
<td>0.57</td>
</tr>
<tr>
<td><strong>Infant manageability (GI scale on the EITQ)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 2 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 3 (75th percentile)</td>
<td>20.63</td>
<td>3.04 to 140.19</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Fatigue (POMS Fatigue-Inertia subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 10 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 16 (75th percentile)</td>
<td>1.15</td>
<td>0.84 to 1.60</td>
<td>0.38</td>
</tr>
<tr>
<td><strong>Anxiety (POMS Tension-Anxiety subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 5 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 9 (75th percentile)</td>
<td>0.87</td>
<td>0.56 to 1.35</td>
<td>0.53</td>
</tr>
<tr>
<td><strong>BIT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 7 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 8 (75th percentile)</td>
<td>4.21</td>
<td>1.33 to 13.29</td>
<td>0.01</td>
</tr>
</tbody>
</table>

The variables included in this model accounted for 48% of the variability in maternal confidence at three months (R-square 0.48). Participants who had a more timid and sensitive personality and had experienced more difficulty conceiving, were less satisfied with the intrapartum care they had received, felt less confident about caring for the baby when they left the hospital, or had a baby that was perceived as more difficult to care
for, were less likely to feel very confident in their ability to care for their baby at three months.

The odds ratio for the potential explanatory variables for lower self-rated maternal confidence at eight months (p<0.01 in univariate analyses) are shown in Table 5.13.2.2.2.

**Table 5.13.2.2.2 Odds ratio for potential explanatory variables for lower self-rated maternal confidence at eight months (n=146)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enjoyment of the baby</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some/Most aspects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All aspects</td>
<td>0.37</td>
<td>0.14 to 0.94</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>VPSQ (Vulnerability subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 14 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 18 (75th percentile)</td>
<td>1.28</td>
<td>0.79 to 2.07</td>
<td>0.32</td>
</tr>
<tr>
<td><strong>Quality of attachment (MPA subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 42 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 44 (75th percentile)</td>
<td>0.47</td>
<td>0.29 to 0.75</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Absence of hostility (MPA subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 20 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 22 (75th percentile)</td>
<td>0.78</td>
<td>0.36 to 1.65</td>
<td>0.51</td>
</tr>
<tr>
<td><strong>Infant manageability (Easy Difficult Scale on the STSI)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 2.5 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 3 (75th percentile)</td>
<td>0.58</td>
<td>0.02 to 14.81</td>
<td>0.74</td>
</tr>
<tr>
<td><strong>Fatigue (POMS Fatigue-Inertia subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 9 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 15 (75th percentile)</td>
<td>0.92</td>
<td>0.67 to 1.26</td>
<td>0.61</td>
</tr>
<tr>
<td><strong>Anxiety (POMS Tension-Anxiety subscale)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 5 (50th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 7 (75th percentile)</td>
<td>1.09</td>
<td>0.64 to 1.87</td>
<td>0.74</td>
</tr>
</tbody>
</table>

The listed variables accounted for 41% of the difference in maternal confidence at eight months (R-square 0.41). Less enjoyment in relation to caring for the baby and a less intense emotional attachment to the baby made a significant independent contribution to lower self-rated maternal confidence at eight months.
The putative explanatory variables for lower self-rated maternal confidence at 18 months (p<0.01 in univariate analyses) and their odds ratio are shown in Table 5.13.2.2.3.

Table 5.13.2.2.3 Odds ratio for potential explanatory variables for lower self-rated maternal confidence at 18 months (n=129)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoyment of the baby</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some/Most aspects</td>
<td>0.21</td>
<td>0.07 to 0.62</td>
<td>0.005</td>
</tr>
<tr>
<td>All aspects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to talk to partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than before</td>
<td>0.29</td>
<td>0.04 to 2.08</td>
<td>0.22</td>
</tr>
<tr>
<td>About the same as before/ More than before</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VPSQ (Vulnerability subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 14 (50th percentile)</td>
<td>0.81</td>
<td>0.44 to 1.49</td>
<td>0.50</td>
</tr>
<tr>
<td>Score of 18 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of attachment (MPA subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 42 (50th percentile)</td>
<td>0.55</td>
<td>0.34 to 0.89</td>
<td>0.02</td>
</tr>
<tr>
<td>Score of 44 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absence of hostility (MPA subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 20 (50th percentile)</td>
<td>2.22</td>
<td>0.83 to 5.92</td>
<td>0.11</td>
</tr>
<tr>
<td>Score of 22 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant manageability (Easy Difficult Scale on the STST)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 3.2 (50th percentile)</td>
<td>11.98</td>
<td>0.30 to 475.95</td>
<td>0.19</td>
</tr>
<tr>
<td>Score of 3.8 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue (POMS Fatigue-Inertia subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 9 (50th percentile)</td>
<td>1.92</td>
<td>1.13 to 3.29</td>
<td>0.02</td>
</tr>
<tr>
<td>Score of 14 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety (POMS Tension-Anxiety subscale)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 5 (50th percentile)</td>
<td>0.78</td>
<td>0.45 to 1.36</td>
<td>0.38</td>
</tr>
<tr>
<td>Score of 8 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 37 (50th percentile)</td>
<td>1.02</td>
<td>0.92 to 1.13</td>
<td>0.69</td>
</tr>
<tr>
<td>Score of 40 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Forty-seven percent of the difference in maternal confidence at 18 months was explained by these variables (R-square 0.47). As was the case at eight months, less enjoyment of the baby and less intense emotional attachment to the baby made a significant independent contribution to the difference. In addition, being more fatigued predicted lower confidence at this time.

In summary, the prevalence and determinants of lower self-rated maternal confidence about caring for the baby changed as the babies grew older. The proportion reporting feeling less than very confident in the early postpartum was 44%, which decreased to 32% at eight months. However, there was no decrease in this proportion between eight and 18 months. In the early postpartum the most important predictors of lower maternal confidence were feeling anxious about baby care when leaving the hospital, perceiving the baby as more challenging to look after (higher GI score), and having experienced more difficulty conceiving (higher BIT score). In addition, less satisfaction with the intrapartum care and having a less assertive and more sensitive personality (higher VPSQ Vulnerability score) were explanatory factors for early maternal confidence. When the children were eight and 18 months old, lower maternal confidence was significantly linked to less enjoyment of the baby and less intense emotional attachment to the baby (lower MPA “Quality of attachment” score). At 18 months, being more fatigued also contributed significantly to the likelihood of participants reporting lower maternal confidence about caring for the child.

5.13.2.3 Determinants of utilisation of postnatal residential services

For analyses of the determinants of residential postnatal service utilisation in the first 18 months after the birth the same method as for the analyses of maternal confidence was used.

The odds ratio for the potential explanatory variables (p<0.01 in univariate analyses) for residential service use are listed in Table 5.13.2.3.1 and the first listed category is the reference for the comparison.
Table 5.13.2.3.1 Odds ratio for potential explanatory variables for utilisation of residential postnatal services in the first 18 months postpartum (n=141)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratio</th>
<th>95% CI for the difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant feeding advice in hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairly clear/Confusing</td>
<td>0.51</td>
<td>0.15 to 1.70</td>
<td>0.27</td>
</tr>
<tr>
<td>Very clear and worked well</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self rated maternal confidence at three months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairly confident/ Occasionally anxious</td>
<td>0.53</td>
<td>0.17 to 1.69</td>
<td>0.28</td>
</tr>
<tr>
<td>Very confident</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Getting enough help at home at three months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0.75</td>
<td>0.20 to 2.78</td>
<td>0.67</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling lonely at three months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes/Very often</td>
<td>0.37</td>
<td>0.11 to 1.33</td>
<td>0.13</td>
</tr>
<tr>
<td>Occasionally/Rarely</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant behaviour (ISCFP1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 2.5 (50th percentile)</td>
<td>1.40</td>
<td>1.0 to 1.97</td>
<td>0.05</td>
</tr>
<tr>
<td>Score of 4 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment to the baby (MPA Global attachment)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 84 (50th percentile)</td>
<td>0.73</td>
<td>0.53 to 0.99</td>
<td>0.05</td>
</tr>
<tr>
<td>Score of 88 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety (POMS Tension-Anxiety subscale) at three months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score of 5 (50th percentile)</td>
<td>0.91</td>
<td>0.55 to 1.52</td>
<td>0.72</td>
</tr>
<tr>
<td>Score of 9 (75th percentile)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Together the listed variables explained 31% of the residential postnatal service use (R-square 0.31) which suggests that other factors not elicited in this study contributed to the elevated risk of admission to these services in this sample. More disturbed infant sleep, cry and feeding patterns in the newborn period (higher ISCFP1 score) and less intense attachment to the baby (lower MPA “Global attachment” score) made significant independent contribution to the likelihood of residential service use between birth of the baby and 18 months postpartum.
5.14 CONCLUSION

These results have demonstrated the dynamic and complex nature of postnatal maternal adjustment after ART and the range of factors that influence postnatal mood and confidence among participants in this study. Two findings in particular suggest that the well-documented negative effects of infertility and infertility treatment on self-confidence and self-esteem may be cumulative and contribute to delayed acquisition of a confident maternal identity and early parenting difficulties. Firstly, those who had experienced more difficulty conceiving as measured by the BIT were less likely to feel very confident about caring for their baby in the first three months after the birth. Second, in concordance with previous reports, the elevated rate of utilisation of residential postnatal services observed in this study suggest that early parenting difficulties are more common after ART than spontaneous conceptions.
6 DISCUSSION AND CONCLUSION ..............................................................................274

6.1 Strengths and limitations of the study ........................................................274

6.2 Implications of findings...............................................................................276

   6.2.1 The experience of childbirth........................................................ 277
   6.2.2 Postnatal adjustment................................................................. 278

6.3 Strategies to improve the experience of childbirth and postnatal
adjustment after assisted reproductive technology........................................285

6.4 Future research ...........................................................................................287
6 DISCUSSION AND CONCLUSION

The original and unique findings of this study extend substantially knowledge about the experience of childbirth and postnatal psychological adjustment after infertility and assisted conception. The significant proportion of participants being admitted to residential early parenting services in the first 18 months after the birth indicate that a path to motherhood complicated by infertility and infertility treatment may adversely affect women’s confidence in their ability to adequately care for their baby.

6.1 STRENGTHS AND LIMITATIONS OF THE STUDY

The study has a number of methodological strengths that allow generalisation of the findings not permitted by much of the previous research in this field. These include the prospective longitudinal design of the study, the recruitment of a consecutive cohort large enough to detect the outcomes of interest, which included groups of women excluded in most previous studies, the length of the study period, the use of validated standardised psychometric instruments, a high response rate and very high retention rates throughout the study period. Furthermore, on treatment indicators, those who took part in the study were similar and not statistically significantly different to those who declined participation and, on all available indicators, participants were similar to all women who give birth after ART in Australia and New Zealand. Therefore, it can be claimed with some confidence that the studied women accurately represent Australian women who give birth after ART.

The aim to characterize postpartum functioning of women who conceive through ART and compare it to existing knowledge of the characteristics of women who have conceived spontaneously was achieved through use of interviews, comprehensive questionnaires and self-report measures as sources of information for comparisons. The combination of these sources of information allowed meaningful comparisons between participants and the general population of parturient women on a number of medical, sociodemographic, and psychological indicators and enabled a more detailed description of life after birth among women who conceive with ART than provided by earlier
studies. The additional information gathered from medical records allowed quantification of the degree of difficulty involved in conceiving and the construction of the composite Burden of Infertility and Treatment (BIT) score. The need to quantify the infertility and treatment experiences was demonstrated in the study by McMahon et al. (1997) where it was noticed that women who had experienced treatment failure had worse postnatal psychological outcomes than those who conceived on their first ART attempt. The BIT expanded understanding of the putative effect of infertility and ART on postnatal functioning (Hammarberg et al. 2005).

The implementation of the second aim, to identify factors associated with postpartum psychological distress, low self-reported maternal confidence and admission to residential early parenting services among women who conceive with ART, revealed the influence of a broad range of factors, some not previously identified, for these outcomes.

Some limitations are also apparent in this study. It is well known that a previous history of depression increases the risk of postnatal depression. As no question canvassing previous mental health was included, it is not possible to comment on its effect on postnatal psychological functioning. However, the remarkably low prevalence of depression in pregnancy suggests that participants at that time had high levels of psychological well-being. Another oversight was the non-inclusion of a standardised measure of self-esteem which, had one been included, might have yielded complementary information to that of responses to the question about self-reported maternal confidence.

It also needs to be recognised that the telephone contact prior to mailing of each questionnaire, intended to ensure optimum retention rates, may have had a therapeutic effect. It was clear that many participants appreciated the opportunity to discuss their baby’s progress and in some instances problems they were facing and this may have ameliorated concerns they might have had. However, any effect of this might have been to reduce the rate of postpartum admission and therefore to have led to an under rather than an over estimate of the outcome of interest.
Women who conceive with ART are diverse in terms of their infertility experience and reproductive history. The decision to compare study participants with the general parturient population rather than to use a control group was in the interest of avoiding inadequate matching and allowing inclusion of the range of women who give birth after undergoing ART. However, women who give birth after ART are also different in many respects from the general parturient population as they are older, on average, when they give birth, more likely to be first-time mothers, have an operative birth and have twins. And, as this study revealed, they are also more likely to be partnered, have higher level of education and occupation, and be socioeconomically advantaged than other childbearing women. It is therefore not possible to exclude the possibility that differences in the experience of childbirth and postnatal adjustment detected between study participants and other childbearing women may in part be attributable to differences in these characteristics rather than to the infertility experience. However, again these differences would usually be regarded as protective of health and therefore make more powerful the evidence found here of apparently high rates of postpartum admission to health services in a group whose need for these services might otherwise be thought to be low.

6.2 IMPLICATIONS OF FINDINGS

This study confirms a number of findings in earlier studies of postnatal adjustment after ART. On measures of depression and anxiety, marital satisfaction, and emotional attachment to the baby, this and other studies show that women who conceive with ART are similar to comparison groups who have conceived spontaneously. However, this study found differences not previously identified in the experience of childbirth among women who conceive with ART compared with the general parturient population. Also, this rigorous study has shown that early parenting difficulties are more common after ART than spontaneous conception, which is in contrast to previous studies which have not found differences in parenting stress and parenting self-efficacy between women who have conceived with ART and comparison groups.
6.2.1 The experience of childbirth

The extraordinarily high rate of caesarean section delivery (51%) observed in this study indicates that ART conception constitutes a risk factor for operative birth, at least in Australia. The reasons for this can only be speculated but are likely, at least in part, to be due to non-clinical factors. Treating obstetricians may view ART pregnancies as more ‘precious’ because women are older and thought not to be able to conceive again and this may make them more inclined to intervene as suggested by Windridge and Berryman (1999). Fear of malpractice litigation and convenience to the treating doctor of a scheduled birth may also have contributed to the high caesarean section rate. Fisher et al. (1995) observed an increased likelihood of caesarean birth among privately insured women who in late pregnancy were assured and thinking clearly and in secure partnerships. It is possible that patient personality and socioeconomic circumstances also influenced obstetric decision-making in a similar way among participants in this study. In the Australian two-tiered health care system patients in private care are more likely to have obstetric interventions than those in public care. As most study participants gave birth in private care this partly explains the elevated rate of caesarean section. The higher proportion of participants than of women who conceive spontaneously who had a multiple birth, and therefore were more likely to have an operative birth, also accounts for some of the excess. However, even when compared with women in private care only, participants in this study who had a singleton birth were more likely to experience a caesarean delivery (42% versus 35%). In countries where there are no privately practicing obstetricians, such as Finland and Sweden, the rate of caesarean section after ART conception is similar to that of other parturient women (Koivurova et al. 2002; Sydsjö et al. 2002; Hjelmstedt et al. 2003).

Irrespective of the explanation for the high rate of caesarean section among participants, the adverse effect of operative birth on their overall rating of the experience of the birth is evident. This did not appear to be due to lack of support during the birth or dissatisfaction with the care they received during the birth, but was clearly related to not having an active say in what happened during the birth and being delivered by caesarean section. Of those who had a caesarean section over one third did not feel that they had an active say in making decisions about what happened during the birth and almost half
reported feeling less than pleased with the birth experience. This suggests that the adverse effect on satisfaction with the birth of obstetric interventions and lack of control and involvement in decisions during the birth described by others, also affected study participants. The severe postnatal pain reported by almost one third of women who had a caesarean section may have contributed to a less positive recalled birth experience and unmet expectations of the birth event or a sense of failure at not being able to deliver the baby normally may have caused feelings of disappointment as suggested by Hillan (1996). In addition, the prolonged physical recovery after operative birth may have initially limited participants’ capacity to care for the new baby and this may have compounded feelings of disappointment. For some, disappointment with the birth event may have reduced feelings of accomplishment and negatively affected the transition to parenthood.

As only one previous study (van Balen et al. 1996) has investigated the birth experience among women who have conceived with ART, and that study had very limited information, these findings constitute a significant improvement in the knowledge about the experience of childbirth after infertility and ART.

6.2.2 Postnatal adjustment

The significantly higher rates detected in this study of low maternal confidence in the early postpartum and admission to early parenting services in the first 18 months after the birth among study participants than among other childbearing women provide substantial evidence of increased risk of early parenting difficulties after ART.

There are several reasons why this study had the capacity to detect this difference. First, the unique availability of residential early parenting services in Victoria allows meaningful comparison of parenting difficulties after assisted and spontaneous conception on the basis of admission rates to these services. Second, participants in this study were followed for considerably longer than participants in other studies of postnatal psychological adjustment after ART. Third, a question canvassing self-rated maternal confidence in relation to caring for the baby was included at all three time points.
A multitude of factors and their complex interaction are likely to explain the elevated risk of early parenting difficulties after ART observed in this and other studies (Fisher et al. 2002 a; Fisher et al. 2005; Fisher and Rowe 2005). The comprehensive coverage in the questionnaires administered in this study, of the many aspects of postnatal adjustment, allows interpretation and elucidation of the ways in which infertility and ART may diminish maternal confidence and contribute to risk of early parenting difficulties.

One of the potentially contributing factors to early parenting difficulties is the apparent absence of ambivalence in pregnancy as indicated by remarkably low reports of anxiety, depressive symptoms, and irritability in pregnancy. This suggests idealised expectations of the birth, the baby, and motherhood which may subsequently have been unmet in some cases. The gap between the expected and real experience of life with a new baby may have been unexpected by some.

Previous research has found that anxiety about caring for the baby is associated with longer postnatal hospital stay (Brown and Lumley 1997). The direction of this effect is unclear, anxious women may be encouraged to stay longer and longer stay may contribute to anxiety. However, lack of confidence about caring for the baby at home may explain the high proportion of participants in this study who stayed in hospital for five days or longer after the birth (62%). In spite of the prolonged hospital stay, participants were more anxious about caring for their baby when they left hospital and three months after the birth than comparison groups.

The high degree of anxiety about being separated from the baby and worry, sadness and guilt in relation to separation observed among participants suggests extreme protectiveness and concerns for the child’s welfare when not cared for by the mother. This disquietude may be linked to the extensive difficulties participants had experienced to realise motherhood.

A number of factors associated with higher rate of initiation and longer duration of breastfeeding have been identified, including maternal age over 25, higher level of education, being partnered, and higher socio-economic status (Scott and Binns 1998). These were all prevalent in this population but in spite of this, the rate of initiation of
breastfeeding was not higher and the proportion breastfeeding at three months was significantly lower than among women who participated in the Victorian Survey of Recent Mothers (VSRM) in 2000 (Brown et al. 2001). Some findings suggest that this lower rate may in part be explained by diminished confidence in the ability to provide enough breast milk for the baby, which in turn may be due to the corroding effect of fertility difficulties on self-confidence. Over two thirds of participants reported that they needed quite a lot of feeding advice while in hospital. For participants who had had a caesarean delivery, who were first time mothers or who had twins the need for a lot of feeding advice was almost universal. Over half the sample regarded the advice they were given while in hospital as “confusing” or only “fairly clear” and the qualitative comments regarding breastfeeding advice in hospital were predominantly concerned with its lack of consistency and clarity. Furthermore, almost one quarter attended a day-stay lactation program after discharge from hospital.

Almost one third of participants either did not initiate breastfeeding or breastfed for less than six weeks. Worry about adequacy of the milk supply may have prevented some mothers from initiating or continuing breastfeeding beyond six weeks. Among participants who were still breastfeeding at three months, the most common feeding difficulty reported was insufficient supply of breast milk, which supports the notion that they did not trust their ability to produce sufficient milk for the baby to thrive. However, it is notable that when these initial concerns were overcome, participants were highly likely to continue breastfeed beyond one year.

Measures of mood are commonly used as indicators of postnatal psychological adjustment. In some studies the proportion with probable depression as indicated by scores above a certain cut-off and in others the mean scores on standardised measures of mood are used to describe psychological functioning among groups of new mothers. Yet, this study demonstrates that scores on mood measures inadequately inform understanding of postnatal adjustment after ART.

Participants’ mean scores on the EPDS and the POMS and the proportions scoring above the clinical cut-offs were similar to those recorded in population-based studies of parturient women. However, considering that some of the major risk factors for depressed mood after childbirth either were not present or were rare among participants
in this study, it may have been expected that mood would be better. Buist et al. (2005) for example identified a number of factors that significantly increased the risk of scoring more than 9 on the EPDS which did not feature in this study population. These include not being partnered (OR 3.0), lower socio-economic status (OR 3.1), and having had difficulties accepting the pregnancy (OR 8.7). An uncaring partner, marital conflict, depression in pregnancy, low economic, educational and occupational status, and experiencing postnatal health problems are other recognised risk factors for PND which were largely absent among women in this study.

Multiple birth, which was relatively common among participants, is also known to increase the likelihood of depressed mood. Hay et al. (1990) in their study found that PND among mothers of twins was five times more common than among mothers of singletons. However, at no point were there any statistically significant differences in EPDS scores between mothers of singletons and mothers of twins in this study. There are several possible explanations for this. Women who undergo ART are well aware that their risk of multiple birth is higher than for women who conceive spontaneously and they may therefore have been better prepared for this outcome. Indeed, some may have, as indicated by other studies of women’s attitudes to multiple birth after ART (Gleicher et al. 1995; Goldfarb et al. 1996; Blennborn et al. 2005), wished for and welcomed having twins. Health problems are generally more common among twins than singletons. In this study however, there were no differences in the health and development between singletons and twins as reported by the mothers and this may have reduced the risk of depression associated with having twins.

Two factors made a significant independent contribution to maternal mood at all three time points; feeling lonely and not able to confide in the partner, and fatigue. The quality of the relationship with the partner is known to influence maternal postnatal mental health. An uncaring, unsupportive partner and a poor marital relationship are established risk factors for postnatal mood disturbance (Pope et al. 2000; Scottish Intercollegiate Guidelines Network 2002). Participants in this study rated their partner as significantly more caring and less controlling than the normative sample. Furthermore, a significantly higher proportion of participants than women in a study by Green and Kafetsios (1997) gave the highest rating for their partner’s emotional support in the postpartum. In spite of the apparent caring and supportive qualities of the partner
relationship feelings of loneliness and inability to confide in the partner were independently related to maternal mood at all assessments. This suggests that not all participants enjoyed the presence of an engaging partner willing to listen.

Feelings of loneliness expressed by some in the early postpartum may not have related only to lack of an involved partner but might indicate lack of wider support from friends and peers. As participants were significantly older than other mothers, their friends may not have been at the same life stage.

Clinically significant fatigue is common among new mothers and has been shown to adversely affect postnatal mood (Small et al. 1994; Brown and Lumley 2000; Fisher et al. 2002 b). This study confirms the significance of fatigue for maternal postnatal mood. At all three assessment times, participants who reported being more fatigued had more depressive symptoms.

Parenting difficulties necessitating admission to residential early parenting services were three times more common among participants than other new Victorian mothers. Considering that this was not due to higher levels of depressive symptoms than in the general population, it is evident that mood is an imperfect measure of postnatal adjustment after ART. It also suggests that the presumption that mothering after ART is unproblematic, on the basis of no detectable differences in mood between women who have conceived with ART and other parturient women is ill founded.

This study showed that a range of factors were associated with the need for admission to residential early parenting services. On inspection, all of the factors associated with admission to a residential mother-baby program (p<0.01) were found also to be significantly (p<0.01) associated with lower maternal confidence at three months. This suggests that low maternal confidence in the newborn period may have contributed to the higher than expected rate of early parenting difficulties in this population. Although not possible to measure, it may be postulated that the experience of infertility, the need for technology to conceive, intense surveillance during pregnancy and operative birth have a cumulative adverse psychological effect and erode a woman’s confidence in herself and her ability to care for the new baby.
This is supported by the finding in an earlier study that women who had conceived with ART had lower self-esteem and maternal confidence than a comparison group who had conceived without difficulty (McMahon et al. 1997). In that study, the group difference four months after the birth was mainly accounted for by those who had had more than one ART cycle, which suggests that failed ART adversely affects self-esteem and self-confidence. The present study also indicates that maternal confidence is compromised by infertility and ART. Compared with women in a population based study a higher proportion of participants reported feeling anxious about caring for the baby when they left the hospital and at three months (Brown et al. 2001). Anxiety about taking the baby home was particularly high among first time mothers (65%) and mothers of twins (69%). Furthermore, the independent effect of greater difficulty involved in conceiving, as measured by the Burden of Infertility and Treatment (BIT) score, on lower self-reported maternal confidence in the early postpartum, adds to the plausibility of an inverse relationship between infertility difficulties and early maternal confidence. It is also noteworthy that by the final assessment point at 18 months, as many as one third of participants had not attained full confidence in relation to caring for their child.

Although the final analysis showed that only more unsettled infant behaviour and a lower score on the maternal-infant emotional attachment measure made a significant independent contribution to the risk of admission to residential early parenting programs, those admitted had some clinically relevant characteristics. The high rate of admission to early parenting services after ART among first-time mothers (21%), mothers who needed a lot of feeding advice in hospital (22%), those who felt anxious about baby care when they left hospital (23%), and reported feeling less than “very confident” about caring for the baby at three months (29%) suggest that these groups may be most at risk of experiencing early parenting difficulties. Also conspicuous were the significantly higher scores on the POMS “Anxiety” subscale among women admitted compared with those not admitted to residential services. And, as the BIT score was one of the factors that made a significant independent contribution to maternal confidence at three months, the degree of difficulty involved in conceiving may exert an indirect effect on the risk of admission through its effect on confidence.
It may be argued that women who have used ART generally are greater consumers of health care and that this explains their high rate of utilisation of residential early parenting services. However, previous research does not support this assumption (Fisher et al. 2005) and although this study does not permit a comparison between participants who were admitted to residential early parenting services and other admitted women, it is clear that they were more distressed than participants who were not admitted. It is often assumed that after infertility and ART, caring for a baby must be gratifying and unproblematic. As a consequence, admission to early parenting services may be viewed as a failure of mothering. Therefore women who have conceived with ART are unlikely to seek these services unless they experience considerable difficulties.

Mercer and Ferketich (1990) demonstrated that perceived maternal competence is a major predictor of mother-infant attachment. The relationship between maternal confidence and mother-infant attachment was also evident in this study where there was a statistically significant positive relationship between maternal confidence and the mother’s emotional attachment to her baby. Also, lower scores on the measure of mother-infant attachment made a significant independent contribution to risk of admission to residential early parenting services.

Several studies have demonstrated that early parenting programs have positive effects on infant sleep and feeding patterns and that this results in measurable improvement in maternal mood (Armstrong et al. 1998; Thome and Alder 1999; Fisher et al. 2004). In this study, the utilisation of early parenting services also appeared to have beneficial effects on infant behaviour and maternal mood.

At three months the babies of the mothers in this study had significantly higher scores on the “Rhythmicity” subscale of the Early Infancy Temperament Questionnaire than the normative sample (p<0.0001) indicating that they were more unsettled and irregular in their sleeping and feeding habits. Hiscock and Jordan (2004) suggest that hypervigilant, anxious and overprotective parenting where the baby is handled frequently and not left to self-settle may be more common after fertility treatment and contribute to sleeping and feeding problems in early infancy. Hypervigilant mothering may be related to lack of confidence about caring for the baby and anxiety about the
baby’s welfare and explain the high rate of utilisation of day-stay and residential feeding and settling programs (44%) in the current study. At subsequent time points the babies were rated as more rhythmical than the normative sample, a change that in part may be attributable to the utilisation of these early parenting services.

The adverse effect on maternal mood of a temperamentally difficult infant described in other studies (Beck 1996) was only apparent in the early postpartum in this study. At the two later assessment times, infant temperament did not make a significant independent contribution to the EPDS score. This also supports the theory that access to early parenting services may have improved infant behaviour and thereby removed its negative effect on maternal mood.

6.3 STRATEGIES TO IMPROVE THE EXPERIENCE OF CHILDBIRTH AND POSTNATAL ADJUSTMENT AFTER ASSISTED REPRODUCTIVE TECHNOLOGY

On the strength of the findings in this study a number of strategies to improve the experience of early motherhood for women who conceive after infertility and ART can be suggested.

Although many over-estimate their chance of having a baby with ART, most are aware that there is no guarantee that they will have a baby when they decide to undergo treatment. Clinical experience suggest that those who do become pregnant therefore have a great sense of gratitude and feel fortunate that ART helped them achieve a long-awaited pregnancy. This appears to lead to a very low sense of entitlement to complain about anything that relates to the pregnancy or the baby. Also, ambivalence about pregnancy and life with a new baby, a normal reaction to the anticipated major life changes brought on by having a baby, is rarely acknowledged. Therefore, helping women who conceive with ART to acknowledge and tolerate ambivalence in pregnancy and after the birth may better prepare them for life with a new baby, including its negative aspects.
Considering the extraordinarily high rate of caesarean section observed in this study, antenatal preparation should include realistic information about the high risk of operative birth after ART to lessen disappointment if this occurs. Positive reinforcement that having an operative birth is not a personal failure may also be useful to reduce the risk that this is viewed as a personal flaw or inadequacy.

Promotion of a confident maternal identity should begin in pregnancy and be intensified in the first few weeks after the birth by all health care professionals responsible for the care of women who conceive after infertility and ART. Mothers’ belief in their competence in caring for the new baby, ability to protect the baby from dangers and to nurture him or her are likely to improve the experience of motherhood.

If it is known that a women has conceived with ART, the ascertainment of parity, degree of difficulty involved in conceiving, and levels of confidence and anxiety about caring for the baby, before discharge from hospital would allow extended support to be targeted to those who are most likely to experience early parenting difficulties. The BIT measure of degree of difficulty of conception developed in this study may be useful in this context in identifying women at risk of diminished maternal confidence.

Clear, concise and consistent breastfeeding advice, intensive support, promotion of confidence in the ability to breastfeed, and positive reinforcement that there is sufficient milk for the baby to thrive in the first few weeks after birth may increase duration of breastfeeding among women who give birth after ART.

Provision of practical advice and factual information about feeding and settling techniques before leaving hospital and in the first few weeks after taking the baby home may reduce the need for admission to residential early parenting services. This should include the importance of a sleep-feed-play routine and the need for babies to be allowed to self-settle. If feeding or settling difficulties become apparent, day-stay lactation or settling programs may be suggested as these less intensive and costly interventions may suffice to improve infant behaviour and strengthen the mother’s confidence.
Lastly, fathers need to be actively included, before and after the birth, in efforts to promote maternal well-being and confidence. The importance to the mother of emotional and practical support from the partner and of a partner who is engaged and willing to listen should be emphasised to men who become fathers after ART.

### 6.4 Future research

The current trend for women in many industrialised countries to delay childbearing until the fourth and fifth decades of life will increase the number of women who experience infertility and access ART to conceive. In Australia, the number of children born as a result of ART in 2003 represented 2.6% of all children born in that year (Waters et al. 2006). It is therefore imperative that health care professionals who are responsible for the care of pregnant women and new mothers understand and try to meet the needs of this growing group of mothers.

This study provides detailed information about postnatal adjustment after ART and identifies a number of factors that are associated with early parenting difficulties after ART. These findings could be used to produce evidence-based written information to women about how infertility and ART may influence well-being during pregnancy and after birth. This would include strategies for tolerating ambivalence, acknowledging and accepting negative feelings about the baby, promoting maternal confidence in relation to caring for the baby and breastfeeding, and practical information about infant feeding and settling. Evaluation of the effect of such written information on postnatal adjustment should be tested in a randomised controlled trial.

Evaluation of pregnancy and postnatal adjustment after ART needs to go beyond using postnatal mood as an indicator of functioning. Future studies should explore further the ways in which self-confidence and self-esteem, and subsequently maternal confidence may be adversely affected by infertility and ART and how this can be remedied.

Finally, future studies of the psychological aspects of childbirth and mothering should include questions about time to pregnancy and mode of conception. This will allow a clearer picture to emerge, over time, of the separate and combined effects of maternal age, the experience of infertility and the use of ART to conceive on the experience of birth and postnatal adjustment.
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296


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8 APPENDICES

8.1 APPENDIX I - LETTER OF INVITATION TO PARTICIPATE IN THE STUDY
8.2 Appendix II - Plain Language Statement
8.3 Appendix III - Consent Form
8.4 Appendix IV - Coding Sheet for Structured Telephone Interview
8.5 APPENDIX V - FIRST QUESTIONNAIRE
8.6 **APPENDIX VI - SECOND QUESTIONNAIRE**
8.7 **APPENDIX VII - EXPRESSION OF INTEREST TO COMPLETE ADDITIONAL QUESTIONNAIRE**
8.8 APPENDIX VIII - THIRD QUESTIONNAIRE
APPENDIX IX - QUESTIONNAIRE FOR MOTHERS OF TWINS
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