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Introduction

Globally, the movement of people between countries is increasing. Not only does this include economic or skilled migrants moving for employment and education reasons but also a rapidly growing refugee and asylum seeking population. As of 2015, a staggering 60 million people were forcibly displaced from their homes due to persecution, conflict, violence and human rights abuse. Of these, children and adolescents below the age of 18 years comprise over half of the world’s refugees. Whilst many people remain displaced and languish in appalling circumstances, each year approximately 60,000 children are resettled in high-income countries (United Nations High Commissioner for Refugees, 2015).

Children from refugee backgrounds are likely to have poor physical, mental and social health outcomes, and their parents commonly experience barriers accessing appropriate and meaningful health information and services (Woodland et al., 2010, Davidson et al., 2004). In particular, these children are at increased risk of poor oral health due to the adversity they have experienced early in life, which may impact on their long-term health, development and wellbeing (Shonkoff et al., 2012). Health services, including providers of dental health services, need to recognise, understand and be responsive to the issues emerging with this changing and growing demographic in order to minimise poor oral health outcomes.

This review summarises the evidence surrounding the oral health (dental status, oral hygiene practices, and access to care) of children of refugee backgrounds living in developed countries. Based upon this evidence we will discuss potential strategies available to oral health service providers in high-income refugee-receiving countries to optimise provision of responsive dental care to this growing population.

Background

People from refugee backgrounds may arrive in their new country in a variety of ways, through formal migration programs, including humanitarian resettlement programs or seek asylum on or soon after arrival. Many experience protracted periods in refugee camps or living precariously in urban settings, time spent in detention centres, and multiple displacements seeking safety. Whatever the pathway, the refugee experience is characterised by displacement, conflict, human rights violations, persecution, family separation, prolonged times in transit with limited or no access to services or basic necessities (shelter, food, water and safety) and often includes torture as well as physical and sexual violence (Victorian Foundation for the Survivors of Torture, 1998). Refugee populations have an increased risk of health problems related to their traumatic and stressful
experiences which can be exacerbated during settlement by separation, loss of family members and poverty (Victorian Foundation for the Survivors of Torture, 1998).

Dental caries is one of the most common chronic diseases of childhood (Selwitz et al., 2007) affecting between 60-90% of children globally (World Health Organization, 2012). Poor oral health in the form of untreated dental caries is associated with chronic pain, infection and sepsis which impacts on both function e.g. speech, eating and sleep as well as school performance e.g. absenteeism, concentration and achievement (Gussy et al., 2006). In addition, having poor oral health can have a psychological impact on children contributing to lower self-esteem and confidence which can cause social isolation and exclusion.

On arrival in their new country, children from refugee backgrounds may never have had access or been exposed to oral health care or common preventive oral health measures, such as a toothbrush or fluoridated toothpaste (Riggs et al., 2015a). Further, families who arrive and subsequently have
children in their new country, may be unaware of preventative oral health practices for their children (Riggs et al., 2012). Another risk factor for poor oral health is the context of family social deprivation associated with socio economic status that may be compounded by low levels of parental education and health literacy (Riggs et al., 2016a). In addition, for some, previous experiences of torture and trauma may create a fear of seeking dental care (Davidson et al., 2006b).

Consistently, studies demonstrate the disparities experienced by people from refugee background in relation to untreated decayed teeth and major oral health issues (Davidson et al., 2006a). Diversity within refugee populations also suggests that acculturation (degree to which practices within the host country are adopted) may also play a role in the deterioration of oral health over time (Cote et al., 2004). Understanding these disparities is important in order to address modifiable oral health practices, however, there is little evidence available to inform interventions to improve oral health, particularly for children from refugee backgrounds.

**Methods**

The specific aims of this review are:

1. To report the oral health status of children of refugee background resettled in high-income refugee-receiving countries.

2. To describe the oral health beliefs, knowledge and practices of resettled refugee children and their families.

3. To describe the interventions that aim to improve refugee child oral health conducted in high-income refugee-receiving countries?

To inform this review, a systematic search strategy was developed and conducted to explore the international literature over the past ten years (2005-2016, Medline, Embase and Pubmed databases). The search strategy was developed in Medline and modified for each subsequent database (see appendix 1 in supplemental materials).

There is no agreed definition of ‘who is a refugee?’, however, the refugee experience is often characterised by persecution, displacement, conflict, human rights violations, family separation, prolonged uncertainty and limited or no access to services or basic necessities (shelter, food, water and safety). Experiences may include torture, physical and sexual violence (Ager and
Strang, 2008). For the purpose of this review, the term ‘refugee background’ is used as it recognises the varying experiences of forcibly displaced people.

A total of 281 papers were identified. Exclusion criteria (See Table 1) were applied, resulting in 13 papers (12 studies) that included children of likely refugee background or their parents.

Table 1 Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study design</strong></td>
<td>intervention, cross sectional, epidemiological, qualitative, reviews</td>
</tr>
<tr>
<td></td>
<td>Case reports, commentaries. Papers without a clear description of the methods</td>
</tr>
<tr>
<td><strong>Type of paper</strong></td>
<td>Peer reviewed published papers</td>
</tr>
<tr>
<td></td>
<td>Non-peer reviewed. Grey literature.</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td>Refugee background children aged 0-18.</td>
</tr>
<tr>
<td></td>
<td>Children or their parents not of refugee background.</td>
</tr>
<tr>
<td>Outcome of interest</td>
<td>Oral health status, behaviours, knowledge or attitudes</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Setting</td>
<td>High-income refugee receiving countries</td>
</tr>
<tr>
<td></td>
<td>Refugee camps, low-income countries, developing countries</td>
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</tbody>
</table>

Most of the studies were excluded because they focused on refugee adult populations and did not describe their population sufficiently to identify whether the participants were of refugee background. In total, there were 1 longitudinal, 2 intervention, 4 cross-sectional, and 5 qualitative studies conducted in Canada, Australia and Israel (See Tables 2 and 3).
Table 2: Characteristics of longitudinal and cross sectional studies

<table>
<thead>
<tr>
<th>Studies</th>
<th>Study design</th>
<th>Country of Study</th>
<th>Population</th>
<th>Sample size</th>
<th>Data collected</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BL 12 yrs and FU 17 yrs (n=81)</td>
<td>Calibrated examiners</td>
<td>BL=0.10 ± 0.59; FU 0.31 ± 0.97 Age 12-17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BL=0.61 ± 1.52; FU 0.81 ± 1.75</td>
</tr>
<tr>
<td>Melvin et al (2006)</td>
<td>Intervention: school based dental screening for high risk children followed by targeted referral and supported by classroom education.</td>
<td>United States</td>
<td>Mix of refugee and otherwise ‘impoverished’ children not further defined</td>
<td>n=635, age 6-11</td>
<td>Clinical screening by dental hygienists and referred to dentist for treatment</td>
<td>% of children with a dental home; YR1 increased 59% to 78% YR2 increased 51% to 87%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Proportion of children receiving restorative care YR1 = 22%, YR2 = 11% YR3 = 46%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intervention group showed sig</td>
</tr>
<tr>
<td>orientation.</td>
<td>refugee background.</td>
<td>improvement in both Debris Index (OR=0.44 (0.22 to 0.88)) and Modified Gingival Index (OR=0.34 (0.19 to 0.61))</td>
<td></td>
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<tr>
<td>Prospective before/after intervention with 18 month FU and control non-intervention group as comparison.</td>
<td>Questionnaires of parents.</td>
<td>47% of intervention families and 49% of control families failed to attend FU</td>
<td></td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>Study</th>
<th>Study design</th>
<th>Country</th>
<th>Population details</th>
<th>Sample Size</th>
<th>Methodology</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnston et al (2012)</td>
<td>Cross-sectional</td>
<td>Australia</td>
<td>Refugees (59% Asia, 16% West and central Africa, 25% East Africa – no breakdown of children)</td>
<td>n=67, aged &lt; 15 years</td>
<td>Retrospective review of medical records. Information collected by GMPs.</td>
<td>19% (CI 9.6-29) dental disease (including dental pain and gum disease)</td>
</tr>
<tr>
<td>Mutch et al (2012)</td>
<td>Cross-sectional</td>
<td>Australia</td>
<td>Refugees (35 self-reported ethnicities from 10 geographic regions)</td>
<td>n=1026 children (median age 7.8 years, range 2-17.3 years)</td>
<td>Retrospective review of medical records. Information collected by non-dental healthcare professionals</td>
<td>27.4% dental disease, 9.4% reported toothache</td>
</tr>
<tr>
<td>Shah et al (2014)</td>
<td>Cross-sectional</td>
<td>United States</td>
<td>Refugees (80% Asia, 15% Africa, 4% Middle East, 1% Americas)</td>
<td>Age 0-18 Total=555</td>
<td>Retrospective review of medical records. Visual examination done by nurses</td>
<td>44.8% dental caries with significant differences between ethnic groups. African, Bhutanese &amp; Burmese.</td>
</tr>
<tr>
<td>Nicol et al (2015)</td>
<td>Intervention</td>
<td>Australia</td>
<td>Refugees (Burma, Iran, Sri Lanka, Afghanistan, Iraq, Africa, Nth Africa, Middle East)</td>
<td>n=105 (mean age 3.2 years, range 2.9-3.4)</td>
<td>dmft Attendance at dental services.</td>
<td>62% had dmft &gt; 0, 46% attended dental services.</td>
</tr>
</tbody>
</table>

BL = Baseline assessment; FU = Follow Up assessment; GMP = General Medical Practitioner
Table 3 Characteristics of the qualitative studies

<table>
<thead>
<tr>
<th>Studies</th>
<th>Study type and method</th>
<th>Country of Study</th>
<th>Population</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amin et al (2012)(Amin and Perez, 2012)</td>
<td>Qualitative Focus groups</td>
<td>Canada</td>
<td>Refugee - Ethiopian, Eritrean and Somali</td>
<td>n=48 mothers (mean=33.6±8.1) with children age 3-5 yrs</td>
</tr>
<tr>
<td>Nicol et al (2014)(Nicol et al., 2014)</td>
<td>Qualitative Focus groups and interviews</td>
<td>Australia</td>
<td>Refugee - 41% Burma, 23% Middle East (Iraq, Kuwait), 13% Sudan, 8% Afghanistan, 5% Burundi, 5% Congo, 5% Rwanda &amp; Nigeria</td>
<td>n=39 women with children age 0-5 yrs</td>
</tr>
<tr>
<td>Prowse et al (2014)(Prowse et al., 2014)</td>
<td>Qualitative Focus groups</td>
<td>Canada</td>
<td>Aboriginal, Hutterite, immigrant (Congo, Eritrea, Nigeria, Sudan), refugee (Chad, Congo, Ethiopia, Iraq, Morocco, Nigeria and Somalia)</td>
<td>n=40 parents/caregivers of children age 0-6 yrs&lt;br&gt;n=9, Aboriginal; n=14, Hutterite; n=11, Refugee; n=6, Immigrant</td>
</tr>
<tr>
<td>Riggs et al (2016)(Riggs et al., 2016b)</td>
<td>Qualitative Focus groups</td>
<td>Australia</td>
<td>Refugee background from Afghanistan and Sri Lanka</td>
<td>n=25 mothers and fathers with children age 0-3 yrs&lt;br&gt;14 Afghan; 11 Sri Lankan</td>
</tr>
<tr>
<td>Riggs et al (2014, 2015) (Riggs et al., 2014)</td>
<td>Qualitative Focus groups</td>
<td>Australia</td>
<td>Refugee and migrant background from Iraq, Pakistan and Lebanon</td>
<td>n=122 women with children age 0-6 yrs&lt;br&gt;(n=22 Assyrian Chaldean (from Iraq))</td>
</tr>
<tr>
<td>2015a, Riggs et al., (2014a) and interviews</td>
<td>n=24 Pakistani</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>n=14 Iraqi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=29 Lebanese</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>n=33 Lebanese and Iraqi - breakdown not reported</td>
<td></td>
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</tr>
</tbody>
</table>
Results

1. Oral health status of refugee children

Three studies included a clinical oral health examination undertaken by an oral healthcare professional (Vered et al., 2008, Gibbs et al., 2015, Nicol et al., 2015). The remaining four quantitative studies reported only retrospective clinical data recorded as part of a refugee general health assessment (Melvin, 2006, Mutch et al., 2012, Johnston et al., 2012, Shah et al., 2014). The origin of these audit data varied but in only one study was an oral healthcare professional involved in the dental screening (Melvin, 2006). Consequently there is very limited evidence surrounding the current oral health status of resettled refugee children.

Only one longitudinal study was identified (Vered et al., 2008) and whilst reported within the timeframes set out in the search strategy (i.e. between 2005 and 2016), the data were collected in Israel between 1999 and 2005 and as such may not be representative of current refugee child populations. The study consisted of 672 Ethiopian immigrants (refugee-like background) of whom 129 were children (under 18 years of age). Each child was examined at baseline (aged 6 and 12 years) and again after five years (aged 12 and 17 years). While DMFT was reported for these two sub-groups at both baseline and follow-up, the relatively small numbers and wide age range (with the associated difference in number of erupted permanent teeth) render these data uninformative. However, for the study sample as a whole there was a statistically significant increase in caries experience with prevalence increasing from 30% to 43% over the period of the study.

In all, no studies compared refugee oral health to any population of children born in the host country.

2. Oral health behaviours, knowledge and beliefs

Five qualitative studies (6 papers) were identified that describe the oral health knowledge, practices and beliefs of parents of children from refugee backgrounds. All are exploratory in nature and have qualitative designs (Amin and Perez, 2012, Nicol et al., 2014, Prowse et al., 2014, Riggs et al., 2016b, Riggs et al., 2015a, Riggs et al., 2014). Several studies provide accounts of the traditional oral health practices that parents used in their home countries and how they have changed (or not) in their new country (Nicol et al., 2014, Riggs et al., 2015a, Prowse et al., 2014). Generally, parents acknowledged the importance of maintaining good oral practices, however barriers in accessing traditional forms of oral hygiene were noted. Interestingly, the Israeli longitudinal study reported that at baseline 74% of the study sample (both children and adults included at 6-18 months post arrival) used chewing and cleaning sticks and while five years later, 97% used toothbrushes exclusively (Vered et al., 2008).
There was no intervention conducted, this change in behaviour is likely to be a result of acculturation i.e. adopting practices of the host country and relinquishing those of their home country.

In most of the qualitative studies, parents suggested that the change in their children’s diet was a factor that caused dental decay. Parents described a shift from a diet low in sugar in their home country, to a diet high in sugar and processed foods in their new country. Furthermore parents often felt they had little control over their child’s changing diet (Amin and Perez, 2012, Nicol et al., 2014, Prowse et al., 2014, Riggs et al., 2015a).

The qualitative studies also highlighted the challenges that families face when accessing dental services in their new country. Barriers to service access were related to parental knowledge of services and entitlements, attitudes towards dentists and oral health services, English language skills, interpreter provision, dental insurance and cost of services, social support and transportation (Riggs et al., 2016b, Riggs et al., 2014a).
None of the included studies asked children themselves about their oral health.

3. Learnings from intervention studies

All the studies suggest there is a high need for dental care when children first arrive in their new country. Three studies describe interventions to facilitate access to dental care for this population (Melvin, 2006, Nicol et al., 2015, Gibbs et al., 2015). However, the outcomes and strength of evidence is mixed not least because only one study clearly describes the participants’ refugee background (Nicol et al., 2015).

Set in the United States, The Tooth Tutor program involved a dental hygienist visiting schools to conduct dental screenings to identify children without a ‘dental home’ (defined as a child who had not seen a dentist within the previous 12 months) (Melvin, 2006). Once identified these children, who were not exclusively from refugee backgrounds, were exposed to targeted oral health education and referred for restorative care when required. Over the course of two academic years, the proportion of high risk children reported to have a ‘dental home’ rose from between 51-59% to 78-87%. There was also an initial decrease in the proportion of children requiring restorative care over the first two years. However by the third year, the need for restorative care increased to 46% which was attributed (without any supporting evidence) to an influx of newly arrived refugees to the schools with high dental needs.

Nicol and co-workers in Western Australia, report on a similarly targeted oral health screening programme integrated in to a general health assessment as part of a Refugee Health Service (Nicol et al., 2015). A research paediatric dentist completed an oral health screening and referred high risk children to local community dental services using bespoke referral pathways. Disappointingly less than half (46%) of those children referred actually engaged with the community dental services despite the provision of interpreting services and support from refugee health nurses. However, of those that did attend nearly two-third had caries. Financial cost and other competing community priorities were deemed barriers associated with non-attendance.

The Teeth Tales is a community based intervention involving culturally and linguistically matched peer education program with Iraqi and Lebanese from refugee background families and a third group of Pakistani non-refugee (economic) migrants in Melbourne, Australia (Gibbs et al., 2015, Gibbs et al., 2014). Simultaneously, a health service intervention was implemented that targeted aspects of cultural competence in dental service delivery. 521 families (692 children) were recruited at baseline and allocated to either intervention or comparison arms. 275 families (365 children) were followed-up 18 months later with a similarly low response rate between the intervention arm (54%) and the
comparison arm (50%). While the impact of the intervention on rates of dental caries was not reported, the intervention did increase parent oral health knowledge with a decrease in the presence of plaque on the children’s teeth being interpreted as an indicator of improved tooth brushing practices.

**Discussion**

It is acknowledged that children from refugee backgrounds have high oral health needs and that they face specific and complex barriers to accessing dental services. Furthermore it appears that caries experience may increase with acculturation. Parental report suggests the low sugar diet and oral hygiene practices in their home country for children was positive, however, the acculturative nature of settlement is associated with an increased availability of high sugar food. This, coupled with the inability of refugee parents to access their traditional oral hygiene practices for example miswak, and a perceived loss of control over their children’s dietary intake, contributes to the worsening levels of
disease over time. This has also been reported in adult Somali refugees in the United States (Geltman et al., 2013, Geltman et al., 2014). This young and vulnerable population requires responsive and empathetic care that includes working with their parents, families and communities. However there is a dearth of evidence to support effective interventions that address these issues, with this review suggesting that refugee child oral health continues to be a neglected area of research and intervention. Consequently, we are left to extrapolate from the limited evidence available, intervention strategies that appear promising and to advocate for appropriate resourcing and robust evaluation.

**Multi-disciplinary collaborative workforce**

It has been argued that prompt oral health care plays a significant part in supporting recovery and settlement in a new country (Davidson et al., 2007). To adequately engage families with young children, a multi-disciplinary approach is required to provide on-arrival health assessment and care that includes timely provision of preventative healthcare and information for families that includes their oral health needs. Such an approach should involve all practitioners that interact with families with young children, i.e. maternal and child health nurses, community health services, teachers, case workers, general practitioners, and counsellors along with the dental workforce.

For instance, on arrival to their new country, an oral health assessment should be available to all children with appropriate referral and follow-up in place. This should be offered regardless of reported dental pain. Dental problems should be treated and if no toothache or dental problem is identified oral health education should be provided given their new context and high risk of developing poor oral health. However, as the findings from Nicol and colleagues demonstrate, once referred, there are still barriers for families to attend dental care. A better understanding of these barriers at a service level, through community engagement and potential service changes is required to address ongoing issues related to access (Nicol et al., 2015). Barriers identified by other studies include limited access to transport, long waiting times, reminder letters sent in English, as well as staff understanding of policies and entitlements (Riggs et al., 2014a, Amin and Perez, 2012, Riggs et al., 2016b). Establishing a dental home for the newly arrived family would help assist to overcome pressing settlement priorities (psychosocial needs, housing, schooling etc) (Mutch et al., 2012, Johnston et al., 2012). The dental home, however, should be ‘refugee friendly’ by way of offering a flexible and approachable high quality service. Woodland and colleagues outline 10 elements of good practice to promote improved access, equity and quality of care in service delivery for newly arrived refugee children (Woodland et al., 2010). These elements of good practice delivery need to be considered for delivery in traditional and non-traditional oral health service settings.
As such, identifying opportunities in existing appropriate and acceptable non-dental settings to promote oral health and dental service access to refugee families may be a more sustainable strategy. For example, given that maternal characteristics undoubtedly play a role in their child’s oral health (George et al., 2010), greater collaboration between dental and maternity health services provides a platform for oral health care. Although maternity services vary world-wide, in many countries, including Australia maternity care is government funded and provided universally to all women and families. Combining this with the high birth rate associated with many refugee background women, (Paxton et al., 2011) antenatal care provides an opportunity for sustained contact with healthcare services such that pregnant refugee women could be offered oral health care and education during this time. However, research has found that refugee women may not be aware of the significance of their own oral health; the importance of establishing a dental home; the safety of dental care during pregnancy and the recommended dental hygiene practices for their new born
Caring for children typically requires communicating and working with their parents. Enabling people to communicate freely in their own language supports the development of trust, respect, rapport, cultural safety and relationship-centred care (Riggs et al., 2016a). Providing the best possible standards of professional interpreting requires service systems and management to ensure timely access to language services, accompanied by professional development, and staff opportunities to reflect and learn from their practice. The broader refugee literature demonstrates the important role of interpreters in healthcare to aid communication between clinicians and their clients (Yelland et al., 2016, Karliner et al., 2007).

The refugee population may well have had disrupted education owing to protracted time in precarious living situations, so it cannot be assumed that everyone can read in their own language let alone in that of the ‘host’ country. Further, due to displacement and changes in family composition, traditional ways of sharing health information may be fragmented. A range of communication strategies may need to be considered for information provision. Bicultural staff may assist families to navigate health services, get to appointments and negotiate expectations they may have for services and treatment. They also act as an aide for clinicians to understand differing health beliefs and social circumstances that may affect access to services and decision making. Internationally, the benefits of a community health worker workforce are recognised, (Glenton et al., 2013) and with support, capacity building and training this workforce could be extended and integrated into the oral health sector.

Community engagement and participation

The benefits of a considered approach to working in partnership with communities from refugee backgrounds to address health issues are not only increasingly self-evident but necessary to improve outcomes and eliminate disparities (Riggs et al., 2014b). A commitment by the oral health sector to embed participatory strategies in the engagement of communities is worthwhile. Community education is necessary to promote the importance of oral health prevention to communities where this may be an unfamiliar concept. To do this, community-based participatory strategies which are effective in engaging communities are essential, not only to conduct research but also to develop valid, effective and sustainable interventions and improve service delivery. For example, Community Advisory Groups have proved to be a fruitful and effective strategy for the engagement of refugee background communities in the context of maternal and child health and service engagement (Riggs et al., 2015b). This involves bringing together community advisors for a particular community, to
discuss community priorities and appropriate responses. Advisors enable community consultation that is inclusive and rigorous allowing community voices to be heard and dissemination of knowledge to be shared between services and the community.

Lack of attention to adequate community engagement may limit community acceptance of both the outcomes of the research and/or subsequent intervention efforts. This is inefficient and unethical and also potentially counterproductive to reducing health inequalities. A major consequence of the underrepresentation of diverse communities in research means that the available evidence is skewed, and recommendations for services, policy and programs may exacerbate inequalities in subpopulations already adversely affected (Renzaho et al., 2012).

Identifying refugee populations

There are many limitations of the research conducted with refugee populations, not least the need to define study participants accurately. Several manuscripts failed to adequately define the ‘refugee’
population and it is therefore possible that studies may have been excluded that actually did include a refugee population but were inadequately described. In the course of this review, we made some assumptions based upon the participant’s country of origin and our knowledge and understanding of the patterns of global humanitarian movement. For example, Vared’s longitudinal study of Ethiopian migrants in Israel (Vered et al., 2008) are of ‘likely-refugee background’ as the statistics are evidence of the movement of this population for humanitarian reasons in previous decades (United Nations High Commissioner for Refugees, 2016).

Many papers were excluded from this review because they described their populations as ‘migrant, immigrant, foreign-born, Asian, Hispanic etc’. Without further details it is impossible to infer specific refugee populations. Adequate identification in research and clinical settings is critical to establishing effective responsive interventions/care that is mindful of the health issues and trauma that may impact a child’s oral health. Identifying populations of refugee backgrounds is not straightforward as they are often ‘invisible’ in administrative health datasets (Paxton et al., 2012) with similar challenges relating to identification also likely in clinical encounters. Professional development for staff, including both clinicians and administrators, would support better identification and triage into appropriate models of care. Identification of a ‘refugee’ study population must go beyond adequate documentation of country of origin, year of arrival and language spoken. An understanding of the migration history and settlement priorities would enable researchers/practitioners to be mindful of the intersecting factors (for example culture, language, financial hardship and other life circumstances) that contribute to social disparities experienced by refugee background populations that may impact on their oral health status and inform approaches to addressing these disparities.

Again, adopting strategies that support bicultural community workers and community advisors are an appropriate way of gaining this knowledge. This is a complex and challenging area of research and further work is needed to assist in adequate ascertainment of refugee background people both in research, dental and other healthcare services.

**Reliable measures of dental caries**

Disappointingly, but consistent with much of the wider dental literature, there was a lack of consistency and quality of both the screening protocols and the instruments used to diagnose dental caries. Most of the studies use data from either retrospective review of medical records (Johnston et al., 2012, Mutch et al., 2012, Shah et al., 2014) or ‘dental screenings’ that are not comprehensive hence caries experience may be under reported (Melvin, 2006, Nicol et al., 2015). International standards for epidemiological oral health studies encourage consistency through the use of the International Caries Detection and Assessment System (ICDAS II) (Ismail et al., 2007). This was used
in only one study and while Gibbs and co-workers describe the implementation of ICDAS II in detail (including training and calibration of examiners) they do not report any caries outcome data in their paper (Gibbs et al., 2015). A validated and reliable method of caries assessment (that can be conducted in non-clinical settings) is required so that interventions can be evaluated and population level outcomes can be monitored overtime.

Conclusion

Overall there are limited longitudinal and intervention studies with refugee background children to support evidence-based strategies for this population. A comprehensive health assessment can assist in identifying children at risk of poor health and may help provide them with timely and effective care, advocacy and appropriate referral. The ultimate goal for this population would be to establish the burden of disease and to subsequently provide families with oral health care emphasising preventative and life-long self-management (self-efficacy). To achieve this, populations, and their
needs, have to be adequately identified, engaged with and heard, by developing partnerships and building models of community engagement. Once this is in place, disease prevalence can be assessed and culturally appropriate oral health care and education can be provided to parents and their children. Whilst it is not at all clear what might work to prevent the oral health issues experienced by refugee background children, community engagement is undoubtedly important in identifying the issues, building capacity within these communities and enabling ongoing access to a suitable dental home.

Conflicts of Interest

The authors have no conflicts of interest to declare.

References


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