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Community-based oral health interventions for people experiencing homelessness: a scoping review

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Objective: To determine the characteristics of community-based oral health interventions for people experiencing homelessness. ***Basic research design***: A scoping review was conducted, adhering to the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses: Scoping Reviews) checklist. A search strategy was developed using MeSH terms and key words, and used to search the following electronic databases: Medline/PubMed, CINAHL, ProQuest Assia, Scopus, Web of Science and PsychNet. Key journals and reference lists were also hand-searched. Two reviewers then read the abstracts of all papers, excluding duplicates and papers that did not meet the eligibility criteria. The reviewers then read to full-texts of the studies to be included in the review. ***Results***: Eighteen studies met the inclusion criteria and were included in the study. These studies were predominantly evaluations of community-based dental services or other oral health interventions. Several recommendations were extracted. Interventions should involve co-design with homeless service users; multidisciplinary working, collaboration with dental practitioners, and working with educational establishments. The location of community-based services was also found to be of importance. ***Conclusion***: This review has highlighted several recommendations, as well as gaps in the literature. These gaps suggest a need for more non-clinical oral health interventions for the homeless population, and a closer look at the role that non-dental practitioners can play in the delivery of oral health care.

Keywords: *Oral health, scoping review, homeless persons, homeless youth, dental care*

Introduction

In the United Kingdom, you may be homeless if you “have no home… where you and your family can live together”, if you do not have the right to live where you are currently staying, or if the place where you are currently staying is “unsuitable or unsafe” (Shelter Scotland). This means that you may be homeless, even with a roof over your head. The European Federation of National Organisations Working with the Homeless (FEANTSA, 2005) have developed a typology of homelessness which includes rooflessness, houselessness, insecure housing and inadequate housing (Table 1). Thus, an individual may be considered homeless if they are in temporary accommodation, or if they are sleeping rough, or experiencing multiple social exclusion (Joseph Rowntree Foundation): homelessness is not a homogenous experience (Patterson and Tweed, 2009).

Homeless populations have higher levels of dental caries, periodontal disease, edentulousness, poor oral hygiene, a higher prevalence of negative health behaviours compared to the general population and are a high-risk group for oral cancer (Wagner *et al*., 2014; Coles *et al*., 2011; Sfeatcu *et al*., 2011; Collins and Freeman, 2007). This suggests that people experiencing multiple exclusion homelessness have the levels of oral disease commensurate with ‘extreme oral health’ (Freeman, *et al.,* 2019).

Evidence suggests that many people experiencing multiple exclusion homelessness are emergency-only dental attenders (King *et al*., 2003; Groundswell, 2017). However, this is not necessarily the case for all people experiencing different types of homelessness: the Smile4life survey in 2011 found that 31% of their homeless sample were registered with a dentist; Groundswell found that 36% of their sample, surveyed in 2017, were registered with a dentist (Coles *et al*., 2011; Groundswell, 2017). Therefore, people experiencing homelessness vary in their dental attendance pattern as they do with regard to their homelessness experience, with those experiencing multiple exclusion homelessness tending to rely on emergency and community-based care (Coles *et al*., 2011). Wallace and MacEntee (2012) highlighted that people experiencing multiple exclusion had greater priorities than oral health, such as food or accommodation, and their social circumstances affected their access to, and utilisation of, services (King *et al.,* 2003; Wagner *et al*., 2014). A recent qualitative exploration of barriers and facilitators to achieving good oral health amongst homeless adults found that participants considered their dental health a low priority, and often had a negative attitude towards oral health professionals; however, single appointments for treatment and oral health promotion delivered at accessible locations were found to be facilitators (Csikar *et al.,* 2019).

De Palma and Nordenram (2005) noted that poor oral health affected the social function, self-esteem and self-confidence of people experiencing homelessness. They found that their oral health was associated with “human dignity” (p.295). Coles et al. (2011) agreed, showing that homeless participants had poor oral health-related quality of life, higher depression and dental anxiety.

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Table 1. FEANTSA (20005): European Typology of Homelessness and Housing Exclusion

Conceptual Category	*Operational Category*
Roofless	People living rough
	People in emergency accommodation
Houseless	People in accommodation for the homeless
	People in women's shelters
	People in accommodation for immigrants
	People due to be released from institutions
	People receiving longer-term support (due to homelessness)
Insecure	People living in insecure accommodation
	People living under threat of eviction
	People living under threat of violence
Inadequate	People living in temporary/non-conventional structures
	People living in unfit housing
	People living in extreme over-crowding

While much is known about the oral and psychosocial needs of the homeless population, there is comparatively little research regarding interventions designed to improve the oral health of this population and/or address the barriers known to influence their oral health. Cochrane Equity Methods have produced Homeless Health Guidelines in Canada, but these omitted oral health. In 2014, NICE published guidelines for local strategies for oral health and community-based interventions, which included a review of evidence regarding the effectiveness of community-based oral health improvement programmes and interventions for people living in the community, including people experiencing homelessness, although this population was not the sole focus of the review. NICE concluded: "There is a lack of evidence on the effectiveness or cost effectiveness of community based oral health improvement programmes that aim to promote, improve, and maintain the oral health of groups of people considered at high risk for poor dental health such as people who are homeless" (NICE, 2014, p.63). However, a recent systematic literature review examined oral health and homelessness, with a focus on the behaviours and barriers affecting homeless people seeking and accessing dental care (Goode *et al.*, 2018) and demonstrated a need to explore the oral health and homelessness literature with a focus on oral health interventions. As this population is known to consist of emergency-only attenders, it seemed prudent to conduct a scoping review focusing on community-based preventive and treatment interventions.

Scoping reviews may be considered similar to systematic reviews in that both "follow a structured process" (Munn *et al.,* 2018). They are used to determine the coverage and scope, to "map the available evidence" including identifying gaps in the literature. The same authors concluded, that scoping reviews are preferable to systematic reviews when the purpose is to "scope a body of literature, clarify concepts (or) investigate research conduct". In this instance, a scoping review was chosen to scope, or map, the available literature, to determine what community-based oral health interventions for people experiencing homelessness existed, and what recommendations may be extracted from them. Compared to a systematic review, a scoping review will have a broader scope, but will still have an *a priori* protocol and search strategy and be systematic in its approach to searching the literature. This broader scope was more appropriate for this review, given the limited number of studies conducted in the field of oral health and homelessness.

This scoping review aimed to map the available literature on community-based oral health interventions for people experiencing homelessness to establish what worked/did not work and extract characteristics of successful interventions. The following research question was developed for this review: 'What are the characteristics of community-based oral health preventive and treatment interventions for people experiencing homelessness?'

Method

This review was conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses-Scoping Reviews (PRISMA-ScR) checklist, a rigorous list of items that should be included within a scoping review (Tricco *et al.,* 2018).

The protocol was based on the PRISMA guidelines for protocols (PRISMA-P) (Shamseer *et al.,* 2015), setting out what the scoping review intended to do, including the eligibility criteria and search strategy utilised. The final protocol was registered with the Open Science Framework (https://osf.io/kxym5).

Eligibility Criteria

Inclusion and exclusion criteria were developed to aid the selection of appropriate papers. The inclusion criteria were that studies had to:

- Be written in English
- Present primary research
- Be qualitative, quantitative or mixed methods
- Include people experiencing homelessness or practitioners working with this population
- Be concerned with improving the oral health of people experiencing homelessness
- Be community-based, e.g. hostels, drop-ins, homelessness centres/accommodations (Coles *et al*., 2012). 'Community-based' was not specifically defined, as it was likely that there would be variance in the papers included. Community-based dental services such as community outreach clinics or mobile dental units were included.

Studies would be excluded if they were:

- Set in a primary or secondary healthcare setting such as dental practices, clinics or hospitals.

Search Strategy

The following electronic databases were searched to identify potentially relevant studies: Medline/Pubmed, CINAHL, ProQuest ASSIA, Scopus, Web of Science, PsychNet.

A search strategy was developed using specific MeSH terms and key words representing four broad themes: homelessness, oral health, community and interventions (Table 2). This strategy was based on the research question, and the definitions of the key elements within it (Arksey and O'Malley, 2005). It was then piloted and refined, with the intention of yielding more relevant studies, and fewer irrelevant studies (Arksey and O'Malley, 2005). The most recent search was executed on the 4th May 2019.

Table 2. Search strategy

1.	Homeless*
2.	"Rough sleeper"
3.	Roofless
4.	"Homeless Persons"
5.	"Homeless Youth"
6.	1 or 2 or 3 or 4 or 5
7.	"Oral health"
8.	"Dental health"
9.	Dentistry
10.	Dental
11.	"Dental Health Services"
12.	"Delivery of Health Care"
13.	"Health Education, Dental"
14.	7 or 8 or 9 or 10 or 11 or 12 or 13
15.	Communit*
16.	Intervention
17.	6 and 14 and 15 and 16

Selection of sources of evidence

After the initial search, duplicates were removed and studies were checked to determine if they met the eligibility criteria. Full-text articles were then read by the review team (LB and RF). Additional studies for potential inclusion were identified by hand-searching reference lists and appropriate journals. The full-texts of these studies were read by the review team. Any disagreements were discussed until consensus was reached.

Data charting

A data charting form was used to extract key variables. Variables were chosen that would provide key information regarding the characteristics of the reported interventions, and also to summarise demographic information about each study. Where possible, the following information about included studies was charted: title; author; year of publication; country of origin; aim; study population and sample size; method; intervention type; duration of study; how outcomes were measured; and a summary of key findings and recommendations made.

Quality Assessment

Critical appraisal checklists developed by the Joanna Briggs Institute (http://www.joannabriggs.org/) and NICE were used to appraisal the quality of the included studies. Most scoping reviews lack an appraisal of the quality of the included studies (Pham *et al*., 2014). This is another example of the differences between scoping reviews and systematic reviews. However, Munn et al. (2018) suggested that while this was not a mandatory element of a scoping review, it was possible to include a quality appraisal. Indeed, Pham et al. (2014) conducted a scoping review of scoping reviews and concluded that this lack of quality appraisal is frequently cited as a limitation of such reviews, and could result in them being interpreted as less rigorous than systematic reviews. This supported the earlier suggestion by Levac et al. (2010) that a lack of quality appraisal meant that it was difficult to interpret the results of scoping reviews, particularly with regard to their implications for policy and practice. Pham et al. (2014) recommended that scoping reviews should appraise study quality, but that this should not be used to determine the studies included in the review, as the intent of a scoping review is to provide an overview of the evidence base, which may be limited if studies are rejected based on their quality. Instead, the inclusion of a quality appraisal element of scoping reviews aids in the identification of gaps within the literature. Therefore, this review included an appraisal of quality, but the results were not be used to exclude studies.

Analysing the data

The information charted from each study was summarised in a table to overview the available literature. This was then reviewed to conduct descriptive and thematic analyses (Braun and Clarke, 2006), using the study objectives as a guide, as well as identifying themes emerging from the data. The descriptive analysis summarised the number of papers for each characteristic being recorded (e.g. year, country of origin, study population, and overall aim). Thematic analysis identified and analysed themes emerging from qualitative data in six stages: familiarisation with the data; generating initial coding; searching for themes; reviewing themes; defining and naming themes; and producing the report (Braun and Clarke, 2006; Nowell *et al*., 2017). For example, in order to extract recommendations from the included studies, a list of all recommendations, from quantitative, qualitative and mixed method studies, was made using the extracted and charted information, which included summaries of key findings. This list was read through and initial common themes were noted. The list was then re-read, to establish examples of these themes. These themes were then reviewed to determine if they were appropriate and were then labelled, based on the recommendations within them.

Results

A total of 483 papers were retrieved, reduced to 441 following removal of duplicates. The abstracts were screened using the eligibility criteria. Nine were found to match the criteria. Following a hand-search of reference lists and key journals, a further 16 papers were included for full-text screening. After screening the full-text articles, seven were excluded, resulting in a total of 18 studies (Figure 1).

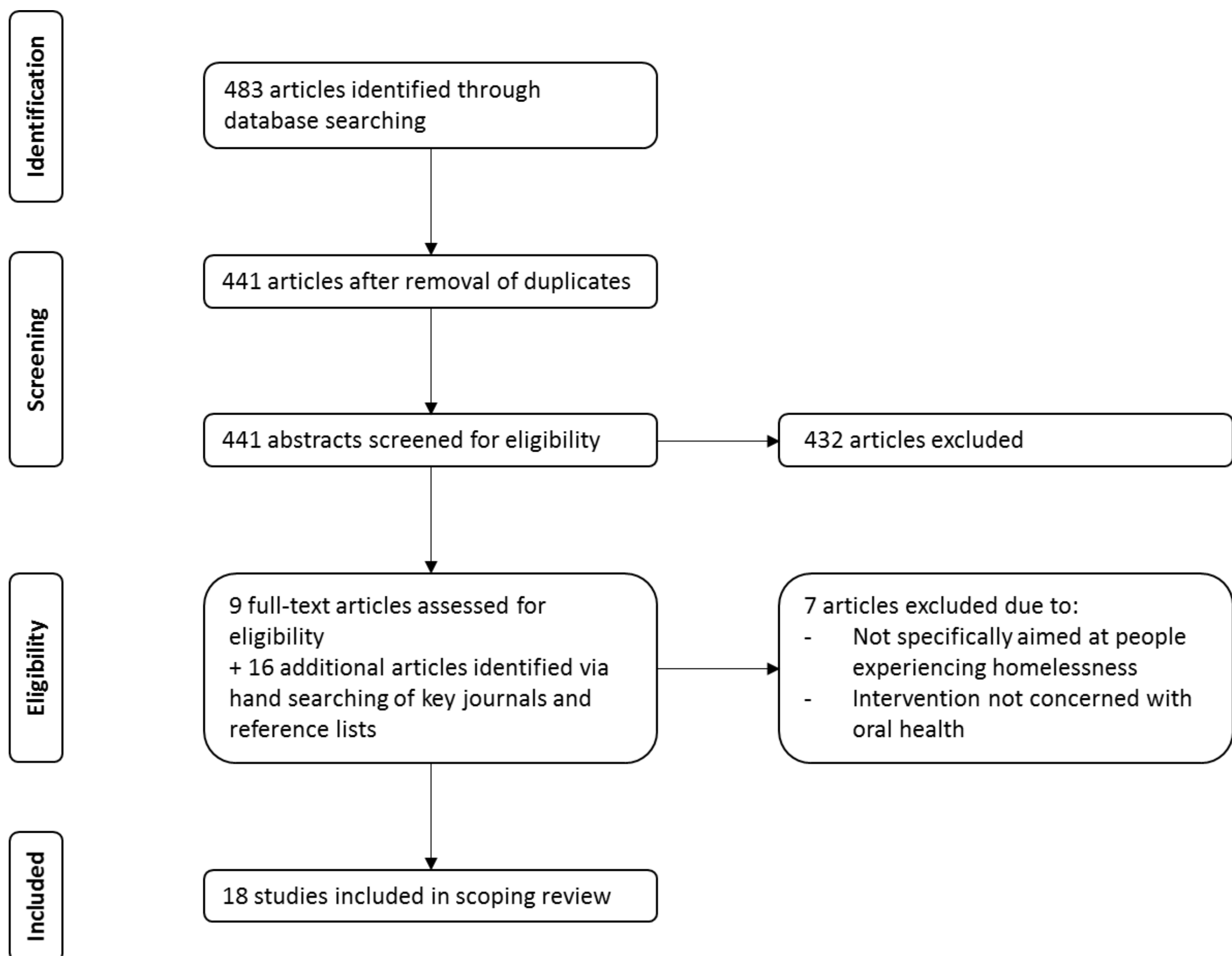

Figure 1. *Review profile.*

Study Characteristics (Table 3)

Nine studies were from the United Kingdom (Daly *et al*., 2010; Simons *et al*., 2012; Coles *et al.,* 2013; Pritchett *et al*., 2014; Beaton and Freeman, 2016; Beaton *et al*., 2016; Caton *et al*., 2016; Doughty *et al*., 2018; Rodriguez *et al*., 2019), five from the USA (Bolden and Kaste, 1995; Zabos and Trinh, 2001; Lashley, 2008; DiMarco *et al*., 2009; Nunez *et al.,* 2013), one from Ireland (Gray, 2007), two from Canada (Melanson, 2008; Wallace *et al*., 2013) and one from Australia (Stormon *et al.,* 2018).

All but one of the included studies was conducted in the last two decades, the exception being Bolden and Kaste (1995). Seven studies used quantitative evaluation methods (Gray, 2007; Lashley, 2008; DiMarco *et al*., 2009; Daly *et al*., 2010; Simons *et al*., 2012; Nunez *et al*., 2013; Stormon *et al*., 2018), six adopted qualitative methods (Zabos and Trinh, 2001; Coles *et al*., 2013; Pritchett *et al*., 2014; Beaton and Freeman, 2016; Caton *et al*., 2016; Rodriguez *et al*., 2019) and three had a mixed-methods approach (Wallace *et al*., 2013; Beaton *et al*., 2016; Doughty *et al*., 2018). Two studies were predominantly descriptive (Bolden and Kaste, 1995; Melanson, 2008).

People experiencing homelessness were participants in 10 studies (Zabos and Trinh, 2001; Gray, 2007; Lashley, 2008; DiMarco *et al*., 2009; Daly *et al*., 2010; Simons *et al*., 2012; Nunez *et al*., 2013; Pritchett *et al*., 2014; Doughty *et al*., 2018; Stormon *et al*., 2018), while practitioners working with people experiencing homelessness participated in 5 (Melanson, 2008; Coles *et al*., 2013; Wallace *et al*., 2013; Beaton and Freeman, 2016; Beaton *et al*., 2016). Two studies examined both of these participant groups (Caton *et al*., 2016; Rodriguez *et al*., 2019). One did not have a specific participant group as it was about the development of an intervention (Bolden and Kaste, 1995).

Eleven papers discussed the implementation of community-based dental services (Bolden and Kaste, 1995; Zabos and Trinh, 2001; Gray, 2007; Melanson, 2008; Daly *et al*., 2010; Simons *et al*., 2012; Wallace *et al*., 2013; Pritchett *et al*., 2014; Caton *et al*., 2016; Doughty *et al*., 2018; Stormon *et al*., 2018). Two interventions focused on the role of non-dental practitioners working with people experiencing homelessness, with one investigating the role of a paediatric nurse practitioner (DiMarco *et al*., 2009) and the other exploring the role of dental and nursing students (Lashley, 2008). Two studies evaluated the impact of practitioner training (Coles *et al*., 2013; Beaton *et al*., 2016). One study discussed a housing intervention with an oral health component (Nunez *et al*., 2013), and two were oral health promotion interventions (Beaton and Freeman, 2016; Rodriguez *et al*., 2019).

Table 3. Data Charting

Author(s)	*Year*	*Country of origin*	*Aim*	*Study sample*	*Method*	*Intervention*	*Key findings*
Gray	2007	Ireland	Assess accessibility of a dental service within a homeless drop-in centre.	237 homeless patients	Review of dental records	Community-based dental service.	There is a need for services that are accessible to older patients. Interdisciplinary care pathways important. Services should be targeted to specific populations.
Coles,Watt, Freeman	2013	UK	Evaluate if Something to Smile About increased staff oral health capacity.	Staff working with homeless people	Focus groups	Capacity building in staff	Staff could use oral health knowledge with homeless people
DiMarco, Huff, Kinion, Kendra	2009	USA	Assess the role of Paediatric Nurse Practitioners in giving oral health care to homeless children	264 homeless children	n/a	PNPs were trained by hygienist to give oral health advice at a shelter-based dental clinic.	PNPs could provide dental education, dental resources, referrals and assessments of oral health status.
Beaton, Coles, Rodriguez, Freeman	2016	UK	Process evaluation of the benefits of Smile4life training	10 dental health and 13 Third Sector practitioners	Questionnaires	Smile4life training for practitioners	Practitioners reported an increase in knowledge and changes in attitudes and behaviours regarding oral health and homelessness.
Nunez, Gibson Jones, Shinka	2013	USA	Examine the impact of dental care on housing among homeless veterans	9870 homeless veterans	Retrospective longitudinal cohort study	Community-based transitional housing intervention	Veterans who received dental care were 30% more likely to complete the program, 14% more likely to gain employment and 15% more likely to obtain residential housing.
Lashley	2008	USA	Improve the oral health of urban homeless populations	279 residents of homeless shelter	Survey of demographics and risk factors	Oral health education delivered by nursing students, screening and referrals at a faith-based shelter	Students gained understanding of barriers to healthcare affecting homeless people.
Simons, Pearson, Movasaghi	2012	UK	Assess a community dental service for homeless people	350 homeless patients	Audit of patient records and feedback from service users	Community-based dental service with a dedicated homeless clinic & mobile service	61% completed treatment, 40% presented in pain. Results confirmed there was a need for services for this population, that were flexible and embedded in local health and social networks.
Zabos, Trinh	2001	USA	Discuss a mobile dental service for people living with HIV/AIDS, including people experiencing homelessness	10 HIV+ patients, including homeless youth	Focus groups	Community-based mobile dental service, emphasising prevention, early intervention and service linkage	The non-judgemental attitudes of staff and "aggressive outreach" of the intervention helped to alleviate fears, and dental treatment was tailored to the specific needs of patients.
Bolden, Kaste	1995	USA	Review factors when establishing a shelter-based dental programme for homeless people	n/a	n/a	Community-based dental programme	Interventions should consider homelessness status (duration, health, accommodation, socio-economic status), and the dental needs of the target population. Barriers to dental care must also be considered.
Daly, Newton, Batchelor	2010	UK	Describe patterns of use for dental service for homeless people	204 homeless patients	Review of case notes	A targeted dental service (fixed site and outreach)	Service was better at meeting patients' initial needs, rather than completing courses of treatment. Presence of service promoted uptake. A flexible service meant delayed outcomes.

Table 3 continued overleaf....

...table 3 continued.

Author(s)	*Year*	*Country of origin*	*Aim*	*Study sample*	*Method*	*Intervention*	*Key findings*
Wallace, MacEntee, Harrison, Hole, Mitton	2013	Canada	Explain how 5 community dental clinics provide services	Practitioners at community dental clinics	Case study and open-ended interviews	Community-based dental service	There is a need for services to be located in accessible locations and be integrated with others health and community services.
Stormon, Pradhan, McAuliffe, Ford	2018	Australia	Evaluate a system integration model for oral healthcare for homeless people.	76 homeless people	Questionnaire and feedback from patients.	Dental practitioners visiting community organisations for dental screening, oral health advice and referrals	High attendance rates at the dental screenings, but although the intervention was lost-cost, it was labour intensive. A collaborative effort between the university, the health service and community organisations.
Doughty, Stagnell, Shah, Vasey, Gillard	2018	UK	Assess the impact of the Crisis at Christmas Dental Service.	2454 homeless or vulnerably housed patients	Review of clinical notes and anonymised patient feedback.	Volunteer dentists, nurses and therapists with mobile dental units at 2 community bases.	The mobile dental unit was found to be a good opportunity for oral health promotion and fluoride varnish application. This service should be responsive and flexible, offering single-item treatments and signposting to the Community Dental Service.
Melanson	2008	Canada	Describe how a social dental clinic was planned and implemented.	Dental hygienists	n/a	A fixed-site, community-based dental clinic giving free pain relief, staffed by volunteers	Similar projects should: consider a needs assessment at the planning stage, to define the population; create partnerships with other agencies (e.g. health and social care); and identify champions within the dental community.
Pritchett, Hine, Franks, Fisher-Brown	2014	UK	Explore the feasibility of including dental students in oral health education for homeless populations.	35 homeless patients	Informal conversations with patients	Student-led oral health education in a community dental service	The input of the students was considered to be valuable, but the authors stressed that a tailored approach should be adopted.
Beaton, Freeman	2016	UK	Understand how Smile4life was implemented and adopted by NHS Boards	20 oral health practitioners	Telephone interviews	Smile4life: client-centred intervention focused on behaviour change and oral health promotion	NHS Boards often lacked resources required to deliver Smile4life. Practitioners were ambivalent or had negative perceptions of homelessness. Geography of NHS Boards made nationwide implementation difficult. Partnership working and existing links were found to be enablers.
Rodriguez, Beaton, Freeman	2019	UK	Co-design, implement and evaluate oral health and health workshops with and for homeless young people.	13 young homeless people, 5 community-based staff	Interviews	Co-designed workshops on oral health and health topics	Beneficial to include service users in design of workshops to build trust. Workshops gave the young people the opportunity to voice their health needs and increased their oral health literacy.
Caton, Green-halgh, Goodacre	2016	UK	Explore the dental care experiences of people accessing a community-based dental service.	33 homeless /hard to reach patients. Dental & community staff.	Interviews	Community-based outreach dental service	Must accommodate the needs of service users and be flexible and approachable. Interventions should work with GPs and reach out to people and the community.

Quality Assessment

Twelve studies were of high quality, four of medium quality, and two low quality (Table 4). As mentioned above, these results were not used to determine study inclusion.

Table 4. Quality Assessment

Type of study	*Study*	*Quality*
Text and opinion	Bolden and Kaste, 1995	High
	DiMarco et al., 2019	High
	Melanson, 2008	High
Qualitative research	Zabos and Trinh, 2001	Low
	Coles et al., 2013	Medium
	Wallace et al., 2013	High
	Pritchett et al., 2014	Medium
	Beaton and Freeman, 2016	High
	Caton et al., 2016	High
	Rodriguez et al., 2019	High
Case series	Gray, 2007	High
	Lashley, 2008	Low
	Daly et al., 2010	High
	Simons et al., 2012	High
	Doughty et al., 2018	High
	Stormon et al., 2018	High
Questionnaire	Beaton et al., 2016	Medium
Cohort studies	Nunez et al., 2013	Medium

Intervention Characteristics

The included papers were analysed thematically to extract recommendations for future community-based oral health interventions for people experiencing homelessness. Themes emerged from these recommendations, which were then grouped based on these themes (Table 5).

The overarching theme was collaboration, divided into five sub-themes of: (1) Co-design and co-production; (2) Multidisciplinary working between oral health, community-based services and Local Authorities; (3) Location of services; (4) Working within education and (5) Collaboration with dental practitioners. These themes are analysed in greater detail below.

1. Co-design and co-production

Many interventions discussed the need to increase involvement from homeless service users. Doughty et al. (2018) concluded that their community-based dental service needed feedback from homeless patients if it was to meet the needs of the homeless population. Rodriguez et al. (2019) included young homeless people in the co-design of an intervention, involving them at the development stage to determine the content of planned workshops. Early involvement would likely increase "buy-in" from the service users (Coles *et al*., 2013), i.e. that the service users were more likely to engage with the intervention.

Many papers stressed the need to better understand the homeless population and homelessness status. Gray (2007) noted that the "homeless population is not homogenous, being very diverse in age, socio-economic status, education and substance misuse": interventions must be tailored and cannot be one-size-fits-all. This was reiterated by Bolden and Kaste (1995), who stressed that their intervention was developed taking into consideration the oral health status of the homeless population they were targeting, with treatment plans being dependent on patient status. Similarly, Melanson (2008) suggested conducting a needs assessment to define the target population.

A greater understanding of the needs of this population would allow services to be tailored to the needs of the individuals, taking into account their often-chaotic lifestyles. Flexible dental services were ones that allowed for one-off treatment, without the expectation of a full course of treatment being completed (Zabos and Trinh, 2001; Daly *et al.,* 2010; Simons *et al*., 2012; Caton *et al.,* 2016; Doughty *et al*., 2018).

Pritchett et al.'s (2014) intervention involved the delivery of oral health information tailored to each patient. In an evaluation, most participants stated that they "would benefit from tailored oral health education on a regular basis", confirming the need for this service.

Gray (2007) advocated services that were tailored and targeted specifically at subsections of the homelessness community. She noted that dental services aimed at homeless people were not as accessible to people over the age of 40 as they were to younger groups. She suggested that referral pathways for the older homeless population would need to be investigated to ensure equity of access.

2. Multidisciplinary working

Beaton and Freeman (2016) and Beaton et al. (2016) recommended greater partnership working between oral health practitioners and Third Sector staff in community-based organisations, as well as the social care practitioners within Local Authorities.

Melanson (2008) highlighted the need for partnership working, particularly with social agencies. She noted that staff within these agencies would have a firm understanding of the needs of their service users, and would therefore "require little convincing of the need for dental treatment for the underprivileged".

Caton et al. (2016) suggested that oral health interventions should reach out to community-based services in order to develop relationships with service users. Gray (2007) suggested a similar integration between oral health and community-based services when she reviewed referral patterns to dental services; the main source of referrals was the homeless drop-in centre. Gray (2007) recommended an interdisciplinary approach, in order to include oral health assessments as part of the initial assessment carried out by the homeless centre staff.

Wallace et al. (2013) suggested integrating dental services with other health services: "Dental services are integrated with other health and social services, mostly within community health centres" so that all elements of healthcare could work closely together to address the social determinants of health and overcome physical barriers for the service users accessing healthcare.

Table 5. Recommendations extracted and identified as themes

Study	*Recommendations*	*Themes*
Beaton and Freeman, 2016	There is a need for partnership working	Multidisciplinary working
Gray, 2007	Services must be available to the people they are aimed at	Location of services
	Interdisciplinary care	Multidisciplinary working
	Targeted services	Co-design and co-production
	Allow service users space to voice their health needs	Co-design and co-production
	Need for a safe space	Location of services
Caton et al., 2016	Reach out to the community	Co-design and co-production
	Link to GP practices	Location of services
	Flexible, approachable services	Co-design and co-production
Pritchett et al., 2013	Student input can be valuable	Working with education
	Tailored approach should be adopted	Co-design and co-production
Daly et al., 2010	Flexible attendance	Co-design and co-production
	Mobile dental surgeries	Location of services
Melanson, 2008	Conduct needs assessment	Co-design and co-production
	Create partnerships between health and social care	Multidisciplinary working
	Identify champions within the dental community	Collaboration with dental practitioners
Doughty et al., 2018	Incorporate feedback from service users	Co-design and co-production
	Flexible, responsive service	Co-design and co-production
	Flexible re: treatment	Co-design and co-production
Wallace et al., 2013	Services should be located in accessible locations	Location of services
	Integrated with other health and community services	Location of services Multidisciplinary working
Stormon et al., 2018	Collaboration with universities and community groups	Working with education
Bolden and Kaste, 1995	Consider homelessness status	Co-design and co-production
	Consider dental needs and barriers	Co-design and co-production
Zabos and Trinh, 2001	Non-judgemental attitudes	Co-design and co-production
	Tailored dental treatment	Co-design and co-production
	Co-located services	Location of services
Simons et al., 2012	Flexible dental services	Co-design and co-production
	Embedded services	Location of services
Lashley, 2008	Values of partnership working between universities and community organisations	Working with education
	Involve key stakeholders at all stages of intervention development	Co-design and co-production
DiMarco et al., 2009	Value of non-dental staff	Multidisciplinary working
Beaton et al., 2016	Increased partnership working	Multidisciplinary working
Coles et al., 2013	Non-dental staff could be used to deliver oral health education	Multidisciplinary working
	Need buy-in from service users	Co-design and co-production

3. Location of services

The location of services was seen to impact upon the success of a dental service or intervention. Wallace et al. (2013) recommended that services for oral health should be in accessible and appropriate locations, and highlighted practical considerations: "emphasis was placed on the need for a safe location and on the availability of staff who speak the languages of the community".

Many studies discussed dental services that were co-located with other health or social services. The service discussed by Wallace was integrated with other health care services. Zabos and Trinh (2001) provided co-located services, which they concluded was an "effective way to enhance the delivery of oral health services" to populations who would often face discrimination.

The location of services was also considered in studies using a mobile dental unit, which could be taken anywhere, setting up next to community-based homeless organisations. As Pritchett et al. (2014) noted, a mobile dental clinic was often the first place a person experiencing homelessness would seek dental treatment. Simons et al. (2012) also discussed the use of portable dental equipment which could be used to take the dental service to the service user.

The need for a safe environment was also highlighted by Rodriguez et al. (2019), detailing an oral health education intervention for young homeless people. The authors noted that the young people appreciated that the intervention took place at a familiar location, which encouraged a trusting environment.

4. Working with education

Three studies included had an element of dental student involvement. Lashley (2008) concluded that involving dental and dental hygiene students in on-site oral health screenings, preventive care and education had benefited both them and the shelter where the intervention took place. The shelter benefited from the much-needed health services. The students gained understanding of the barriers facing the homeless population in accessing dental care, awareness of the societal and political situations that give rise to inequalities and clinical experience that they may not have acquired otherwise.

Stormon et al.'s (2018) intervention involved dental students, among other volunteer dental/oral health professionals, visiting community-based organisations screen people and give oral health advice. Feedback from participants suggested that the students and other volunteers "worked well with the service".

Pritchett et al.'s (2014) intervention was student-led, with students supporting dentists by providing tailored oral health information to homeless people at a community-based dental service. The authors concluded that the intervention developed students' "communication skills and social responsibility… shaping future career direction and ethical responsibilities", alongside a greater understanding of the problems facing homeless people in their attempts to access dental care.

5. Collaboration with dental practitioners

DiMarco et al. (2009) highlighted the benefits of working with non-dental health professionals and noted that the oral health of children is a significant public health concern that paediatric nurses could be involved in addressing, stating that "dental and health care providers should share… responsibilities".

Melanson (2008) suggested that interventions should identify champions within the dental community at an early stage of planning. Not only could dental professionals help to determine clinical needs, they could encourage involvement from their colleagues. She concluded that "each profession needs a champion who brings the passion of their professional to the mix".

Two groups (Doughty *et al*., 2018; Beaton and Freeman, 2016) highlighted the need for trained and motivated practitioners in community-based oral health interventions for people experiencing homelessness, Doughty et al. noted that their volunteer-led community-based dental service depended on the motivation of volunteers, who also needed to be trained dental practitioners. Beaton and Freeman found that the motivation of practitioners to engage with community-based homelessness services or service users affected the adoption of their intervention.

Discussion

Summary of evidence

The recommendations focused on collaboration with key stakeholders. This included: co-design and co-production of services with service users; multidisciplinary working with community-based organisations; working alongside education; locating or embedding services within community-based organisations and collaborating with dental practitioners. This supports the earlier work conducted by Goode et al. (2018) and a mixed-methods review of community-based health promotion for people experiencing homelessness (Coles *et al*., 2012). Studies included in the Coles review recommended approaching community-based services and their staff at the earliest stages of intervention design, to gain their engagement and establish rapport. Similarly, Goode et al. found that a key strategy for improving access to dental care for homeless populations was to work "in close collaboration with homeless support agencies". The recommendations extracted within this review also mirror those made in the review by Coles et al. who concluded that homeless people should be involved with the design of the intervention from the development stage, to encourage their engagement and to facilitate their access to services.

Revisiting the review, a series of recommendations to promote the acceptability, feasibility and sustainability for community-based oral health interventions for people experiencing homelessness can be proposed. In terms of acceptability, increased attempts to encourage engagement and partnership working with service users, oral health practitioners, community-based services and Local Authorities will ensure that any future intervention meets the felt and expressed needs of those involved (Coles *et al.,* 2013; Beaton and Freeman, 2016; Melanson, 2008). Furthermore, increased engagement from practitioners and community-based services will ensure that future interventions are easily incorporated into current practices. This will be strengthened by the integration of health and social

care services, already a reality in Scotland, and planned for England (Scottish Government; NHS England). Indeed, in a recent review called for the "incorporation of oral health into health and social care" (Freeman *et al.*, 2019). Finally, encouraging dental student involvement in delivering interventions may increase their sustainability and train the next generation of dentists in how to address the oral health needs of people experiencing homelessness, so developing experienced and motivated practitioners for the future.

Research gaps

This review identified three gaps in the literature concerning community-based oral health interventions for homeless people:

1. Only two studies addressed the role of non-dental/oral health practitioners: DiMarco et al. (2009) used a paediatric nurse practitioner effectively in oral health interventions for homeless children and Lashley (2008) discussed oral health education delivered by nursing students, as part of oral health promotion with other practitioners. Other health practitioners could deliver preventative oral health advice and support clinical staff in treatment provision.
2. Only one paper described oral health as part of a non-dental intervention (Nunez *et al*., 2013). This suggests that there may be other ways in which oral health can be embedded within other homelessness-related holistic care (Freeman *et al.,* 2019) and highlights the potential for future interventions to re-enforce communication and integration across sectors. Such integration may be increasingly complex.
3. Most interventions focused on the provision of dental treatment. While there is a need for service provision, there is less focus on non-clinical oral health education/promotion that is effective, cost-effective and less resource-intensive. Indeed, oral health education has been found to be a cost-effective method for oral disease prevention (Nakre and Harikiran, 2013), and interventions that use minimal equipment will also cost less than those that require mobile or fixed-site clinics (Stormon *et al.,* 2018).

Limitations

While this scoping review was not intended to be exhaustive, it has some limitations. First, the search strategy was limited to online resources. Second, the inclusion criteria were limited to papers written in English, based in developed countries. Furthermore, when compared to a systematic review, scoping reviews are often considered to be less rigorous. However, the use of the PRISMA-ScR and the inclusion of a quality appraisal partly overcame this limitation.

Conclusion

This review has implications for the future development and design of community-based oral health interventions for people experiencing homelessness. It has highlighted several gaps in the literature, suggesting a need for more non-clinical oral health promotion for the homeless population, and a closer look at the role that non-dental practitioners can play in the delivery of oral health care.

The extracted recommendations suggest that community-based oral health interventions for people experiencing homelessness should involve multidisciplinary collaboration with key stakeholders from the earliest stage, including service users, dental/oral health practitioners and practitioners from community-based organisations, all of whom should play an active role in programme development. By adopting these recommendations, interventions may be acceptable, feasible and sustainable, improving the oral health of people experiencing homelessness.

References

Arksey, H. and O'Malley, L. (2005): Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology* **8***,* 19-32.

Beaton, L., Anderson, I., Humphris, G., Rodriguez, A. and Freeman, R. (2018): Implementing an oral health intervention for people experiencing homelessness in Scotland: a participant observation study. *Dentistry Journal* **6***,* 1-14.

Beaton, L., Coles, E., Rodriguez, A. and Freeman, R. (2016): Exploring the benefits of Smile4life training: findings from a pilot study. *Community Practitioner* **89***,* 40-45.

Beaton, L. and Freeman, R. (2016): Oral health promotion and homelessness: a theory-based approach to understanding processes of implementation and adoption. *Health Education Journal* **75***,* 184-197.

Bolden, A.J. and Kaste, L.M. (1995): Considerations in establishing a dental program for the homeless. *Journal of Public Health Dentistry* **55***,* 28-33.

Braun, V. and Clarke, V. (2006): Using thematic analysis in psychology. *Quality Research in Psychology* **3***,* 77-101.

Caton, S., Greenhalgh, F. and Goodacre, L. (2016): Evaluation of a community dental service for homeless and 'hard to reach' people. *British Dental Journal* **220***,* 67-70.

Cochrane Equity Methods. Homeless Health Guidelines. https://methods.cochrane.org/equity/projects/homeless-health-guidelines

Coles, E., Freeman, R., Edwards, M., Elliott, G., Heffernan, A., and Moore, A. (2011): *Smile4life: The Oral Health of Homeless People in Scotland*. Dundee: University of Dundee.

Coles, E., Themessl-Huber, M. and Freeman, R. (2012): Investigating community-based health and health promotion for homeless people: a mixed methods review. *Health Education Research* **27**, 624-644**.**

Coles, E., Watt, C. and Freeman, R. (2013): 'Something to Smile About': An evaluation of a capacity-building oral health intervention for staff working with homeless people. *Health Education Journal* **72***,* 146-155.

Collins, J. and Freeman, R. (2007): Homeless in North and West Belfast: an oral health needs assessment. *British Dental Journal* **202***,* E31.

Csikar, J., Vinall-Collier, K., Richemond, J.M., Talbot, J., Serban, S.T. and Douglas, G.V.A. (2019): Identifying the barriers and facilitators for homeless people to achieve good oral health. *Community Dental Health* **36***,* 1-6.

Daly, B., Newton, T. and Batchelor, P. (2010): Patterns of dental service use among homeless people using a targeted service. *Journal of Public Health Dentistry* **70***,* 45-51.

De Palma, P., Frithiof, L., Persson, L., Klinge, B., Halldin, J. and Beijer, U. (2005): Oral health of homeless adults in Stockholm, Sweden, *Acta Odontologica Scandinavica* **63***,* 50-55.

De Palma, P. and Nordenram, G. (2005): The perceptions of homeless people in Stockholm concerning oral health and consequences of dental treatment: a qualitative study. *Special Care Dentistry* **25**, 289-295.

DiMarco, M.A., Huff, A., Kinion, E. and Kendra, M.A. (2009): The pediatric nurse practitioner's role in reducing oral health disparities in homeless children. *Journal of Pediatric Health Care* **23**, 109-116.

Doughty, J., Stagnell, S., Shah, N., Vasey, A. and Gillard, C. (2018): The Crisis at Christmas Dental Service: a review of an annual volunteer-led dental service for homeless and vulnerably housed people in London. *British Dental Journal* **224**, 43-47.

FEANTSA. European Typology of Homelessness and housing exclusion. https://www.feantsa.org/download/en-16822651433655843804.pdf

Freeman, R., Doughty, J., Macdonald, M.E. and Muirhead, V. (2019): Inclusion oral health: advancing a theoretical framework for policy, research and practice *Community Dentistry and Oral Epidemiology. doi.org/10.1111/cdoe.12500*

Gray, R. (2007): Referral patterns and access to dental services of people affected by homelessness in Dublin, Ireland. *Journal of Disability and Oral Health* **8**, 51-56.

Groundswell. Health Mouths: A peer-led health audit on the oral health of people experiencing homelessness. https://groundswell.org.uk/wp-content/uploads/2017/10/Groundswell-Healthy-Mouths-Report-Final.pdf

Joanna Briggs Institute. Critical Appraisal. https://wiki.joannabriggs.org/display/MANUAL/3.2.7+Critical+Appraisal

Joseph Rowntree Foundation. Tackling homelessness and exclusion: understanding complex lives. https://www.homeless.org.uk/sites/default/files/site-attachments/Roundup_2715_Homelessness_aw.pdf

King, T.B. and Gibson, G. (2003): Oral health needs and access to dental care of homeless adults in the United States: a review. *Special Care Dentistry* **23**, 143-147.

Lashley, M. (2008): Promoting oral health among the inner city homeless: a community-academic partnership. *Nursing Clinics of North America* **43**, 367-379.

Melanson, S.L. (2008): Establishing a social dental clinic: addressing unmet dental needs. *Canadian Journal of Dental Hygiene* **42**, 185-193.

Munn, Z., Peters, M.D.J., Stern, C., Tufanaru, C., McArthur, A. and Aromataris, E. (2018): Systematic review of scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology* **18**.

Nakre, P.D. and Harikiran, A.G. (2013): Effectiveness of oral health education programs: a systematic review. *Journal of International Society of Preventive and Community Dentistry* **3**, 103-115.

NHS England. Five Year Forward View. https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf

NICE. Oral health: local authorities and partners. https://www.nice.org.uk/guidance/ph55/resources/oral-health-local-authorities-and-partners-pdf-1996420085701

NICE. Critical appraisal checklist for a questionnaire study. https://www.nice.org.uk/guidance/cg188/evidence/appendix-k-metholdogy-checklist-pdf-6958881110

Nunez, E., Gibson, G., Jones, J.A. and Schinka, J.A. (2013): Evaluating the impact of dental care on housing intervention program outcomes among homeless veterans. *American Journal of Public Health* **103**, S368-S373.

Parker, E.J., Jamieson, L.M., Steffens, M.A., Cathro, P. and Logan, R.M. (2011): Self-reported oral health of a metropolitan homeless population in Australia: comparisons with population-level data. *Australian Dental Journal* **56**, 272-277.

Patterson, A. and Tweed, R. (2009): Escaping homelessness: anticipated and perceived facilitators. *Journal of Community Psychology* **37**, 846-858.

Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA). www.prisma-statement.org

Pritchett, R.M., Hine, C.E., Franks, M.A. and Fisher-Brown, L. (2014): Student-led oral health education for the homeless community of East London. *British Dental Journal* **217**, 85-88.

Rodriguez, A., Beaton, L. and Freeman, R. (2019): Strengthening social interactions and constructing new oral health and health knowledge: the co-design, implementation and evaluation of a pedagogical workshop program with and for homeless young people. *Dentistry Journal* **7**, 1-15.

Scottish Government. Health and Social Care Integration. https://www2.gov.scot/Topics/Health/Policy/Health-Social-Care-Integration

Sfeatcu, R., Dumitrache, A., Dumitraşcu, D., Funieru, C., and Lupoşoru, M. (2011): Aspects of oral and general health among a community center for the underserved. *Journal of Medicine and Life* **4**, 168-171.

Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., and Stewart, L. (2015): Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *British Medical Journal* **2**, g7647.

Shelter Scotland. Am I Homeless? https://scotland.shelter.org.uk/get_advice/advice_topics/homelessness/help_from_the_councils_housing_department/the_councils_homelessness_tests/are_you_homeless

Simons, D., Pearson, N. and Movasaghi, Z. (2012): Developing dental services for homeless people in East London. *British Dental Journal* **213**, E11.

Stormon, N., Pradhan, A., McAuliffe, A. and Ford, P.J. (2018): Does a facilitated pathway improve access to dental services for homeless and disadvantaged adults? *Evaluation and Program Planning* **71**, 46-50.

Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M.D.J., Horsley, T., Weeks, L., Hempel, S., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M.G., Garritty, C., Lewin, S., Godfrey, C.M., Macdonald, M.T., Langlois, E.V., Soares-Weiser, K., Moriarty, J., Clifford, T., Tunçalp, Ö. and Straus, S.E. (2018): PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine* **169**, 467-473.

Wagner, J., Diehl, K., Mutsch, L., Löffler, W. and Burkert, N. (2014): Health status and utilisation of the healthcare system by homeless and non-homeless people in Vienna. *Health and Social Care in the Community* **22**, 300-307.

Wallace, B.B. and MacEntee, M.I. (2012): Access to dental care for low-income adults: perceptions of affordability, availability and acceptability. *Journal of Community Health* **37**, 32-39.

Wallace, B.B., MacEntee, M.I., Harrison, R., Hole, R. and Mitton, C. (2013): Community dental clinics: providers' perspectives. *Community Dentistry and Oral Epidemiology* **41**, 193-203.

Zabos, G.P. and Trinh, C. (2001): Bringing the mountain to Mohammed: a mobile dental team serves a community-based program for people with HIV/AIDS. *American Journal of Public Health* **91**, 1187-1189.