

Title: Improving access of young adults with experience of homelessness to primary care dental services in the UK: a realist synthesis

Authors: Maryam Ahmadyar ^{1*}, Tanvi Rai ¹, Blanaid Daly ², Geoffrey Wong ¹

1. Nuffield Department of Primary Care Health Sciences, University of Oxford, UK
2. Dublin Dental University Hospital, Trinity College Dublin, Lincoln Place, Dublin 2, Ireland

*** Correspondence**

Maryam Ahmadyar, Nuffield Department of Primary Care Health Sciences, Radcliffe Observatory Quarter, Woodstock Road, Oxford, OX2 6GG

Email: maryam.ahmadyar@phc.ox.ac.uk

Abstract

Objective: To understand why, how and under what circumstances interventions lead to improved access of young adults with experience of homelessness (YAEH) to primary care dental services in the UK.

Methods: We followed a realist, theory-driven methodology. It involved locating existing theories, searching for evidence, document selection, data extraction/appraisal and evidence synthesis. We searched scientific databases and grey literature sources. We used these data and relevant substantive theories to develop explanations of how, why and under what circumstances interventions lead to desired outcomes. We presented these explanations in the form of context-mechanism-outcome configurations (CMOCs). The CMOCs were incorporated in an overarching programme theory, which was iteratively developed and refined throughout the realist synthesis.

Results: We used 106 scientific and 18 grey literature records to synthesise 61 CMOCs. Our revised programme theory highlights the importance of four main considerations: ‘preparing a service’, ‘producing and disseminating information’, ‘outreach activities’ and ‘facilitating interactions’. When designing dental programmes for YAEH, we recommend considering the importance of prior service planning (including resourcing of emergency dental care, training staff, incorporating safety measures), creating positive experiences, flexibility, patient-centeredness, being informative and reassuring, creating an enabling environment (including strong communication, building rapport, avoiding negative judgments), having realistic expectations and designing services that empower patients.

Conclusions: Improving dental access of YAEH requires attention to multiple levels. Services can achieve positive outcomes by understanding the complexity of YAEH lives, and creating contextual circumstances that encourage their attendance.

Keywords: homeless youth, oral health, healthcare disparities, health services research, program evaluation, review

Introduction

Homelessness is a significant public health concern in the UK, the prevalence of which has been increasing in recent years ^{1,2}. It can be defined as not having an available and reasonable home to occupy, and includes lack of housing (rough sleeping), temporary accommodations, insecure housing (such as sofa surfing) and inadequate housing (such as overcrowding) ³. The homeless population is diverse, comprising of different subgroups, each with their own characteristics. One subgroup is young adults. They include foster care leavers, LGBT youth, ex-prisoners, ethnic minority and refugee youth and those who have had abusive or dysfunctional family backgrounds ^{4,5}. Between 2019-20, 121,000 young people aged 16-24 were estimated to be homeless or at risk of homelessness in the UK ⁶. A significant proportion of homelessness amongst this age group is 'hidden', mainly in the form of sofa surfing ⁷.

Numerous studies have demonstrated that the homeless population suffer from disproportionately higher levels of oral disease ⁸, the majority of which is left undiagnosed and untreated ^{9,10}. Although primary care General Dental Services and Community Dental Services are available in many areas, attendance rates of people experiencing homelessness are significantly lower than the general population ⁹. Common barriers include chaotic lifestyles, competing priorities, dental anxiety and refusal or inability to register ¹¹. Meanwhile, homeless populations are significantly more likely to attend hospital Emergency Departments (ED) for urgent dental problems ⁹.

To find solutions, we believe that we need to understand this problem as a complex phenomenon that involves interaction of multiple psychosocial and environmental factors leading to homelessness and poor dental access. By using a realist approach, we were able to take into account this complexity ¹², and develop rich, context sensitive explanations.

Considering the limited theoretical understanding of dental access and little data about young adults within the homeless dental literature, a realist approach also provided us with the flexibility to fill in some of these gaps using data from other closely related fields. The aim of this study is to understand interventions that improve access of young adults with experience of homelessness (YAEH) to primary care dental services in the UK. Our high-level research question was why, how and under what circumstances do service level interventions lead to desired (and unintended) outcomes for YAEH?

Methods

Realist methods focus on providing explanations of what interventions or programmes work for whom, under what circumstances and how. This is done by viewing each intervention or programme as collections of context-mechanism-outcome configurations (CMOCs) ¹². For example, in this study, CMOCs can be thought of as interactions of dental programme contexts with underlying causal mechanisms (reasons behind events, often not directly visible) that lead to particular outcomes. These explanations are then summarised and illustrated in the form of a programme theory (PT), which is refined throughout the synthesis ¹³. The end result is a series of related explanations that provide deeper understanding of an intervention or programme, and how it can be made to work most effectively. In this realist synthesis of the published literature, we were guided by Pawson's five iterative stages ¹², and used RAMESES publication standards for reporting ¹⁴. More information about our research methods and definitions of realist terms are provided in Table 1.

Results

We used a total of 106 full-text scientific articles (including 5 PhD theses) and 18 grey literature records. Details of each stage of our search are presented in Figure 1. Included literature was published between 1988 and 2021. 29 (27%) of the studies were from UK and 77 (73%) from other Western countries (majority from USA, Australia and Canada). 59 of the studies used quantitative methods, 29 used qualitative methods, 6 mixed-methods, 10 reviews and 2 reports (Appendix 8). Data from all sources was used to develop 61 CMOCs (Appendix 9). These CMOCs were in turn used to refine and expand our initial PT into a revised PT (Figure 2).

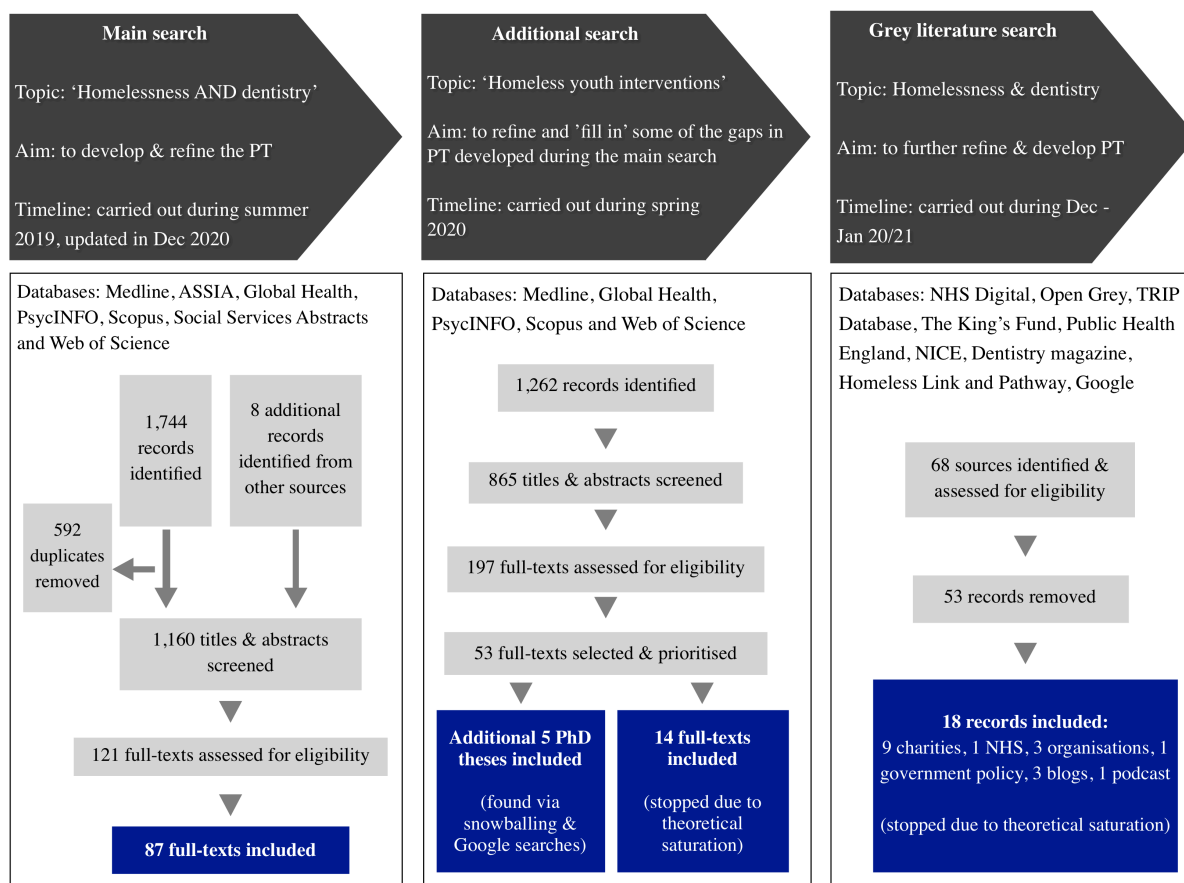


Figure 1. Realist synthesis search processes and results

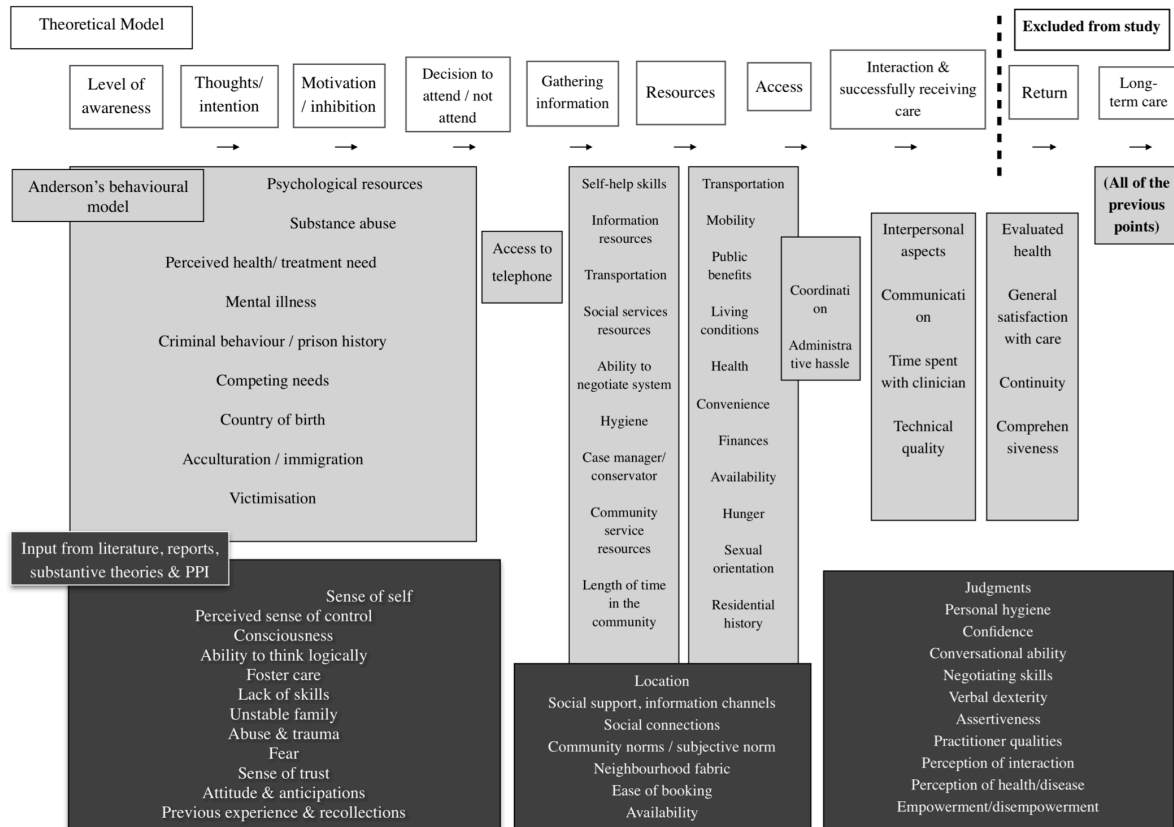


Figure 2a. Initial programme theory

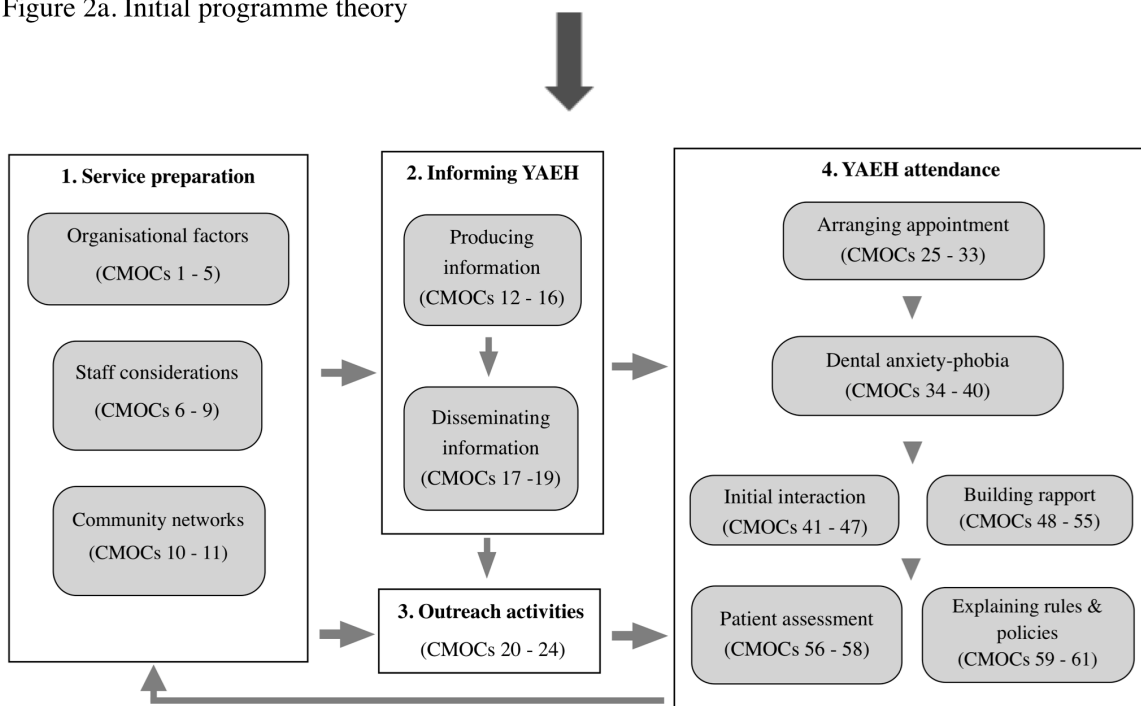


Figure 2b. Revised programme theory

Figure 2. The initial programme theory (Figure 2a) was iteratively refined using data from included articles to produce the revised programme theory (Figure 2b)

In the following sections, we present and explain our findings in a narrative format, in accordance with the categories and subcategories of our revised PT (Figure 2b).

1. Service preparation

1.1-1.2 Organisational factors and staff considerations

Arranging the organisational structure of a dental service so that it supports access of YAEH is an important step in ensuring that staff feel able to do their job. This means that various processes are designed so that staff members don't feel penalised and feel supported when they take steps toward improving access of YAEH (CMOC 1). For this to happen, it is important that staff are assigned roles that align with their motivations and interests (CMOC 6). It is also important that their concerns are addressed so they can feel more reassured (for example regarding safety) (CMOC 7). Providing appropriate training can help staff feel more confident to handle different situations when they arise, as it equips them with necessary knowledge and skills (CMOC 9).

If members of staff have a good understanding of YAEH lived experiences and competing priorities, they would be better able to tailor their approach to meet individual needs. Examples include developing achievable, patient-centered treatment plans or oral health promotion that is structured around the realities of a person's life (CMOCs 2-3). It is beneficial if services give their staff the opportunity to gain first hand experience of working with YAEH (such as via outreach or direct interactions during service delivery). This can help develop better understanding of the barriers that young adults face, and challenge any of the staff's misconceptions about homeless populations (CMOC 8). By asking YAEH their views at different stages of dental service provision (such as during planning or delivery), young adults would be more likely to engage, especially if they were informed about where and how their input may be used (CMOCs 4-5).

1.3 Community networks

Building relationships and collaborating with other dental / non-dental services can allow pooling of resources and supportive networks. For example, dental services can improve attendance by collaborating with youth hostels (CMOC 10). Interconnection of services in a neighbourhood also helps YAEH feel more safe and accepted. This is because local

individuals and services are more likely to be receptive to young adults during any interactions in their journey to the dental service (such as if they enquire about directions) (CMOC 11).

2. Informing YAEH

2.1 Producing information

If dental services can provide information that is appropriate and easily understood by YAEH, it can reassure and remove some anxieties about attendance (i.e. by addressing individual concerns and uncertainties) (CMOC 13, 16). It is important for services to recognise young adults' needs and preferences, so that the right content, tone and language can be used. According to the literature, YAEH preferences are often specific to their backgrounds, circumstances and age group. Examples include a preference for the use of graphics, giving information in a brief format, using simple language and a positive tone to messages (CMOCs 12-13). One way that dental services can produce this information is to ask for and incorporate views of YAEH (CMOC 12). If services can also identify and provide information on specific aspects of attendance, it can reduce uncertainty and reassure young adults. Examples include information on location, neighbourhood safety, transport routes, dental procedures or eligibility criteria for registration. Providing this information would also remove the additional barrier of individuals having to find it out for themselves (CMOCs 14-16).

2.2 Disseminating information

Dental services should disseminate information in ways that are accessible and widely used by young adults (such as websites and social media) (CMOC 17). It is also helpful to target dissemination to locations where YAEH will be most likely to congregate (CMOC 18). Asking young adults to disseminate information to their contacts can also make the information more credible to new individuals who are not familiar with a service (CMOC 19).

3. Outreach activities

It is beneficial for dental services to incorporate outreach activities, as it can help YAEH feel cared for. Outreach activities can also transfer a sense of value and recognition to young adults, which can help them feel more motivated to care for their oral health (CMOC 20).

Undertaking outreach in locations that are comfortable and familiar for YAEH allows them to feel safer and engage more easily with the dental team (CMOC 21). It is recommended for members of an outreach team to adopt an informal, friendly manner. Young adults should not be talked down to, or made to feel uncomfortable (CMOC 22). It may also be helpful for staff to provide incentives, as these can act as ice breakers, and allow recipients to feel more valued and inclined to reciprocate positive gestures (CMOC 23). Meanwhile, outreach staff should be respectful toward basic needs of YAEH, such as sleep or eating (i.e. they should not wake people up or disturb them in their private time). There may also be less apparent, psychological needs, such as the need for withdrawal and social isolation. Outreach team members can develop more positive relationships with young adults by being sensitive, asking individuals if they feel comfortable before starting conversations and respecting their wants and wishes (CMOC 24).

4. YAEH attendance

4.1 Arranging appointment

There are three main contextual factors that can make an appointment process more successful. The first is for services to employ a flexible, simple and convenient appointment system. This would allow staff to better meet individual needs and thus improve service use (CMOCs 25-27). Secondly, allowing or encouraging YAEH to attend with someone they know and trust can help them feel more safe, motivated and empowered, and more likely to attend (CMOCs 28-29). Thirdly, it is recommended that dental services set expectations according to realities of YAEH lives. As an example, this would enable services to view irregular attendance as an inevitable pattern, and emergency attendance as a 'norm' for many young adults. Services would then be able to make plans for emergency dental care, in order to accommodate this attendance pattern (CMOCs 30 - 32). As homelessness is often accompanied by instability, it is advisable to remind individuals of their appointments (CMOC 33). However, a certain number of missed appointments are likely to be inevitable, and it would help if services could devise suitable contingency plans in order to minimise any potential financial loss (CMOC 31).

4.2 Dental anxiety/phobia

Many YAEH suffer from dental anxiety/phobia, and encouraging them to attend with a trusted chaperone can be particularly beneficial (CMOC 34). If dental services reduce waiting

times and eliminate fear-triggering stimuli (such as drill noises) from their waiting area, it can reduce triggering of dental anxiety (CMOCs 35-36). Members of staff can also help by building good rapport with anxious/phobic patients (as described in sections 4.3-4.4), as it allows individuals to develop better trust and feel more at ease. Building rapport also allows staff to better understand anxious young adults' dental needs, and develop more personalised plans to meet them (CMOC 37 & 39). Lack of information is a strong source of dental anxiety, and providing adequate information to such patients can help them prepare and reduce fear of the unknown (CMOC 38). Finally, if staff members are able to manage interactions with anxious young adults in a confident and skilful manner, they will likely feel less anxious and more reassured by the staff (CMOC 40).

4.3-4.4 Initial interaction & building rapport

When YAEH first enter dental services, they are most likely to be greeted by the reception team; much of the literature highlights this stage as important. Due to the high levels of stigmatisation and negative attitudes faced by this group, reception staff should make young adults feel at ease, welcome and accepted. This can be achieved by employing a friendly and welcoming approach, being respectful and non-judgmental (CMOCs 41-44). Avoiding negative labels (during conversations or written documents) such as 'homeless' or 'addict' and using more positive labels can help patients to gain a more positive sense of self, and in turn be more likely to improve their oral health (CMOC 45-46).

Building rapport can be an important motivation for YAEH to attend dental services, as it allows development of a strong relationship and trust (CMOCs 48 & 50). Services can improve this by assigning the same member of staff to individuals where possible (CMOC 51). Having strong communication skills and maintaining communication with young adults outside of their dental appointments (such as via text messages or emails) can also help YAEH develop a more long-term connection with the service (CMOCs 47 & 52). Whilst some YAEH may occasionally display unexpected behaviour, tolerating a certain amount of unpredictability can help to further develop trust and improve relationships (CMOC 53).

Finally, maintaining balance between directly supporting young adults and giving them the opportunity to develop their own skills can help them feel more empowered, take responsibility and develop their confidence (CMOC 54). If staff can recognise achievements

of individuals and give positive feedback, it can further help them feel motivated and confident to improve their oral health (CMOC 55).

4.4 Patient assessment

Homelessness amongst young adults is often a journey with different stages. Some young adults may be at the start of their homeless journey, others established and some recovering from homelessness. YAEH in different stages are likely to have different requirements and motivations. Assessing patient motivations and preferences for dental care can enable services to tailor care around individual needs (CMOCs 56-57). One example is prioritising appearance and function of the dentition, which is often an important priority for many young adults and can help encourage attendance (CMOC 58).

4.5 Explaining rules & policies

If members of staff communicate effectively with YAEH, they can develop stronger relationships and help individuals feel more understood (CMOC 59). It is also important for staff to be clear and upfront about what they can and cannot provide, so that patients will know what to expect, and there will be fewer opportunities for misunderstanding (CMOC 60). An area that is important in communication is addressing concerns of YAEH. One example of this is in terms of confidentiality, as many young adults would utilise services only once they are reassured that their information is not shared with anyone (CMOC 61).

Discussion

Summary of findings

Our findings indicate that access to dental services for YAEH requires multiple interventions directed at different levels and individuals (such as practice policy, staff and YAEH). We have divided the steps that dental services must undertake under four categories of: service preparation; providing information; outreach activities and attendance at the dental service (Figure 2b). The most important components of preparing a service include establishing an organisational structure that is conducive to access for YAEH, followed by appropriate training and consideration of staff requirements and concerns. In terms of providing information, services should bear in mind the importance of producing and disseminating information using methods that are preferred and understood by YAEH, so they can utilise it more readily. Outreach is an importance component of dental care for homeless populations,

and should be carried out in a safe, comfortable environment and using communication that is respectful and sensitive. YAEHs' experiences when they attend a dental service have a strong influence on whether or not they will return. Ensuring that staff members respect, welcome and treat all individuals in the same manner is highly important. Building rapport and continuity of care with the same member of staff help to put young adults at ease and develop trust. Having strong communication skills, clarity of rules and policies, ensuring confidentiality and taking into account patient preferences and priorities in treatment planning are all important steps.

Comparison with existing literature

The findings of this research are in line with recent systematic reviews on homelessness and dentistry ^{11,15}. Similar to our findings, these reviews had identified the importance of flexible appointment systems ^{11,15}, collaboration between services ^{11,15}, providing adequate information ¹¹, approachable and non-judgmental staff encounters ¹¹, patient feedback ¹¹ and support from service managers ¹¹. Our study has contributed by specifically focusing on young adults, including all study designs/methodologies and conducting additional search of homeless youth intervention literature. We were therefore able to develop new knowledge that can be used to provide recommendations specific to this age group.

A number of well-known theories and explanations have also been developed in the past regarding access to dental and health services ^{16,17,18}. We were able to incorporate some of these in our programme theory, in order to provide a more consolidated understanding of the complexity of access for YAEH.

Implications for policy and practice

We used the in-depth understanding of access for YAEH captured in our revised programme theory (Appendix 10) to develop a summary of recommendations (Table 3). Our revised programme theory enables different stakeholders to obtain an overview of where and why challenges may occur in service provision – something not possible until now. We recognise the limitations of the current dental remuneration system for providing adequate dental care for YAEH who often have more complex needs, and realise that not all dental providers will need to address each and every part of these recommendations.

Implications for future research

We recommend that future research focus more closely on YAEH's experiences of accessing dental services. This would help to explore the cumulative effect of intersectional social disadvantage, and allow researchers and service providers to devise sensitive and effective responses accordingly. We recommend researchers to consider employing theoretical, interpretive and interdisciplinary approaches that can help to better incorporate complexities. Involving YAEH in initial stages of designing research would help develop recommendations that are closer to real life circumstances. We would also suggest authors to include more information about processes (such as why and how steps were carried out), as this would provide helpful data for future interpretive research methods.

Strengths and limitations

The findings of this study are based on a detailed review of the literature; we plan to further develop these by undertaking a realist evaluation (involving primary data collection). This is the first UK and second worldwide study ¹⁹ to focus on dental access of young adults with experience of homelessness. It is also the first realist synthesis of dental access. One strength of a realist synthesis is incorporating findings from a range of sources including additional searches and grey literature. This allowed us to maximise use of relevant data for PT development. Our extensive use of substantive theory enabled further development and consolidation of interpretations (Appendix 7). The CMOCs in this synthesis were generally developed from more than one source of evidence, which helped to strengthen plausibility and coherence of our interpretations (Appendix 9). Identification of underlying causal mechanisms allows those aspects of our findings that are relevant to other settings to be transferable ¹². This is more likely to be the case for other developed countries ²⁰ that share certain socio-political characteristics despite differences in dental care systems.

The findings of this realist synthesis are dependent on the quality and availability of relevant literature. Due to the focus of literature on certain topics, we found greater amounts of data in support of some sections of our programme theory than others. Where there was very limited or no data were available, we compensated by undertaking additional and grey literature searches. Despite this, some gaps still exist in our revised PT and we recognise that our findings are not comprehensive. We also recognise that realist syntheses depend on interpretations by researchers of data, and findings will be to some extent impacted by researchers' backgrounds (Table 1). The diverse expertise and transparent communication of

our research team helped in mitigating this impact. Whilst we were able to inform our initial PT using input from service providers and users, we were not able to recruit an expert advisory group for the entire duration of our study; this was largely due to financial constraints.

Conclusion

We have identified a number of evidence-based interventions that are likely to improve dental access of young adults with experience of homelessness. It is important for services to be prepared before an individual attends. Services must consider the importance of outreach activities, provide suitable information and create an enabling environment where possible. We recognise that some of our recommendations can be implemented by dental services alone, while others are likely to require more upstream interventions and further governmental and policy support.

Acknowledgements

We would like to thank all of the stakeholders and service users who helped to shape the direction of this realist synthesis. We would also like to thank Ms. Nia Roberts, who acted as the expert information specialist and Ms. Alexandra Jager, who acted as second reviewer for screening of documents used in this research.

Funding

This work was part of M.A.'s PhD research degree, which is funded by the University of Oxford Clarendon Scholarship.

Ethics approval and consent to participate

Not applicable as this is a synthesis of existing literature.

Competing interests

GW is: Deputy Chair of the United Kingdom's National Institute for Health Research Health Technology Assessment Prioritisation Committee: Integrated Community Health and Social Care (A) and a member of the Methods Group (A). The other authors declare that they have no competing interests.

Author contribution

All authors were involved in the conceptualization of the paper, drafting and critically reviewing the manuscripts. All authors reviewed and approved the final manuscript.

References

1. This is England: a picture of homelessness in 2019. The numbers behind the story. Shelter 2019. (Available online):
https://assets.ctfassets.net/6sxvmndnnpn0s/1QzOPPJc0PD2R5OzhUNJUo/cbe3cc028eae31d333645d892006b3c/This_is_England_A_picture_of_homelessness_in_2019.pdf
2. Statutory Homelessness Annual Report, 2019-20, England. (Available online):
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/923123/Annual_Statutory_Homelessness_Release_2019-20.pdf
3. Homelessness: applying all our health. 2019. (Available online):
<https://www.gov.uk/government/publications/homelessness-applying-all-our-health/homelessness-applying-all-our-health>
4. Flanagan SM, Hancock B. 'Reaching the hard to reach' — lessons learned from the VCS (voluntary and community Sector). A qualitative study. *BMC Health Serv Res* 2010; 10: 92.
5. Homelessness: Rapid Evidence Assessment. 2019. (Available online):
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/793471/Homelessness_-_REA.pdf
6. Centrepoint charity, databank of youth homelessness. (Available online):
<https://centrepoint.org.uk/databank/>
7. Watts EE, Johnsen S, Sosenko F. Youth homelessness in the UK: A review of the OVO Foundation. Heriot-Watt University, Edinburgh 2015;141p.

8. Simons D, Pearson N, Movasaghi Z. Developing dental services for homeless people in East London. *Br Dent J* 2012; 213:E11.
9. British Dental Association. Dental care for homeless people. BDA, London. 2003. (Available online): https://bda.org/dentists/policy-campaigns/research/patient-care/Documents/homeless_dec20_2003.pdf.
10. A. Healthy Mouths: A peer-led health audit on the oral health of people experiencing homelessness. Groundswell. 2017. (Available online): <https://groundswell.org.uk/wp-content/uploads/2018/10/Groundswell-Healthy-Mouths-Report-Full-Report-Web.pdf>
11. Paisi M, Kay E, Plessas A, Burns L, Quinn C, Brennan N, White S. Barriers and enablers to accessing dental services for people experiencing homelessness: A systematic review. *Community Dent Oral Epidemiol.* 2019; 47: 103-111.
12. Pawson R, Greenhalgh T, Harvey G, Walshe K. Realist synthesis: an introduction. RMP Methods Paper 2/2004.
13. RAMESES Project. Realist synthesis: RAMESES Training Materials. 2013. (Available online): https://www.ramesesproject.org/media/Realist_reviews_training_materials.pdf
14. Wong G, Greenhalgh T, Westhorp G, Buckingham J, Pawson R. RAMESES publication standards: realist syntheses. *BMC Med* 2013; 11, 21
15. Goode J, Hoang H, Crocombe L. Homeless adults' access to dental services and strategies to improve their oral health: a systematic literature review. *Aust J Prim Health.* 2018; 24: 287-298.
16. Shahid M, Shum JH, Tadakamadla SK, Kroon J, Peres MA. Theoretical evidence explaining the relationship between socio-demographic and psychosocial barriers on

access to oral health care among adults: A scoping review. *Journal of Dentistry* 2021; 107:103606.

17. Gelberg L, Andersen RM, Leake BD. The Behavioral Model for Vulnerable Populations: application to medical care use and outcomes for homeless people. *Health Serv. Res.* 2000; 34: 1273–1302.
18. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health.* 2013; 12,18.
19. Stormon N, Pateman K, Smith P, Callander A, Ford PJ. Evaluation of a community based dental clinic for youth experiencing homelessness in Brisbane. *Health Soc Care Community.* 2019; 27:241–248.
20. World Economic Situation and Prospects. United Nations, New York, 2020. (Available online): https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2020_Annex.pdf
21. Wong G. Data gathering in realist reviews: looking for needles in haystacks. In: Emmel N, Greenhalgh J, Manzano A, Monaghan M, Dalkin S, editors. *Doing realist research*. London: Sage; 2019.
22. Papoutsis C, Mattick K, Pearson M, Brennan N, Briscoe S, Wong G. Social and professional influences on antimicrobial prescribing for doctors-in-training: a realist review. *J Antimicrob Chemother.* 2017; 72: 2418-2430.

Table 1. Stages of realist synthesis

<p>Stage 1: locating existing theories</p>	<p>We aimed to identify a range of possible explanations about improving access of YAEH to primary care dental services. This was done via discussions amongst the research team, exploratory search of the literature, consultation with stakeholders / ex-homeless individuals and purposive searching for relevant substantive theories. Our research team comprised of a multi-disciplinary group with expertise in primary healthcare, dental public health, special care dentistry, health inequalities (including homelessness) and realist approaches. We used our findings to develop an Initial Programme Theory, which was used as a preliminary framework and guide for subsequent searches. It was populated with evidence and refined iteratively throughout the realist synthesis ¹².</p>
<p>Stage 2. Searching for evidence</p>	<p><u>Main search</u></p> <p>We conducted a systematic search of all scientific literature in fields of homelessness AND dentistry. We first developed our search strategy using guidance from an expert information specialist and a closely related systematic review ¹¹ (Appendix 1). We then carried out a comprehensive search of the following databases: Medline, ASSIA, Global Health, PsycINFO, Scopus, Social Services Abstracts and Web of Science. Additional literature was identified using supplementary search methods such as forward citation tracking (snowballing), personal contacts and networks.</p> <p><u>Additional search: homeless youth interventions</u></p> <p>Our search of the literature on homelessness and dentistry revealed little that was specific to YAEH. To find data relevant to YAEH, we developed a different set of search terms based on 'homeless youth interventions', as we judged that this was close enough to our area of research that similar mechanisms might be in operation. We then carried out a comprehensive search of Global Health, Medline, PsycINFO, Scopus and Web of Science databases (Appendix 2).</p>

	<p><u>Grey literature search</u></p> <p>We included any documents, reports, evaluations, news articles, websites and policy documents that contributed toward the programme theory (PT). We carried out Google searches and targeted search of well known information sites relevant to this topic; including NHS Digital, Open Grey, TRIP Database, The King's Fund, Public Health England, NICE, Dentistry magazine, Homeless Link and Pathway.</p>
Stage 3. Document selection and appraisal	<p>We used our study selection criteria (Table 2) to conduct screening in two stages:</p> <ol style="list-style-type: none"> 1. All retrieved documents were exported onto Rayyan QCRI. M.A screened all titles, abstracts and keywords for eligibility. A second reviewer screened a random 10% subsample of these documents 2. M.A reviewed full-text versions of all documents selected in stage 1. The same second reviewer independently screened a random 10% subsample of all full-texts <p>We selected articles based on their relevance (ability to provide data for theory testing and development) and rigour. Judgements of rigour were made at the level of the programme theory. We judged the plausibility and coherence of the programme theory using the criteria of consilience, simplicity and analogy ²¹.</p>
Stage 4. Data extraction and organisation	<p>M.A carried out data extraction and organisation of included documents (Appendix 3). Main document characteristics were entered onto an Excel spreadsheet (Appendix 4).</p> <p>For additional and grey literature searches, we stopped data extraction at the point of theoretical saturation. This was defined as the point where no significant new theoretical insights were emerging from the data ¹².</p>

<p>Stage 5. Synthesising the evidence</p>	<p>Working across and within coded data extracts, context–mechanism–outcome configurations (CMOCs) were developed as part of an iterative and retroductive development of causal explanations (Appendices 5 & 6). We used a range of relevant substantive theories (Appendix 7), which enabled us to enhance the plausibility and coherence of arguments that underpinned our CMOCs and PT ²². Where data were incorporated from other countries and/or sources outside of the homeless dental literature, we used abstraction to extract their transferrable components and synthesise these to provide a more general explanation that was applicable to the UK context ¹².</p>
<p>Definitions ¹³</p>	<p>Context: Can take on a multitude of forms. Broadly speaking, it is the ‘surroundings’ of an intervention or programme, and can include social or geographical features, make-up of participants, population profiles and conditions in which subjects seek to enact their choices.</p> <p>Mechanism: an underlying generative process that leads to outcomes. It cannot usually be directly observed.</p> <p>Outcome: the result of a process. In the case of realist reviews and evaluations, the outcome is the result of the interaction between context and mechanism.</p> <p>Programme Theory: an abstracted description and/or diagram that proposes what a programme (or family of programmes) comprises and how it is expected to work.</p> <p>Context-mechanism-outcome configuration: A statement that explains how an outcome is caused (O) ‘because of the action of some underlying mechanisms (M), which only comes into operation in particular contexts (C)’.</p>

Table 2. Study selection criteria

Inclusion	Exclusion
<p>All study designs and methodologies (including all types of primary research, opinions, reviews and reports)</p> <p>Any date</p> <p>All age groups</p> <p>Full-text available in English</p> <p>All categories of 'homelessness' and 'dentistry' (main search)</p> <p>Or</p> <p>'Homeless youth interventions' (additional search)</p> <p>Carried out in UK or other countries classified as developed economies (excluding Japan) by the United Nations ²⁰</p>	<p>Not carried out in UK or other countries classified as developed economies (excluding Japan) by the United Nations ²⁰</p>

Table 3. Summary of recommendations for policy and practice

Recommendations for policy & practice	Examples of Potentially useful intervention strategies derived from the literature	Informed by CMOCs in PT
1. Be prepared	<ul style="list-style-type: none"> • Identify and plan for YAEH's need for emergency dental care • Prepare and incorporate safety measures for staff and patients • Prepare/train staff to interact with YAEH • Remind YAEH about their appointments • Have contingency plans for missed appointments 	7, 9, 25, 32, 33, 36, 40, 53
2. Be informative and reassuring	<ul style="list-style-type: none"> • Identify information needs of YAEH • Produce information in a language and format that YAEH can understand • Provide adequate information during personal interactions (such as about registration requirements and costs) • Use dissemination methods that are most often used by young adults • Communicate clearly • Be upfront & honest about what can and cannot be provided • Pay attention to information needs of anxious/phobic patients 	13, 14, 15, 16, 17, 19, 38, 60
3. Create a positive experience for YAEH	<ul style="list-style-type: none"> • Avoid use of negative labels • Positively encourage individuals • Provide constructive feedback • Improve appearance of dentition • Create positive changes in waiting rooms 	23, 35, 45, 46, 48, 55, 58

4. Implement a flexible and patient-centered system	<ul style="list-style-type: none"> • Allow YAEH to attend with a chaperone • Prioritise care that is most important to the individual • Adjust treatment plans to circumstances of each individual (i.e. plan shorter, simpler treatments if needed) 	18, 24, 26, 27, 28, 29, 34, 37, 56, 57
5. Create an enabling environment	<ul style="list-style-type: none"> • Create a safe environment where individuals can develop relationships & share experiences • Avoid judgment, promote trust, establish rapport and promote long-term relationships with YAEH • Establish networks with other dental and non-dental services • Undertake outreach activities 	8, 11, 21, 22, 39, 41, 42, 43, 44, 47, 49, 50, 51, 52, 61
6. Have realistic expectations	<ul style="list-style-type: none"> • Recognise challenges facing YAEH • Distinguish between ‘gold standard’ treatment planning and one that best meets the needs of the individual at that time 	2, 3, 30, 31
7. Empower YAEH	<ul style="list-style-type: none"> • Maintain a balance between supporting YAEH and allowing them to develop their own skills • Use positive encouragement and constructive feedback • Ask for YAEH’s views and feedback when designing dental services • Demonstrate effectiveness and benefits of feedback to individuals 	4, 12, 54

List of figure and table captions

Fig. 1. Realist synthesis search processes and results

Fig. 2. The initial programme theory (Figure 2a) was iteratively refined using data from included articles to produce the revised programme theory (Figure 2b)

Table 1. Stages of realist synthesis

Table 2. Study selection criteria

Table 3. Summary of recommendations for policy and practice