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Non-dental primary care providers and oral health services in Australian rural and remote communities: a qualitative study

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Abstract

Objectives: To investigate the challenges of providing oral health advice/treatment experienced by non-dental primary care providers in rural and remote areas with no resident dentist and their views on ways in which oral health and oral health services could be improved for their communities.

Design: Qualitative study with semi-structured interviews and thematic analysis.

Setting: Four remote communities in outback Queensland, Australia.

Participants: 35 primary care providers who had experienced in providing oral health advice to patients and four dental care providers who had provided oral health services to patients from the four communities.

Results: In the absence of a resident dentist, rural and remote residents did present to non-dental primary care providers with oral health problems such as toothache, abscess, oral/gum infection and sore mouth for treatment and advice. Themes emerged from the interview data around communication challenges and strategies to improve oral health. Although, non-dental care providers commonly advised patients to see a dentist, they rarely communicated with the dentist in the nearest regional town. Participants proposed that oral health could be improved by: enabling access to dental practitioners, educating communities on preventive oral health care and building the skills and knowledge base of non-dental primary care providers in the field of oral health.

Conclusions: Prevention is a cornerstone to better oral health in rural and remote as well as more urbanised communities. Strategies to improve the provision of dental services by either visiting or resident dental practitioners should include scope to provide community based oral health promotion activities and to engage more closely with other primary care service providers in these small communities.

Strengths and limitations of this study

- The use of qualitative methods provided opportunities to explore the challenges of providing oral health advice experienced by non-dental primary care providers.
- This is the first qualitative study to include a wide range of health professionals working in rural areas and explore their views on strategies to improve oral health in rural areas.
- Whilst our findings are limited to data obtained from interested participants who worked in mainstream health care facilities in only four communities in one state of Australia, a strength of the study was that these views were triangulated by interviews with dental practitioners.

Introduction

In Australia, around one-third of the population reside in rural and remote areas. Residents in these areas have poorer health outcomes and less access to health care services than people living in major cities [1]. Both Aboriginal and non-indigenous people are also at risk of poorer oral health outcomes [2], experience higher rates of dental caries than their city counterparts [3] and are more likely to present to dentists for problems such as pain, than residents of major cities [4]. There is no single factor that completely explains this however access to dental services is a key factor. Australia has a maldistribution of dental practitioners [5, 6]. There are more than three times as many dentists practising per 100,000 population in major cities (59.5) than in remote/very remote areas (17.9) [5]. The proportions of other types of dental practitioners including dental therapists and prosthetists are also the lowest in remote/very remote areas [5].

Towns in many rural and remote areas in Australia are often widely dispersed and lack the population base to warrant a full-time dentist. In the absence of a resident dentist, patients with an acute oral health problem may present to other primary care providers located in general medical practices [7], hospital emergency departments (ED) [7-9], pharmacies [10] or to an Aboriginal Health Centre [11, 12]. Non-dental practitioners are usually able to provide only temporary relief of symptoms and referral rather than definitive treatment [7, 10, 13].

Presentations to an ED may result in admission for treatment, especially where there is concern that the patients' condition may deteriorate. Over 2012-2013, dental conditions accounted for 63,000 avoidable hospital admissions, the third highest reason for acute preventable hospital admissions in Australia. These admission rates were higher in non-metropolitan areas and highest for very remote areas [14].

Oral health services in Australia are provided by both public (government) and private sectors [15]. In 2010, about 50% of all people aged 5 and over had some level of private health insurance cover for dental services [16]. Public (low cost or fully subsidised) oral health services are provided for children up to 18 years old and adults with health care concession cards [15]. In the absence of a dental practice in their own or a nearby community, rural and remote residents' dental needs may be met, in part, by visiting mobile facilities or periodic "fly-in: fly-out" services. Residents may also access a dental practitioner by travelling to a larger population centre though regular attendance can be difficult because of costs associated with travel (which can be many hundreds of kilometres), time off work, juggling the responsibilities associated with caring for dependents and, for those with less than adequate health insurance cover, the fees involved, especially when return visits are required for optimal treatment.

Given this context and limited research on the views of rural non-primary care providers in the literature, this study investigated the challenges experienced by the non-

dental primary care providers in four outback towns and their views on ways in which oral health and oral health services could be improved for their communities. In this report, the term "primary care provider" refers to the range of health care workers whose role includes being a first point contact for patients with a health issue or problem.

Methods

Study design

We conducted a qualitative study with primary and dental care providers who had experienced in providing oral health advice and treatment to patients in rural and remote communities. Semi-structured interviews were used to explore their perspectives on oral health in rural areas as they were main health care providers for people with oral health problems in rural areas.

Study sites

The chief dental officer who was responsible for the delivery of public oral health services in Queensland, Australia was invited to identify rural/remote communities (Australian Standard Geographical Classification Remoteness Areas - ASGC RA 4 and 5) in which there was: no resident dentist/dental surgery, at least one general medical (GP) practice, a health care facility and a pharmacy. A convenience sample of four communities were then selected after verification that each met the study inclusion criteria. A public dentist visited two communities to treat eligible patients e.g. children and those with health care concession cards. The other two communities were visited by a private dentist (for private patients) once a month. Residents of the four communities could travel to the nearest regional centre to access both public and private dental services **(**Table 1).

Table 1. Characteristics of study sites

Town	Population	Proportion of Aboriginal and Torres Strait Islander people	Nearest dental surgery (kms)	ASGC	Visiting dental services	Median weekly household income*
Town A	<2000	30.8%	199	RA5-Very Remote	By a private dentist once a month	$874
Town B	<1000	10.9%	87	RA4-Remote	By a private dentist once a month	$835
Town C	<1000	11.2%	210	RA5-Very Remote	By a public dentist every 3 months	$928
Town D	<3500	17.5%	195	RA4-Remote	By a public dentist once a month	$1,046

* *Australian weekly average $1,234* (ABS, 2014)

Participants

Primary and oral health care providers who had experienced in providing oral health advice and treatment to patients in the four communities were included in this study. Primary care providers were recruited through the managers of the GP (medical) practice, pharmacy, hospital and other health care services of the four communities. The managers were asked to identify staff who had been involved in providing advice to a patient with an oral health

problem and forward to them with a study information package that included an invitation to contact the research team should they be willing to participate in a semi-structured interview. Dental care providers identified by the non-dental participants, were also subsequently recruited through a snow ball sampling technique. They had provided dental services to patients from the communities sampled.

Data collection

The interview guide was developed from our literature review [13] and discussion among the team then piloted with a rural dentist and a pharmacist. The guide included items on: the profile of the practice; participants' professional background; information on the number of people who requested oral health advice or treatment; treatment/advice provided and their level of confidence with this; the communication they had with dental practitioners and their views on strategies that could improve oral health in their community. Three authors (TB, HH and JS) conducted all the interviews and focus groups using the interview guide in the participants' workplace between October 2013 and March 2014. The interviews/focus groups lasted from 30 to 60 minutes.

Data analysis

Interviews were audio recorded and transcribed verbatim into Microsoft Word and then cross checked by HH and JS against audio recordings for errors. Each participant was assigned a numerical code to maintain confidentiality. The data were then imported into QSR - NVivo v10.0 software [17] to assist with the analysis. The interview data were analysed by HH and JS using thematic analysis [18] to identify key patterns, trends in the data and recurring themes. Broad categories were first identified within an overall schema. Then a detailed series of hierarchical themes and sub-themes were developed. Data were coded and, where necessary, extra themes were built into the schema.

Study trustworthiness

The trustworthiness of the study was ensured by establishing credibility, dependability and confirmability. According to Lincoln and Guba[19] one of most important aspects in establishing trustworthiness is ensuring credibility. In this study credibility was ensured by triangulation which used different data collection strategies including field notes, focus groups and individual interviews [20] and involved a range of participants in different sites. Field notes were taken during each interview and then compared with interview transcripts for discrepancies. Viewpoints and experiences of primary care providers were triangulated with that of dental care providers. Site triangulation were achieved where similar results emerged at different sites [21]. In addition, participants were offered the opportunity to review their interview transcripts to check that their words matched what they wanted to say. Furthermore, sufficient contextual information on the study sites was provided to help the reader relate to the actual contexts under investigation and make a transfer to similar situations. Dependability and confirmability of the study were also established. Two researchers (HH and JS) coded the interview data independently for cross-validation purposes. The coding results were compared and discussed at regular meetings involving all researchers until consensus was reached.

Ethics considerations

Ethics approval for the study was granted by the Human Research Ethics Committee (Tasmania) Network. This study was a part of a wider research project investigating the relationship of dental practitioners to primary care networks in three different states in Australia. Participants provided written consent prior to interviews.

Results

Two focus groups and 19 individual interviews were conducted with 39 participants including 35 primary and 4 dental care providers. Of the 39 participants, 24 were females and

15 males. Eighteen (18) participants aged over 40 years and 21 participants aged between 18 and 40 years. Nearly half of the participants (19) had been in the current practice for one to five years and six participants for more than five years. This is shown in Table 2.

Table 2 Characteristics of participants (N=39)

Characteristic	Number (%)
Sex	
• Female	24 (61.5)
• Male	15 (38.5)
Age groups	
• 18-30	9 (23.1)
• 31-40	12 (30.8)
• 41-50	10 (25.6)
• Over 50	8 (20.5)
Primary Care Provider*	
• General Practitioner (GP)	12 (30.8)
• Pharmacist	6 (15.4)
• Practice manager	4 (10.3)
• Child Health Nurse/Nurse	3(7.7)
• Manager/Director of Nursing	3 (7.7)
• Receptionist	3 (7.7)
• Medical student	3 (7.7)
• Speech Therapist	1 (2.6)
Dental Care Provider	
• Dentist	3 (7.7)
• Dental nurse	1 (2.6)
Years in current practice	
• < 1 month	5 (12.8)
• 1 to 12 months	9 (23.1)
• >1year to 5 years	19 (48.7)
• >5 years	6 (15.4)

*Term broadly defined

A number of themes and sub-themes emerged from the interview data as illustrated in Table 3 and discussed below.

Table 3 Common themes and subthemes

Themes	Subthemes
Challenges faced	- Oral health problems presentations - Oral health advice - Confidence in providing advice - Travel and cost
Communication and referral pathways	- Lack of communication between primary and dental care teams - Referral pathways
Strategies to improve oral health	- Oral health promotion - Dental workforce and service provision - Education and training

Challenges faced

Oral health problems presentations: All participants reported they had seen patients with oral health problems though there was variation in the frequency of presentations across each community and practice site (appendix 1). GP practices reported seeing people with oral health problems from "everyday" to "one per month", hospitals from "very common" to "4 in a month", pharmacies from "10-15 per week" to "1 a month". The most common oral health problems were: toothache, abscess, oral/gum infections, sore mouth and trauma.

> *... We see a lot of adults and children usually with pain, abscesses or broken teeth. They come to us because there is not a dentist and they need pain relief or antibiotics. (Nurse, female, 45 yo)*

Recidivism was also apparent. Delay or failure to obtain follow-up treatment with a dentist meant that participants may see the same patient a number of times:

..... I see people that have had dental pain again and again on the scripts. I look through their notes and see that they had dental pain here, here and here. So dental care is generally very poor from an individual basis. (GP, male, 42 yo)

Oral health advice: The treatment and/or advice provided by primary health care providers were influenced by their professional background. Many (14) included as part of their advice, a recommendation that the patient see a dentist. GPs were most likely to provide short term pain relief (11) and provide prescriptions for antibiotics (8) and other participants advised patients to see a doctor (8). Some also provided oral hygiene advice and non-prescription antibacterial medicine.

Confidence in providing advice: Close to half of the primary care providers interviewed indicated that they were "confident" in providing oral health advice and treatment within their scope of practice.

Yes pretty confident with basic dental emergency relief. (GP, male, 42 yo)

However, some acknowledged that they were sometimes "not confident enough" (4) and "not confident" (2) in dealing with oral health presentations.

I must admit, I'm not very knowledgeable; I just think, 'they need painkillers, antibiotics and a dentist'. I certainly don't really know much else, you know? (GP, female, 38 yo)

Travel and cost: Participants were conscious of the difficulty some patients faced when they were advised to see a dentist that necessitated travel to a regional centre, acknowledging that this was "expensive" and given that travel could be "200km each way" on occasion "almost impossible".

.... They don't have a lot of money and a lot of them don't have a vehicle. They will put up with the pain rather than drive for 2 hrs and spend $400 on a tooth. (GP, female, 38 yo)

...even though there may be a service in [regional town] it might be a low income family, it's driving there and driving back. It's expensive to do that. (Nurse, female, 55 yo)

For residents without their own car and especially for older residents who had to rely on their family and friends for transport, travel to a regional centre could be more difficult when public transport to that place was not available:

...there is no public transport to either of those places. (Nurse, female, 45 yo)

...So if they don't have anybody to take them there is really nothing... (Nurse, female, 55 yo)

Communication and referral pathways

Lack of communication between primary and dental care teams: Although non-dental and visiting/regional dental care providers may have seen the same patients, there was little communication between the two teams. Many non-dental care providers were uncertain or not aware of the availability of oral health services provided to their communities such as visiting dental services, the mobile dental van and school dental services.

...and in that [dental] surgery, we don't know when they come. They don't say ok yes we are in this week so we can ring and say we have a patient here with an abscess or with whatever who needs to be seen. (Nurse, female, 45 yo)

The majority of non-dental care providers reported that they would "never" or "rarely" try to contact the dentists in the regional centre/s for advice or to make an appointment for the patient when someone presented to them with an oral health problem.

I would never even think of ringing a dentist now, I just tell the patient to ring and make an appointment. (GP, female, 38 yo)

Distance to the nearest dental surgery and lack of a resident or regular visiting dentist meant that most participants did not know who their nearest dentist was or how to contact them.

> It would be different if you had a relationship with the dentist like if we had a local dentist here you might ring them and say could you fit this patient in… but there is no relationship! *(GP, female, 38 yo)*

In contrast, the three dentists interviewed reported that they did communicate with non-dental care providers. A dentist who had previously serviced one of the communities stated:

> *Yes I introduced myself to the pharmacist and I knew the doctors from the hospital. I didn't actually meet them all in person but just communicated about patients with various diseases. (Dentist, male, 61 yo)*

Referral pathways: Twelve participants made mention of a "central referral unit" in a regional centre for which there was a toll free number for patients or health care providers to call to make appointments to see the public dentist. Many reported they received no feedback on the patients referred to the centre for treatment and complained that "phone messages were not returned". One stated that they learned of the treatment outcomes:

> *Only if I see them [the patient] again or follow-up somehow... It is very unprofessional …not knowing what's going on. (Nurse, female, 55 yo).*

A dental participant explained that there may have been different perceptions of what the central referral unit was and this would have contributed to the expectations primary care providers had of the system:

> *It is basically a 1300 number that they ring up. It is a call centre to be precise, not a central referral unit ….. (Dentist, female, 42yo)*

Strategies to improve oral health

A number of strategies were suggested by the participants to improve oral health care services. These, grouped in order of frequency of comments related to: oral health promotion; dental workforce and service provision; and education and training.

Oral health promotion: Having seen patients with oral health problems, participants observed a lack of oral health knowledge in the community especially among parents.

> *..... Also most families don't know that they should be actually cleaning the child's teeth after them till about the age 8 and like you say half of them might not even have toothbrushes. (Nurse, female, 45 yo)*

Both primary care and dental participants emphasised the importance of educating people from an early age in schools and the community about oral health, "regular check-ups" and preventative dental care.

> *A lot of the people out there don't know the basics. Teach them that and a lot of the bigger dental problems go away. (Dentist, male, 61 yo)*

Some participants mentioned water fluoridation as a strategy to improve oral health:

> *....See most of the people here would only drink tank water so what I was actually asking was is our water fluoridated? Maybe that impacts on our teeth being worse? (Nurse, female, 45 yo)*

Dental workforce and service provision: The difficulty in attracting and retaining a dentist to these small communities was widely acknowledged. Participants therefore recognised the importance of establishing and maintain regular visiting services by dentists. Preference was for such visits to occur "one day a week" instead of "3 days every 3 months" and for dental team visits using a mobile dental truck or caravan towed from community to another. "Get the van to come" was a common suggestion from participants. A number of participants also commented that more transport options could be provided to offset costs and enable patients to travel more easily to and from the nearest regional centre with a resident dentist.

Four participants commented that a "mixed" private and public dentistry model could be an attractive option to encourage dentists to work in a rural town. With this arrangement, a

dentist would work part-time for the public health service whilst retaining private practice privileges to augment their income.

> *The dentist should be allowed to work in both public and private practice. (Pharmacist, male, 28 yo)*

One dentist, who had previously worked with such an arrangement recalled:

> *That's not a bad model to work on, to give the dentists the rights to private practice to work out of the same clinic. (Dentist, male, 61 yo)*

Education and training: To better manage oral health problem presentations, the majority of non-dental primary care providers expressed an interest in further developing their oral health knowledge and skills. Work schedules and competing priorities meant that most GPs and pharmacists preferred shorter courses on practical skills in the management of dental health problems.

> *... a half day or one day course focusing on practical advice to help buy time until a definite treatment can be done by a dentist is what I'd be interested in. (GP, male, 42 yo)*

Discussion

Non-dental primary care providers faced a number of challenges in providing oral health services in rural and remote areas. As found elsewhere, in the absence of a resident dentist and irregularity of visiting dental services, people in the four communities did present to GP practices, local hospitals, pharmacies and Aboriginal Health Centres with a range of oral health problems [9, 10, 12]. Overall, non-dental care providers were reasonably confident in providing oral health advice/treatment within their limited scope of practice. Most were keen to learn more about oral health, acknowledging that this was often a neglected area in undergraduate training [22-24]. The regular inclusion of oral health topics in continuing

education/professional development [25] and staff induction programs may be particularly relevant for those working rural and remote areas.

The study results indicated that little communication occurred between non-dental primary care providers and visiting or regional dental practitioners. Although patients were often referred to a dental service, knowledge about how the system worked and lack of feedback was the cause of some frustration amongst participants, especially when they observed the same patient make repeat presentations. They reported that transport and cost issues that made it difficult for patients to access public dental services in regional centres and insufficient funding for public oral health services compounded the problem. In contrast to the non-dental participant experience, the three dentist participants reported that they did communicate with doctors in these rural areas. A similar finding was reported from a European study [26] which found that the dentists sampled rated their relationship with doctors as good or excellent whilst the doctors rated their relationships with the dentists as non-existent. This suggests that more effective mechanisms could be established to develop a shared understanding of what needs to be communicated and how best to do this in ways that support a more collaborative and holistic approach to oral health care [27]. The establishment and maintenance of effective communication and referral pathways between primary care providers, dental practitioners and the local community would help build confidence in how oral health problems can be more effectively managed and, most importantly, prevented [28].

In the current study, participants detailed a number of strategies that could contribute to better oral health care in their communities. First, educating communities on preventive oral health and providing oral health training for primary care practitioners will benefit both public and private patients. Second, while providing more regular public visiting dental services will better serve public patients, the mixed private-public income model for dentists may also improve services to private patients. Third, providing transport options for rural

patients would improve access to public and private dentists located in larger population centres.

Participants emphasised the importance of oral health promotion and illness prevention. This included water fluoridation, a cost effective, equitable public health intervention, shown to reduce dental caries across the population [29]. Upstream, preventive strategies were seen as critical to improving the oral health status of these communities and the most effective way to reduce problem presentations downstream. A number of these proposed were consistent with the National Oral Health Plan 2014-2023 [30], a policy document that also emphasises the need for oral health promotion, collaboration between health professionals and building the capacity of the non-oral health workforce to support clients with their oral health.

This is the first qualitative study to include a wide range of health professionals working in rural areas and explore their views on strategies to improve oral health in rural areas. Whilst our findings are limited to data obtained from interested participants who worked in mainstream health care facilities in only four communities, a strength of the study was that these views were triangulated by interviews with dental practitioners.

Conclusion

The results highlight the challenges experienced by non-dental primary care providers and their views on how oral health may be improved in rural/remote areas. Better communication and stronger collaborations between mainstream and oral health services may provide additional impetus to oral health promotion initiatives, reduce the discontinuity/disruptions to oral health service provision and help reduce the frequency of problem presentations. Regular training should be available to non-dental care providers in rural areas to build their capacity

and confidence in managing oral health problem presentations. This may also contribute to reducing the burden of preventable hospitalisations due to oral health problems in these areas.

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Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups

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Abstract

Background. Qualitative research explores complex phenomena encountered by clinicians, health care providers, policy makers and consumers. Although partial checklists are available, no consolidated reporting framework exists for any type of qualitative design.

Objective. To develop a checklist for explicit and comprehensive reporting of qualitative studies (indepth interviews and focus groups).

Methods. We performed a comprehensive search in Cochrane and Campbell Protocols, Medline, CINAHL, systematic reviews of qualitative studies, author or reviewer guidelines of major medical journals and reference lists of relevant publications for existing checklists used to assess qualitative studies. Seventy-six items from 22 checklists were compiled into a comprehensive list. All items were grouped into three domains: (i) research team and reflexivity, (ii) study design and (iii) data analysis and reporting. Duplicate items and those that were ambiguous, too broadly defined and impractical to assess were removed.

Results. Items most frequently included in the checklists related to sampling method, setting for data collection, method of data collection, respondent validation of findings, method of recording data, description of the derivation of themes and inclusion of supporting quotations. We grouped all items into three domains: (i) research team and reflexivity, (ii) study design and (iii) data analysis and reporting.

Conclusions. The criteria included in COREQ, a 32-item checklist, can help researchers to report important aspects of the research team, study methods, context of the study, findings, analysis and interpretations.

Keywords: focus groups, interviews, qualitative research, research design

Qualitative research explores complex phenomena encountered by clinicians, health care providers, policy makers and consumers in health care. Poorly designed studies and inadequate reporting can lead to inappropriate application of qualitative research in decision-making, health care, health policy and future research.

Formal reporting guidelines have been developed for randomized controlled trials (CONSORT) [1], diagnostic test studies (STARD), meta-analysis of RCTs (QUOROM) [2], observational studies (STROBE) [3] and meta-analyses of observational studies (MOOSE) [4]. These aim to improve the quality of reporting these study types and allow readers to better understand the design, conduct, analysis and findings of published studies. This process allows users of published research to be more fuller informed when they critically appraise studies relevant to each checklist and decide upon applicability of research findings to their local settings. Empiric studies have shown that the use of the CONSORT statement is associated with improvements in the quality of reports of randomized controlled trials [5]. Systematic reviews of qualitative research almost always show that key aspects of study design are not reported, and so there is a clear need for a CONSORT-equivalent for qualitative research [6].

The Uniform Requirements for Manuscripts Submitted to Biomedical Journals published by the International Committee of Medical Journal Editors (ICMJE) do not provide reporting guidelines for qualitative studies. Of all the mainstream biomedical journals (Fig. 1), only the British Medical Journal (BMJ) has criteria for reviewing qualitative research. However, the guidelines for authors specifically record that the checklist is not routinely used. In addition, the checklist is not comprehensive and does not provide specific guidance to assess some of the criteria. Although checklists for critical appraisal are available for qualitative research, there is no widely endorsed reporting framework for any type of qualitative research [7].

We have developed a formal reporting checklist for in-depth interviews and focus groups, the most common methods for data collection in qualitative health research.

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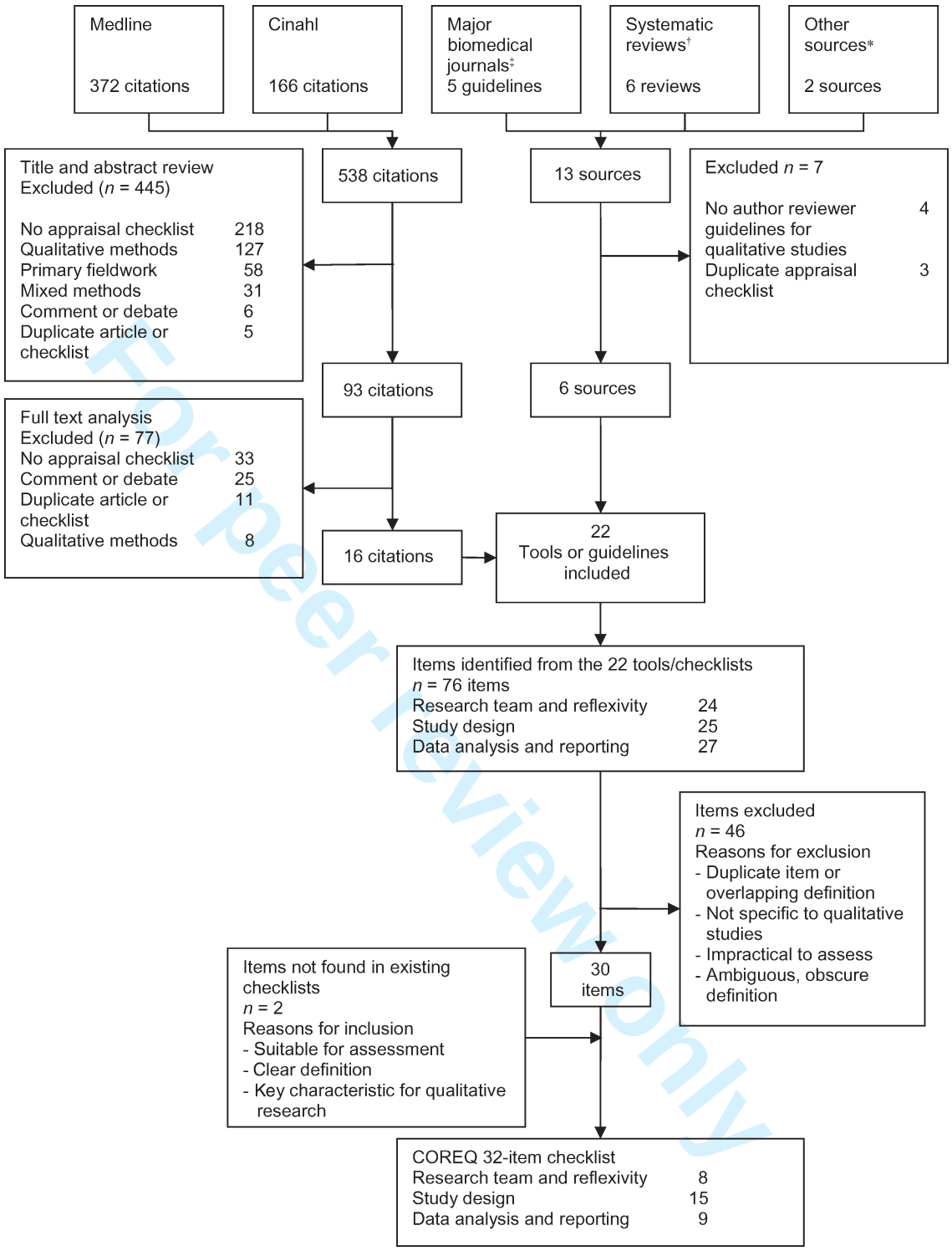

Figure 1 Development of the COREQ Checklist. *References [26, 27], †References [6, 28–32], ‡Author and reviewer guidelines provided by BMJ, JAMA, Lancet, Annals of Internal Medicine, NEJM.

These two methods are particularly useful for eliciting patient and consumer priorities and needs to improve the quality of health care [8]. The checklist aims to promote complete and transparent reporting among researchers and indirectly improve the rigor, comprehensiveness and credibility of interview and focus-group studies.

Basic definitions

Qualitative studies use non-quantitative methods to contribute new knowledge and to provide new perspectives in health care. Although qualitative research encompasses a broad range of study methods, most qualitative research

publications in health care describe the use of interviews and focus groups [8].

Interviews

In-depth and semi-structured interviews explore the experiences of participants and the meanings they attribute to them. Researchers encourage participants to talk about issues pertinent to the research question by asking open-ended questions, usually in one-to-one interviews. The interviewer might re-word, re-order or clarify the questions to further investigate topics introduced by the respondent. In qualitative health research, in-depth interviews are often used to study the experiences and meanings of disease, and to explore personal and sensitive themes. They can also help to identify potentially modifiable factors for improving health care [9].

Focus groups

Focus groups are semi-structured discussions with groups of 4–12 people that aim to explore a specific set of issues [10]. Moderators often commence the focus group by asking broad questions about the topic of interest, before asking the focal questions. Although participants individually answer the facilitator's questions, they are encouraged to talk and interact with each other [11]. This technique is built on the notion that the group interaction encourages respondents to explore and clarify individual and shared perspectives [12]. Focus groups are used to explore views on health issues, programs, interventions and research.

Methods

Development of a checklist

Search strategy. We performed a comprehensive search for published checklists used to assess or review qualitative studies, and guidelines for reporting qualitative studies in: Medline (1966—Week 1 April 2006), CINAHL (1982—Week 3 April 2006), Cochrane and Campbell protocols, systematic reviews of qualitative studies, author or reviewer guidelines of major medical journals and reference lists of relevant publications. We identified the terms used to index the relevant articles already in our possession and performed a broad search using those search terms. The electronic databases were searched using terms and text words for research (standards), health services research (standards) and qualitative studies (evaluation). Duplicate checklists and detailed instructions for conducting and analysing qualitative studies were excluded.

Data extraction. From each of the included publications, we extracted all criteria for assessing or reporting qualitative studies. Seventy-six items from 22 checklists were compiled into a comprehensive list. We recorded the frequency of each item across all the publications. Items most frequently included in the checklists related to sampling method, setting for data collection, method of data collection, respondent validation of findings, method of recording data, description of the derivation of themes and inclusion of supporting quotations. We grouped all items into three domains: (i) research team and reflexivity, (ii) study design and (iii) data analysis and reporting. (see Tables 2–4)

Within each domain we simplified all relevant items by removing duplicates and those that were ambiguous, too broadly defined, not specific to qualitative research, or impractical to assess. Where necessary, the remaining items were rephrased for clarity. Based upon consensus among the authors, two new items that were considered relevant for reporting qualitative research were added. The two new items were identifying the authors who conducted the interview or focus group and reporting the presence of non-participants during the interview or focus group. The COREQ checklist for explicit and comprehensive reporting of qualitative studies consists of 32 criteria, with a descriptor to supplement each item (Table 1).

COREQ: content and rationale (see Tables 1)

Domain 1: research team and reflexivity

(i) Personal characteristics: Qualitative researchers closely engage with the research process and participants and are therefore unable to completely avoid personal bias. Instead researchers should recognize and clarify for readers their identity, credentials, occupation, gender, experience and training. Subsequently this improves the credibility of the findings by giving readers the ability to assess how these factors might have influenced the researchers' observations and interpretations [13–15].

(ii) Relationship with participants: The relationship and extent of interaction between the researcher and their participants should be described as it can have an effect on the participants' responses and also on the researchers' understanding of the phenomena [16]. For example, a clinician–researcher may have a deep understanding of patients' issues but their involvement in patient care may inhibit frank discussion with patient–participants when patients believe that their responses will affect their treatment. For transparency, the investigator should identify and state their assumptions and personal interests in the research topic.

Domain 2: study design

(i) Theoretical framework: Researchers should clarify the theoretical frameworks underpinning their study so readers can understand how the researchers explored their research questions and aims. Theoretical frameworks in qualitative research include: grounded theory, to build theories from the data; ethnography, to understand the culture of groups with shared characteristics; phenomenology, to describe the meaning and significance of experiences; discourse analysis, to analyse linguistic expression; and content analysis, to systematically organize data into a structured format [10].

Table 1 Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD*
3.	Occupation	What was their occupation at the time of the study?
4.	Gender	Was the researcher male or female?
5.	Experience and training	What experience or training did the researcher have?
Relationship with participants		
6.	Relationship established	Was a relationship established prior to study commencement?
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. *personal goals, reasons for doing the research*
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. *Bias, assumptions, reasons and interests in the research topic*
Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis*
Participant selection		
10.	Sampling	How were participants selected? *e.g. purposive, convenience, consecutive, snowball*
11.	Method of approach	How were participants approached? e.g. *face-to-face, telephone, mail, email*
12.	Sample size	How many participants were in the study?
13.	Non-participation	How many people refused to participate or dropped out? Reasons?
Setting		
14.	Setting of data collection	Where was the data collected? e.g. *home, clinic, workplace*
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?
16.	Description of sample	What are the important characteristics of the sample? *e.g. demographic data, date*
Data collection		
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?
20.	Field notes	Were field notes made during and/or after the interview or focus group?
21.	Duration	What was the duration of the interviews or focus group?
22.	Data saturation	Was data saturation discussed?
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?
Domain 3: analysis and findingsz		
Data analysis		
24.	Number of data coders	How many data coders coded the data?
25.	Description of the coding tree	Did authors provide a description of the coding tree?
26.	Derivation of themes	Were themes identified in advance or derived from the data?
27.	Software	What software, if applicable, was used to manage the data?
28.	Participant checking	Did participants provide feedback on the findings?
Reporting		
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. *participant number*
30.	Data and findings consistent	Was there consistency between the data presented and the findings?
31.	Clarity of major themes	Were major themes clearly presented in the findings?
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?

(ii) Participant selection: Researchers should report how participants were selected. Usually purposive sampling is used which involves selecting participants who share particular characteristics and have the potential to provide rich, relevant and diverse data pertinent to the research question [13, 17]. Convenience sampling is less optimal because it may fail to capture important perspectives from difficult-to-reach people [16]. Rigorous attempts to recruit participants and reasons for non-participation should be stated to reduce the likelihood of making unsupported statements [18].

Table 2 Items included in 22 published checklists: Research team and reflexivity domain

Item	References																						
	[26][a]	[27][a]	[6][b]	[28][b]	[32][b]	[13]	[15]	[14]	[17]	[33]	[34]	[35]	[16]	[19]	[36]	[7]	[37]	[23]	[38]	[39]	[22]	BMJ
Research team and reflexivity																						
Nature of relationship between the researcher and participants		•		•	•		•		•						•				•			
Examination of role, bias, influence	•	•			•	•	•	•							•						•	
Description of role		•		•					•	•				•	•					•	•	
Identity of the interviewer		•		•		•					•		•		•							
Continued and prolonged engagement		•				•							•	•					•	•		
Response to events	•	•				•	•	•														
Prior assumptions and experience		•						•									•			•		
Professional status		•					•								•							
Journal, record of personal experience		•								•				•								
Effects of research on researcher		•				•	•															
Qualifications		•													•							
Training of the interviewer/facilitator			•		•																	
Expertise demonstrated		•																	•			
Perception of research at inception								•						•								
Age							•															
Gender							•															
Social class							•															
Reasons for conducting study		•																				
Sufficient contact													•									
Too close to participants													•									
Empathy																	•					
Distance between researcher and participants							•															
Background								•														
Familiarity with setting																					•	

[a]Other publications, [b]Systematic review of qualitative studies; BMJ, British Medical Journal—editor's checklist for appraising qualitative research); •, item included in the checklist.

Table 3 Items included in 22 published checklists: Study design

Item	References																							
	[26][a]	[27][a]	[6][b]	[28] [b]	[32][b]	[13]	[15]	[14]	[17]	[33]	[34]	[35]	[16]	[19]	[36]	[7]	[37]	[23]	[38]	[39]	[22]	BMJ
Study design																						
Methodological orientation, ontological or epistemological basis		•		•				•	•					•					•	•	•	•
Sampling—convenience, purposive	•	•			•	•	•	•	•	•	•	•	•	•		•		•	•	•	•	•
Setting		•		•	•			•			•				•					•		
Characteristics and description of sample		•			•			•			•		•	•								
Reasons for participant selection	•	•				•		•			•											
Non-participation	•	•		•	•																	
Inclusion and exclusion, criteria		•			•	•													•			
Identity of the person responsible for recruitment				•	•						•				•							
Sample size		•		•	•						•										•	
Method of approach		•									•					•						
Description of explanation of research to participants	•				•										•							
Level and type of participation														•								
Method of data collection, e.g. focus group, in-depth interview	•	•	•	•	•	•		•	•		•	•	•	•		•				•	•	
Audio and visual recording	•	•	•	•	•	•				•	•		•						•		•	•
Transcripts			•	•	•	•			•		•		•						•			•
Setting and location	•	•		•	•		•		•		•				•						•	•
Saturation of data	•	•	•			•			•				•	•							•	
Use of a topic guide, tools, questions	•	•	•								•					•			•	•		
Field notes			•	•	•	•													•			•
Changes and modifications	•	•		•	•														•		•	
Duration of interview, focus group		•				•					•									•		
Sensitive to participant language and views		•										•		•								
Number of interviews, focus groups		•				•																
Time span																					•	
Time and resources available to the study		•																				

[a]Other publications, [b]Systematic review of qualitative studies; BMJ, British Medical Journal—editor's checklist for appraising qualitative research; •, item included in the checklist.

Table 4 Items included in 22 published checklists: Analysis and reporting

Item	References																							
	[26][a]	[27][a]	[6][b]	[28][b]	[32][b]	[13]	[15]	[14]	[17]	[33]	[34]	[35]	[16]	[19]	[36]	[7]	[37]	[23]	[38]	[39]	[22]	BMJ
Respondent validation	•	•	•		•		•		•	•			•	•			•	•	•	•		
Limitations and generalizability	•	•		•	•		•		•		•		•	•				•	•			
Triangulation	•	•		•	•	•	•	•	•					•			•		•			
Original data, quotation		•	•	•	•			•	•		•			•		•				•	•	•
Derivation of themes explicit	•	•	•	•	•		•	•			•								•			•
Contradictory, diverse, negative cases	•	•		•	•		•			•				•					•			•
Number of data analysts	•	•	•			•			•			•	•						•			•
In-depth description of analysis	•			•	•			•			•			•							•	•
Sufficient supporting data presented	•	•		•	•		•				•					•						
Data, interpretation and conclusions linked and integrated		•		•	•							•		•						•		
Retain context of data		•					•	•						•					•			
Explicit findings, presented clearly	•	•		•					•	•												
Outside checks													•	•				•	•			
Software used		•				•													•			•
Discussion both for and against the researchers' arguments	•	•		•	•																	
Development of theories, explanations		•					•			•		•										
Numerical data		•									•							•				•
Coding tree or coding system		•					•												•		•	
Inter-observer reliability		•									•										•	
Sufficient insight into meaning/perceptions of participants		•								•												
Reasons for selection of data to support findings		•			•																	
New insight		•						•														
Results interpreted in credible, innovative way									•													
Eliminate other theories													•									
Range of views														•								
Distinguish between researcher and participant voices								•														
Proportion of data taken into account														•								

[a]Other publications, [b]Systematic review of qualitative studies; BMJ, British Medical Journal—editor's checklist for appraising qualitative research, •, item included in the checklist.

Researchers should report the sample size of their study to enable readers to assess the diversity of perspectives included.

(iii) Setting: Researchers should describe the context in which the data were collected because it illuminates why participants responded in a particular way. For instance, participants might be more reserved and feel disempowered talking in a hospital setting. The presence of non-participants during interviews or focus groups should be reported as this can also affect the opinions expressed by participants. For example, parent interviewees might be reluctant to talk on sensitive topics if their children are present. Participant characteristics, such as basic demographic data, should be reported so readers can consider the relevance of the findings and interpretations to their own situation. This also allows readers to assess whether perspectives from different groups were explored and compared, such as patients and health care providers [13, 19].

(iv) Data collection: The questions and prompts used in data collection should be provided to enhance the readers' understanding of the researcher's focus and to give readers the ability to assess whether participants were encouraged to openly convey their viewpoints. Researchers should also report whether repeat interviews were conducted as this can influence the rapport developed between the researcher and participants and affect the richness of data obtained. The method of recording the participants' words should be reported. Generally, audio recording and transcription more accurately reflect the participants' views than contemporaneous researcher notes, more so if participants checked their own transcript for accuracy [19–21]. Reasons for not audio recording should be provided. In addition, field notes maintain contextual details and non-verbal expressions for data analysis and interpretation [19, 22]. Duration of the interview or focus group should be reported as this affects the amount of data obtained. Researchers should also clarify whether participants were recruited until no new relevant knowledge was being obtained from new participants (data saturation) [23, 24].

Domain 3: analysis and findings

(i) Data analysis: Specifying the use of multiple coders or other methods of researcher triangulation can indicate a broader and more complex understanding of the phenomenon. The credibility of the findings can be assessed if the process of coding (selecting significant sections from participant statements), and the derivation and identification of themes are made explicit. Descriptions of coding and memoing demonstrate how the researchers perceived, examined and developed their understanding of the data [17, 19]. Researchers sometimes use software packages to assist with storage, searching and coding of qualitative data. In addition, obtaining feedback from participants on the research findings adds validity to the researcher's interpretations by ensuring that the participants' own meanings and perspectives are represented and not curtailed by the researchers' own agenda and knowledge [23].

(ii) Reporting: If supporting quotations are provided, researchers should include quotations from different participants to add transparency and trustworthiness to their findings and interpretations of the data [17]. Readers should be able to assess the consistency between the data presented and the study findings, including the both major and minor themes. Summary findings, interpretations and theories generated should be clearly presented in qualitative research publications.

Discussion

The COREQ checklist was developed to promote explicit and comprehensive reporting of qualitative studies (interviews and focus groups). The checklist consists of items specific to reporting qualitative studies and precludes generic criteria that are applicable to all types of research reports. COREQ is a comprehensive checklist that covers necessary components of study design, which should be reported. The criteria included in the checklist can help researchers to report important aspects of the research team, study methods, context of the study, findings, analysis and interpretations.

At present, we acknowledge there is no empiric basis that shows that the introduction of COREQ will improve the quality of reporting of qualitative research. However this is no different than when CONSORT, QUOROM and other reporting checklists were introduced. Subsequent research has shown that these checklists have improved the quality of reporting of study types relevant to each checklist [5, 25], and we believe that the effect of COREQ is likely to be similar. Despite differences in the objectives and methods of quantitative and qualitative methods, the underlying aim of transparency in research methods and, at the least, the theoretical possibility of the reader being able to duplicate the study methods should be the aims of both methodological approaches. There is a perception among research funding agencies, clinicians and policy makers, that qualitative research is 'second class' research. Initiatives like COREQ are designed to encourage improvement in the quality of reporting of qualitative studies, which will indirectly lead to improved conduct, and greater recognition of qualitative research as inherently equal scientific endeavor compared with quantitative research that is used to assess the quality and safety of health care. We invite readers to comment on COREQ to improve the checklist.

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Non-dental primary care providers' views on challenges in providing oral health services and strategies to improve oral health in Australian rural and remote communities: a qualitative study

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Non-dental primary care providers' views on challenges in providing oral health services and strategies to improve oral health in Australian rural and remote communities: a qualitative study

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Abstract

Objectives: To investigate the challenges of providing oral health advice/treatment experienced by non-dental primary care providers in rural and remote areas with no resident dentist and their views on ways in which oral health and oral health services could be improved for their communities.

Design: Qualitative study with semi-structured interviews with thematic analysis.

Setting: Four remote communities in outback Queensland, Australia.

Participants: 35 primary care providers who had experience in providing oral health advice to patients and four dental care providers who had provided oral health services to patients from the four communities.

Results: In the absence of a resident dentist, rural and remote residents did present to non-dental primary care providers with oral health problems such as toothache, abscess, oral/gum infection and sore mouth for treatment and advice. Themes emerged from the interview data around communication challenges and strategies to improve oral health. Although, non-dental care providers commonly advised patients to see a dentist, they rarely communicated with the dentist in the nearest regional town. Participants proposed that oral health could be improved by: enabling access to dental practitioners, educating communities on preventive oral health care and building the skills and knowledge base of non-dental primary care providers in the field of oral health.

Conclusions: Prevention is a cornerstone to better oral health in rural and remote as well as more urbanised communities. Strategies to improve the provision of dental services by either visiting or resident dental practitioners should include scope to provide community based oral health promotion activities and to engage more closely with other primary care service providers in these small communities.

Strengths and limitations of this study

- The use of qualitative methods provided opportunities to explore the challenges of providing oral health advice experienced by non-dental primary care providers.
- This is the first qualitative study to include a wide range of health professionals working in rural areas and explore their views on strategies to improve oral health in rural areas.
- Whilst our findings are limited to data obtained from interested participants who worked in mainstream health care facilities in only four communities in one state of Australia, a strength of the study was that these views were triangulated by interviews with dental practitioners who had visited these communities or were from surrounding towns.

Introduction

In Australia, around one-third of the population reside in rural and remote areas. Residents in these areas have poorer health outcomes and less access to health care services than people living in major cities [1]. Both Aboriginal and non-indigenous people are also at risk of poorer oral health outcomes [2], experience higher rates of dental caries than their city counterparts [3] and are more likely to present to dentists for problems such as pain, than residents of major cities [4]. There is no single factor that completely explains this however access to dental services is a key factor. Australia has a maldistribution of dental practitioners [5, 6]. There are more than three times as many dentists practising per 100,000 population in major cities (59.5) than in remote/very remote areas (17.9) [5]. The proportions of other types of dental practitioners including dental therapists and prosthetists are also the lowest in remote/very remote areas [5].

Towns in many rural and remote areas in Australia are often widely dispersed and lack the population base to warrant a full-time dentist. In the absence of a resident dentist, patients with an acute oral health problem may present to other primary care providers located in general medical practices [7], hospital emergency departments (ED) [7-9], pharmacies [10] or to an Aboriginal Health Centre [11, 12]. Non-dental practitioners are usually able to provide only temporary relief of symptoms and referral rather than definitive treatment [7, 10, 13].

Presentations to an ED may result in admission for treatment, especially where there is concern that the patients' condition may deteriorate. Over 2012-2013, dental conditions accounted for 63,000 avoidable hospital admissions, the third highest reason for acute preventable hospital admissions in Australia. These admission rates were higher in non-metropolitan areas and highest for very remote areas [14].

Oral health services in Australia are provided by both public (government) and private sectors [15]. In 2010, about 50% of all people aged 5 and over had some level of private health insurance cover for dental services [16]. Public (low cost or fully subsidised) oral health services are provided for children up to 18 years old and adults with health care concession cards [15]. In the absence of a dental practice in their own or a nearby community, rural and remote residents' dental needs may be met, in part, by visiting mobile facilities or periodic "fly-in: fly-out" services [17]. Residents may also access a dental practitioner by travelling to a larger population centre though regular attendance can be difficult. This is due to costs associated with travel (which can be many hundreds of kilometres), time off work, juggling the responsibilities associated with caring for dependents and, for those with less than adequate health insurance cover, the fees involved, especially when return visits are required for optimal treatment [18].

Limited studies in the literature suggested that rural and remote people presented to non-dental care providers with oral health problems [10, 17]. One study focused on indigenous

residents [17] and the other was limited to the oral health presentations to rural pharmacies [10]. To the best of our knowledge, there is no study investigating challenges that a wide range of non-dental care providers faced in providing oral health advice and their suggestions to improve rural oral health. Their views on these issues could provide insight to informing rural oral health policy and planning. This study investigated the challenges experienced by the non-dental primary care providers in four outback towns and their views on ways in which oral health and oral health services could be improved for their communities. In this report, the term "primary care provider" refers to the range of health care workers whose role includes being a first point of contact for patients with a health issue or problem.

Methods

Study design

We conducted a qualitative study with primary and dental care providers who had experience in providing oral health advice and treatment to patients in rural and remote communities. Semi-structured interviews were used to explore their perspectives on oral health in rural areas as they were the main health care providers for people with oral health problems in rural areas.

Study sites

The chief dental officer who was responsible for the delivery of public oral health services in Queensland, Australia was invited to identify rural/remote communities (Australian Standard Geographical Classification Remoteness Areas - ASGC RA 4 and 5) in which there was: no resident dentist/dental surgery, at least one general medical (GP) practice, a health care facility and a pharmacy. In total 10 communities were identified. Two communities did not meet the study criteria. A convenience sample of four communities in the same region was then selected after verification that each met the study inclusion criteria. A public dentist

visited two communities to treat eligible patients e.g. children and those with health care concession cards. **(**Table 1).

Table 1. Characteristics of study sites

Town	Population	Nearest dental surgery (kms)	ASGC	Visiting dental services
Town A	<2000	199	RA5-Very Remote	By a private dentist once a month
Town B	<1000	87	RA4-Remote	By a private dentist once a month
Town C	<1000	210	RA5-Very Remote	By a public dentist every 3 months
Town D	<3500	195	RA4-Remote	By a public dentist once a month

Source: (ABS, 2014)

Participants

Primary and oral health care providers who had experience in providing oral health advice and treatment to patients in the four communities were included in this study. Primary care providers were recruited through the managers of the GP (medical) practice, pharmacy, hospital and other health care services of the four communities. The managers were asked to identify staff who had been involved in providing advice to a patient with an oral health problem and forward to them a study information package that included an invitation to contact the research team should they be willing to participate in a semi-structured interview.

All identified and invited participants accepted to participate in the interviews. Participants had a choice of having either an individual interview or a group interview. Group interviews were constructed from different health care services. Each group included staff with different occupations such as doctor, pharmacist and nurse from the same health care service.

Dental care providers identified by the non-dental participants, were also subsequently recruited through a snow ball sampling technique. They had provided dental services to patients from the communities sampled.

Data collection

The interview guide was developed from our literature review [13] , discussion amongst the team then piloted with a rural dentist and a pharmacist. Some questions were reworded to make them clearer and some sub-questions added to the interview guide as a result of piloting. For example one sub-question "What kinds of training would up-skill you for the particular needs you face in your community?" was added as suggested by a pilot participant to better explore primary care providers' needs in oral health training.

The guide included items on: the profile of the practice; participants' professional background; information on the number of people who requested oral health advice or treatment; treatment/advice provided and their level of confidence with this; the communication they had with dental practitioners and their views on strategies that could improve oral health in their community. The main questions asked are below:

Q1. Can you estimate how many people present to your practice with oral health problems per month?

Q2. What oral health advice/treatment are these people requesting?

Q3. How do you respond? What actions/s do you take?

Q4. How confident are you in providing oral health care advice?

Q5. In your opinion, what strategies and interventions should be taken to improve oral health services to better meet the needs of your local community?

Q6. To whom you regularly talk when you need to solve an oral health problem for your patient/client? (within and/or outside your practice)

Q7. Could you tell me where the nearest dental surgery is?

Q8. How often do you contact the dental surgery for advice or refer a patient to that surgery? How do you contact them?

Q9. What are their availability and their opening times?

Three authors (TB, HH and JS) conducted all the individual and group interviews using the interview guide in the participants' workplace between October 2013 and March 2014. TB and HH had extensive experiences in conducting individual and group interviews. JS was trained by TB and HH before joining the team to conduct the interviews.

The individual and group interviews lasted from 30 to 60 minutes.

Data analysis

Interviews were audio recorded and transcribed verbatim into Microsoft Word and then cross checked by HH and JS against audio recordings for errors. Each participant was assigned a numerical code to maintain confidentiality. The data were then imported into QSR - NVivo v10.0 software [19] to assist with the analysis. Two authors (HH and JS) had formal training in using Nvivo by Nvivo experts. HH had extensive experiences in analysing qualitative data using Nvivo software package. NVivo software assists researchers to store, code, classify, and sort qualitative data.

The interview data were analysed by HH and JS using thematic analysis [20] to identify key patterns, trends in the data and recurring themes. HH and JS conducted the analysis independently which involved coding the transcripts, categorising the codes and the generation of themes. The data analysed using a combination of a-priori ideas from the

literature review built into the interview guide and the themes 'emerge' from the data. The results were compared and discussed at regular meetings involving all researchers until consensus was reached.

Ethics considerations

Ethics approval for the study was granted by the Human Research Ethics Committee (Tasmania) Network. This study was a part of a wider research project investigating the relationship of dental practitioners to primary care networks in three different states in Australia. Participants provided written consent prior to interviews.

Results

In total 39 participants participated in 25 interviews including 7 group interviews (ranged from 2 to 8 participants). Out of the 25 interviews, 7 group interviews were conducted with 21 non-dental care providers and 18 individual interviews with 14 non-dental care providers and 4 dental care providers. Of the 39 participants, 24 were females and 15 males. Eighteen (18) participants aged over 40 years and 21 participants aged between 18 and 40 years. Nearly half of the participants (19) had been in the current practice for one to five years and six participants for more than five years. This is shown in Table 2.

Table 2 Characteristics of participants (N=39)

Characteristic	Number (%)
Sex	
• Female	24 (61.5)
• Male	15 (38.5)
Age groups	
• 18-30	9 (23.1)
• 31-40	12 (30.8)
• 41-50	10 (25.6)
• Over 50	8 (20.5)
Primary Care Provider*	
• General Practitioner (GP)	12 (30.8)
• Pharmacist	6 (15.4)
• Practice manager	4 (10.3)
• Child Health Nurse/Nurse	3(7.7)
• Manager/Director of Nursing	3 (7.7)
• Receptionist	3 (7.7)
• Medical student	3 (7.7)
• Speech Therapist	1 (2.6)
Dental Care Provider	
• Dentist	3 (7.7)
• Dental nurse	1 (2.6)
Years in current practice	
• < 1 month	5 (12.8)
• 1 to 12 months	9 (23.1)
• >1year to 5 years	19 (48.7)
• >5 years	6 (15.4)

*Term broadly defined

A number of themes and sub-themes emerged from the interview data as illustrated in Table 3 and discussed below.

Table 3 Common themes and subthemes

Themes	Subthemes (number of responses)
Challenges faced	- Oral health problems presentations (35) - Oral health advice (35) - Confidence in providing advice (24) - Travel and cost (15)
Communication and referral pathways	- Referral pathways (12) - Lack of communication between primary and dental care teams (24)
Strategies to improve oral health	- Oral health promotion (18) - Dental workforce (17) and service provision (13) - Education and training (19)

Challenges faced

Oral health problems presentations: All participants reported they had seen patients with oral health problems though there was variation in the frequency of presentations across each community and practice site (appendix 1). GP practices reported seeing people with oral health problems from "everyday" to "one per month", hospitals from "very common" to "4 in a month", pharmacies from "10-15 per week" to "1 a month". The most common oral health problems were: toothache, abscess, oral/gum infections, sore mouth and trauma.

> *... We see a lot of adults and children usually with pain, abscesses or broken teeth. They come to us because there is not a dentist and they need pain relief or antibiotics. (Nurse, female, 45 yo)*

Recidivism was also apparent. Delay or failure to obtain follow-up treatment with a dentist meant that participants may see the same patient a number of times:

..... I see people that have had dental pain again and again on the scripts. I look through their notes and see that they had dental pain here, here and here. So dental care is generally very poor from an individual basis. (GP, male, 42 yo)

Oral health advice: The treatment and/or advice provided by primary health care providers were influenced by their professional background. Many (14) included as part of their advice, a recommendation that the patient see a dentist. GPs were most likely to provide short term pain relief (11) and provide prescriptions for antibiotics (8) and other participants advised patients to see a doctor (8). Some also provided oral hygiene advice and non-prescription antibacterial medicine.

Confidence in providing advice: Close to half of the primary care providers interviewed indicated that they were "confident" in providing oral health advice and treatment within their scope of practice.

Yes pretty confident with basic dental emergency relief. (GP, male, 42 yo)

However, some acknowledged that they were sometimes "not confident enough" (4) and "not confident" (2) in dealing with oral health presentations.

I must admit, I'm not very knowledgeable; I just think, 'they need painkillers, antibiotics and a dentist'. I certainly don't really know much else, you know? (GP, female, 38 yo)

Travel and cost: Participants (15) were conscious of the difficulty some patients faced when they were advised to see a dentist that necessitated travel to a regional centre, acknowledging that this was "expensive" and given that travel could be "200km each way" on occasion "almost impossible".

.... They don't have a lot of money and a lot of them don't have a vehicle. They will put up with the pain rather than drive for 2 hrs and spend $400 on a tooth. (GP, female, 38 yo)

...even though there may be a service in [regional town] it might be a low income family, it's driving there and driving back. It's expensive to do that. (Nurse, female, 55 yo)

For residents without their own car and especially for older residents who had to rely on their family and friends for transport, travel to a regional centre could be more difficult when public transport to that place was not available:

...there is no public transport to either of those places. (Nurse, female, 45 yo)

...So if they don't have anybody to take them there is really nothing... (Nurse, female, 55 yo)

Communication and referral pathways

Referral pathways: Twelve participants made mention of a "central referral unit" in a regional centre for which there was a toll free number for patients or health care providers to call to make appointments to see the public dentist. These participants reported they received no feedback on the patients referred to the centre for treatment and complained that "phone messages were not returned". One stated that they learned of the treatment outcomes:

Only if I see them [the patient] again or follow-up somehow... It is very unprofessional ...not knowing what's going on. (Nurse, female, 55 yo).

A dental participant explained that there may have been different perceptions of what the central referral unit was and this would have contributed to the expectations primary care providers had of the system:

It is basically a 1300 number that they ring up. It is a call centre to be precise, not a central referral unit ..... (Dentist, female, 42yo)

Lack of communication between primary and dental care teams: Although non-dental and visiting/regional dental care providers may have seen the same patients, there was little communication between the two teams. Thirteen non-dental care providers were uncertain or

not aware of the availability of oral health services provided to their communities such as visiting dental services, the mobile dental van and school dental services.

> *...and in that [dental] surgery, we don't know when they come. They don't say ok yes we are in this week so we can ring and say we have a patient here with an abscess or with whatever who needs to be seen. (Nurse, female, 45 yo)*

Twenty four non-dental care providers reported that they would "never" or "rarely" try to contact the dentists in the regional centre/s for advice or to make an appointment for the patient when someone presented to them with an oral health problem.

> *I would never even think of ringing a dentist now, I just tell the patient to ring and make an appointment. (GP, female, 38 yo)*

Distance to the nearest dental surgery and lack of a resident or regular visiting dentist meant that 24 participants did not know who their nearest dentist was or how to contact them.

> It would be different if you had a relationship with the dentist like if we had a local dentist here you might ring them and say could you fit this patient in… but there is no relationship! *(GP, female, 38 yo)*

In contrast, the three dentists interviewed reported that they did communicate with non-dental care providers. A dentist who had previously serviced one of the communities stated:

> *Yes I introduced myself to the pharmacist and I knew the doctors from the hospital. I didn't actually meet them all in person but just communicated about patients with various diseases. (Dentist, male, 61 yo)*

Strategies to improve oral health

A number of strategies were suggested by the participants to improve oral health care services. These, grouped in order of frequency of comments related to: oral health promotion; dental workforce and service provision; and education and training.

Oral health promotion: Having seen patients with oral health problems, participants observed a lack of oral health knowledge in the community especially among parents.

> *..... Also most families don't know that they should be actually cleaning the child's teeth after them till about the age 8 and like you say half of them might not even have toothbrushes. (Nurse, female, 45 yo)*

Both primary care and dental participants (18) emphasised the importance of educating people from an early age in schools and the community about oral health, "regular check-ups" and preventative dental care.

> *A lot of the people out there don't know the basics. Teach them that and a lot of the bigger dental problems go away. (Dentist, male, 61 yo)*

Some participants mentioned water fluoridation as a strategy to improve oral health:

> *....See most of the people here would only drink tank water so what I was actually asking was is our water fluoridated? Maybe that impacts on our teeth being worse? (Nurse, female, 45 yo)*

Dental workforce and service provision: The difficulty in attracting and retaining a dentist to these small communities was widely acknowledged (17). Participants therefore recognised the importance of establishing and maintaining regular visiting services by dentists. Preference was for such visits to occur "one day a week" instead of "3 days every 3 months" and for dental team visits using a mobile dental truck or caravan towed from one community to another. "Get the van to come" was a common suggestion from participants. A number of participants (6) also commented that more transport options could be provided to offset costs and enable patients to travel more easily to and from the nearest regional centre with a resident dentist.

Four participants from individual interviews, six participants in the group interviews and 3 dentists commented that a "mixed" private and public dentistry model could be an

attractive option to encourage dentists to work in a rural town. With this arrangement, a dentist would work part-time for the public health service whilst retaining private practice privileges to augment their income.

> *The dentist should be allowed to work in both public and private practice. (Pharmacist, male, 28 yo)*

One dentist, who had previously worked with such an arrangement recalled:

> *That's not a bad model to work on, to give the dentists the rights to private practice to work out of the same clinic. (Dentist, male, 61 yo)*

Education and training: To better manage oral health problem presentations, 18 non-dental primary care providers expressed an interest in further developing their oral health knowledge and skills. Work schedules and competing priorities meant that most GPs and pharmacists preferred shorter courses on practical skills in the management of dental health problems.

> *... a half day or one day course focusing on practical advice to help buy time until a definite treatment can be done by a dentist is what I'd be interested in. (GP, male, 42 yo)*

> *I would be interested in an online course if it was CPD [continuing professional development]. (Pharmacist, male, 29 yo)*

Discussion

Non-dental primary care providers faced a number of challenges in providing oral health services in rural and remote areas. As found elsewhere, in the absence of a resident dentist and irregularity of visiting dental services, people in the four communities did present to GP practices, local hospitals, pharmacies and Aboriginal Health Centres with a range of oral health problems [9, 10, 12]. Overall, non-dental care providers were reasonably confident in providing oral health advice/treatment within their limited scope of practice. Most were keen to learn more about basic dental skills, acknowledging that this was often a neglected area in

undergraduate training [21-23]. The regular inclusion of oral health topics in continuing education/professional development [24] and staff induction programs may be particularly relevant for those working in rural and remote areas.

The study results indicated that little communication occurred between non-dental primary care providers and visiting or regional dental practitioners. Although patients were often referred to a dental service, knowledge about how the system worked and lack of feedback was the cause of some frustration amongst participants, especially when they observed the same patients making repeat presentations. They reported that transport and cost issues made it difficult for patients to access public dental services in regional centres and insufficient funding for public oral health services compounded the problem. In contrast to the non-dental participant experience, the three dentist participants reported that they did communicate with doctors in these rural areas to some extent. A similar finding was reported from a European study [25] which found that the dentists sampled rated their relationship with doctors as good or excellent whilst the doctors rated their relationships with the dentists as non-existent. This suggests that more effective mechanisms could be established to develop a shared understanding of what needs to be communicated and how best to do this in ways that support a more collaborative and holistic approach to oral health care [26]. For example, there should be regular face to face meetings between the visiting/regional dental practitioners and rural/local primary care providers. The timetables of the visiting dental practitioners to the communities should be circulated to the primary care providers prior to their visits. The contact details of the nearby dental clinics should be available to the small community primary care providers. The establishment and maintenance of effective communication and referral pathways between primary care providers, dental practitioners and the local community would help build confidence in how oral health problems can be more effectively managed and, most importantly, prevented [27]. Better oral health training in basic and

preventative dental skills for non-dental care providers would facilitate better communication and referral pathways between non-dental and dental care providers. This would help non-dental care providers better deal with oral health problems of rural patients before they become major medical problems. Consequently, this would reduce unnecessary hospitalisations. Better communication and stronger collaborations between mainstream and oral health services may provide additional impetus to reduce the discontinuity/disruptions to oral health service provision and help reduce the frequency of problem presentations.

In the current study, participants detailed a number of strategies that could contribute to better oral health care in their communities. Firstly, educating communities on preventive oral health and providing oral health training for primary care practitioners will benefit both public and private patients. Oral health promotion and education might be done by existing non-dental primary care providers in the community such as community health nurses, GPs and pharmacists. With proper training in oral health, non-dental care providers could play a role in educating and promoting oral health to their communities. For example, GPs could educate patients on oral hygiene when they come for medical appointments. Pharmacists could have oral health posters displayed in their stores and hand out oral health brochures to patients [10]. Community health nurses could educate children on oral health care at playgrounds and schools. Neumann and colleagues [28] demonstrated that rural maternal and child health nurses could deliver an oral health intervention promoting early exposure to fluoridated toothpaste and distributing an oral health starter kit to parents of pre-school children. Secondly, while providing more regular public visiting dental services would better serve public patients, the mixed private-public income model for dentists may also improve services to private patients. Thirdly, providing transport options for rural patients would improve access to public and private dentists located in larger population centres. However, in the current climate of budget cuts finding fund to support this could be a challenge.

Participants emphasised the importance of oral health promotion and illness prevention. This included water fluoridation, a cost effective, equitable public health intervention, shown to reduce dental caries across the population [29]. Upstream, preventive strategies were seen as critical to improving the oral health status of these communities and the most effective way to reduce problem presentations downstream. A number of these proposed strategies were consistent with the National Oral Health Plan 2014-2023 [30], a policy document that also emphasises the need for oral health promotion, collaboration between health professionals and building the capacity of the non-oral health workforce to support clients with their oral health.

Strengths and limitations of the study

The trustworthiness of the study was ensured by establishing credibility, dependability and confirmability. According to Lincoln and Guba[31] one of most important aspects in establishing trustworthiness is ensuring credibility. In this study credibility was ensured by triangulation which used different data collection strategies including field notes, group interviews and individual interviews [32] and involved a range of participants in different sites. Field notes were taken during each interview and then compared with interview transcripts for discrepancies. Viewpoints and experiences of primary care providers were triangulated with that of dental care providers. Site triangulation were achieved where similar results emerged at different sites [33]. In addition, participants were offered the opportunity to review their interview transcripts to check that their words matched what they wanted to say. Furthermore, sufficient contextual information on the study sites was provided to help the reader relate to the actual contexts under investigation and make a transfer to similar situations. Dependability and confirmability of the study were also established. Two researchers (HH and JS) coded the interview data independently for cross-validation

purposes. The coding results were compared and discussed at regular meetings involving all researchers until consensus was reached.

This is the first qualitative study to include a wide range of health professionals working in rural areas and explore their views on strategies to improve oral health in rural areas. The limitation of the study is our findings are limited to data obtained from interested participants who worked in mainstream health care facilities in only four communities and therefore this might be different in other settings. Another limitation is primary health care providers from Aboriginal Health Centres were not specifically recruited. A strength of the study was that these views were triangulated by interviews with dental practitioners who serviced the communities studied.

Conclusion

The results highlight the challenges experienced by non-dental primary care providers and their views on how oral health may be improved in rural/remote areas. Regular training should be available to non-dental care providers in rural areas to build their capacity and confidence in managing oral health problem presentations. Rural oral health could be improved by educating communities on preventative oral health; having better communication and referral pathways between non-dental and dental care providers and better dental service provision.

Contributorship statement

All authors met the ICMJE criteria for authorship.

TB, HH, JS and LC substantially contributed to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND

TB and HH Drafted the work and ST and LC revised it critically for important intellectual content; AND

All authors have read and approved the final version of the paper to be submitted; AND

All authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Competing interests

There are no competing interests.

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Data sharing statement

No additional data available.

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Appendix 1 Frequency of oral health presentation to non-dental care providers

Community	Practice site	Frequency
	GP practice	Several times a week
Town A	Hospital	Very common
	Pharmacy	1 person per day
	GP practice (GP1)	Everyday
	GP practice (GP2)	One a week
Town B	GP practice (GP3)	5 in 3 weeks
	Hospital	1 person in 2 months
	Pharmacy	1 a month
	GP practice (GP1)	2 in 10 days
	GP practice (GP2)	5 per week
Town C	Hospital	4 per month
	Pharmacy	1-7 per week
	Aboriginal Health Centre (GP)	One dental abscess per month.
	Hospital (GPs)	2-3 persons a week
Town D	Hospital (Community Health Nurses)	Regular
	Pharmacy	10-15 per week

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No	Item	Guide questions/description	Checked against our article
Domain 1: Research team and reflexivity			
Personal Characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	✓
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD*	✓
3.	Occupation	What was their occupation at the time of the study?	✓
4.	Gender	Was the researcher male or female?	Not applicable
5.	Experience and training	What experience or training did the researcher have?	✓
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	✓
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.*g. personal goals, reasons for doing the research*	✓
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. *Bias, assumptions, reasons and interests in the research topic*	Not applicable
Domain 2: study design			
Theoretical framework			
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis*	✓
Participant selection			
10.	Sampling	How were participants selected? *e.g. purposive, convenience,*	✓

		consecutive, snowball	
11.	Method of approach	How were participants approached? e.*g. face-to-face, telephone, mail, email*	✓
12.	Sample size	How many participants were in the study?	✓
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Not applicable
Setting			
14.	Setting of data collection	Where was the data collected? e.*g. home, clinic, workplace*	✓
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Not applicable
16.	Description of sample	What are the important characteristics of the sample? *e.g. demographic data, date*	✓
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	✓
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	Not applicable
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	✓
20.	Field notes	Were field notes made during and/or after the interview or focus group?	✓
21.	Duration	What was the duration of the interviews or focus group?	✓
22.	Data saturation	Was data saturation discussed?	Not applicable due to being part of a larger study.
23.	Transcripts returned	Were transcripts returned to participants for comment and/or	✓

		correction?	
Domain 3: analysis and findingsz			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	✓
25.	Description of the coding tree	Did authors provide a description of the coding tree?	✓
26.	Derivation of themes	Were themes identified in advance or derived from the data?	✓
27.	Software	What software, if applicable, was used to manage the data?	✓
28.	Participant checking	Did participants provide feedback on the findings?	Not applicable
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.*g. participant number*	✓
30.	Data and findings consistent	Was there consistency between the data presented and the findings?	✓
31.	Clarity of major themes	Were major themes clearly presented in the findings?	✓
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Not applicable