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Dental practitioners: Rural work movements

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ACKNOWLEDGEMENTS

This research is a project of the Australian Primary Health Care Research Institute, which is supported by a grant from the Australian Government Department of Health. The information and opinions contained in it do not necessarily reflect the views or policy of the Australian Primary Health Care Research Institute or the Australian Government Department of Health.

We are grateful for the assistance of the Australian Dental Association, Dental Hygienist Association of Australia, Australian Dental and Oral Health Therapist Association, and Australian Dental Prosthetists' Association who encouraged and recruited their members to participate in the study. In particular, the research team would like to acknowledge:

- The Australian Primary Health Care Research Institute for funding this study.
- The members of our National Advisory Committee for their active and enthusiastic participation.
- All the study participants who were so open and willing to share their experiences with the research team.

CITATION

Crocombe L., Godwin D., Hoang H. Bell E and Blizzard L. Dental practitioners: Rural work movements, June 2016.

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Background

Poor oral health is a critical factor in many health conditions, including diabetes, low birth weight and premature births, arthritis, heart problems, and respiratory conditions^{1,2}. It affects a person's quality of life with concerns when smiling, difficulty eating, pain, and limited employability³. Other than low fluoride exposure, the causes of poor oral health, i.e. poor hygiene, poor diet, smoking, lack of access to oral health care and social determinants, are the same as the causes of poor systemic health⁴. Unlike medicine, the vast majority of dental services are supplied in the private sector and are funded fee-for-service by the patient⁵.

Oral health is poorer in rural than in urban areas of Australia⁶. Although the oral health of Australians has improved over the last 30 years, the gap in oral health outcomes between rural and urban populations has not diminished. The poor oral health of the rural urban population is due to a number of factors including: poor access to dental care (caused by distance to dental practitioners, a historic undersupply of dental practitioners in rural areas and cost of treatment)⁷; rural attitudes to health that are more focused on treatment than prevention^{6,8}; low socioeconomic status (education, household income); the proportion of Indigenous Australians and elderly people; and low exposure to fluoridated water due to a reliance on tank water and un-fluoridated town water⁶.

Dental practitioner (dentists, dental therapists, dental hygienists, oral health therapists and dental prosthetists/technicians) recruitment and retention issues can lead to poor oral health outcomes in rural communities⁷. Though the projected⁹ increasing oversupply of dental practitioners in Australia has seen a solving of rural recruitment problems, there is a potential for increased workforce turnover ("rural dental workforce churn"), as recent dental graduates gain work experience in rural areas and then move to urban areas after they become experienced employees. Rural dental practitioners need to have a broader scope of practice as there are often no professional help or dental specialists nearby. They often treat emergency patients with complicated conditions such as broken and exfoliated teeth and broken jaws after trauma, undertake oral surgical procedures and supply molar root fillings, orthodontic care, and advanced restorative care. They also act as leaders of their communities. The "rural dental workforce churn" has the potential to lead to lack of experienced and socially aware dental practitioners in rural areas. Another issue with improving access to dental care is the high fixed costs of running a dental practice making many rural and remote towns too small for a viable privately operated dental practice.

Equity suggests that everyone should be able to access dental treatment in Australia. A concern is that unless dental funding is targeted, people in rural areas may continue to miss out on appropriate dental care, while people in urban areas will receive more elaborate care than currently received with an associated risk of over servicing.

AIM

This project investigated the attitudes, barriers and enablers of Australian dental practitioners towards living and working in rural areas.

Methods

The project was divided into two phases.

PHASE 1: SEMI-STRUCTURED INTERVIEWS

A descriptive study¹⁰ utilising one-on-one semi-structured scoping interviews was conducted with dental practitioners. The goal of the scoping interviews was to gather as much information as possible of personal insights into rural practice, provide knowledge to bridge the gaps identified in the literature review, and to inform the construction of questions used in the Phase 2 survey of dental practitioners.

Recruitment

The participants in this study were dental practitioners registered to practice in Australia. Purposive sampling was used to ensure that the sample was representative of the registered categories of Australian dental practitioners, across urban and rural areas, male and female, different age groups and different states. The sample size of 50 participants was considered large enough to draw conclusions on the main drivers which influence rural recruitment and retention for the whole dental practitioner population.

Invitation letters and information about the study were sent to the presidents of the four dental associations (Australian Dental Association [ADA], Dental Hygienist Association of Australia [DHAA], Australian Dental and Oral Health Therapists' Association [ADOHTA] and Australian Dental Prosthetists' Association [ADPA]) to ask for their support for the study. With the four associations' approval and support, advertisements to recruit participants were placed in their websites and newsletters. Interested practitioners were asked to contact the researchers *via* email or telephone, and then a snowball sampling technique was used to recruit others¹¹. Information and written consent forms were emailed to each participant prior to their participation in the study. The forms were emailed, faxed or posted back to the researcher prior to the interview. The telephone interviews were conducted at a time convenient to the practitioner as this method enabled a cost-effective survey of practitioners across Australia.

Data collection

The interview questions were developed after conducting a literature review and a consideration of the knowledge gaps identified in the research. The key knowledge gap occurred because it was assumed that the work location drivers of medical practitioners mirrored those of dental practitioners. The key factors identified were the influences of rural experience, outlined as the rural background effect, and the influence of rural clinical placement programs during undergraduate training.

The interviews were divided into two sections. The first half focused on personal experiences and opinions towards rural practice. This included a section wherein the participants were asked to rate potentially influential factors as important or unimportant towards their work location choice and decision-making processes. The second section comprised background and demographic information about the participants. Participants were asked about their opinions of rural practice and lifestyles, their personal experiences of rural practice and lifestyles, and whether they felt that there was anything which could be done to encourage more dental practitioners to work in rural areas.

Data analysis

All interviews were audio recorded and transcribed verbatim. For quality assurance purposes each of the interviews was replayed and checked against the transcription. All data were de-identified prior to analysis. Participants were identified only by their professional category, gender, and age. The data were then imported into QSR-NVivo

V.10.0 software¹² which assists researchers to store, code, classify and sort qualitative data thereby allowing easy retrieval and identification. The data were then analysed independently using content and thematic analysis¹³, which involved coding the transcripts, categorising the codes and generating themes. The interview transcript was read carefully and a paraphrase or label (a 'code') applied that described the section of the transcript that it was interpreted in as important¹⁴

The research team met regularly during data collection and analysis to discuss the process of coding and theme assignment and any disagreements were resolved by discussion. The study reached thematic saturation when the researchers identified that the content of new interviews repeated that of previous interviews¹⁵.

PHASE 2: SELF-ADMINISTERED SURVEY

The findings from the phase 1 interviews were developed to generate hypotheses and to inform the questions in the Phase 2 self-administered online cross-sectional survey of dental practitioners.

Recruitment

Recruitment was promoted by an advertising campaign through the same Australian dental professional associations as the first phase of the project (the ADA, DHAA, ADOHTA and ADPA). An online survey was selected for use in this study as the population to be surveyed was geographically disparate, had access to computers and the internet, and had the appropriate computer literacy levels needed to navigate a survey. Association members were emailed with an online link to the survey *via* Lime Survey software directly through the dental associations. To protect privacy, personal email information of participants was not given to the research team.

Sample size

The estimates of power for sample size calculation were based on the data collected in the interviews. Power was estimated using the approach of Kahn and Sempas¹⁶ and allowed for a two-sided probability of type 1 error of 5% ($\alpha=0.05$). The calculations were made using the estimated coefficient and the estimated standard error of the relevant predictor in a log binomial regression model (a generalised linear model with binomial errors and log link). The power calculation found that a sample of 500 dental practitioners would provide 96% power to detect a stronger effect of rural background on rural practice for female practitioners than for male practitioners.

The final draft of the survey questionnaire was completed after a pilot survey to test how well the survey was received by a small sample of dental practitioners. The survey comprised 21 questions divided into five sections: background, recruitment, retention, turnover, and further comments. The survey questions included both demographic data and opinions on factors influencing rural practice work decisions.

Statistical analysis

There were two separate data analysis undertaken using SPSS (Statistical Package for the Social Sciences), version 22 and STATA version 14. The dependent variable for the investigation into the rural background effect was rural practice computed from the postcode of the respondent's primary practice location to determine the ASGC-RA category¹⁷ of the area. ASGC-RA 1 (major cities) and 2 (inner regional) were grouped as 'urban' and ASGC-RA 3 (outer regional), 4 (remote) and 5 (very remote) were grouped as 'rural'. Rural background was categorised using each respondent's self-reported designation of birthplace, or if not available, the place of the previous two years of schooling prior to

entering training for a dental qualification. The categories used in analysis were Australian urban, Australian rural, and overseas.

The dependent variable for the key factors analysis was the five ordered levels of respondent ratings of the importance of factors potentially influencing recruitment, retention, and turnover in dental practice in Australian rural areas. The responses were ordered on a rating scale utilising five levels of importance: 'very important', 'important', 'neutral', 'unimportant', and 'not at all important'.

The data analysis included both descriptive statistics and inferential statistics to analyse the responses. Inferential statistics were used further developed the analysis of the associations between the demographic characteristics of the respondents and rural practice, and the rural practice driving factors and rural practice.

Investigation into the rural background effect focused analysis of the survey results used log binomial regression models (a generalised linear model with binomial errors) and log link and Poisson regression. Prevalence and prevalence ratios with 95% confidence intervals comparing demographic characteristics of participants were estimated using Poisson regression with robust standard errors. Factors with a statistically significant and/or at least moderately sized relationship with the outcome were entered into mutually adjusted models. Statistical interaction was assessed from the co-efficient and standard error of a product term formed from the covariates of the two or more factors involved.

The analysis for the key factors influencing rural practice used ordinal log multinomial regression¹⁸ using a forwards-descending adjacent categories model was used to estimate association of rural practice with the five ordered levels of respondent ratings of the importance of factors potentially influencing recruitment, retention, and turnover in dental practice in Australian rural areas. The covariate was a binary term for rural practice computed from the postcode of the respondent's primary practice location to determine the ASGC-RA category¹⁹ of the area where they work. Prevalence ratios with 95% confidence intervals were reported and are interpreted as the probability of a rural-based practitioner relative to the probability of an urban based practitioner advancing to a level of lesser importance on each attitudinal scale.

ETHICS CONSIDERATIONS

Ethics approval was obtained from the Tasmania Social Sciences Human Research Ethics Committee (H0013194).

Results

PHASE 1: INTERVIEWS WITH DENTAL PRACTITIONERS

Interviews were conducted from November 2013 to March 2014 and varied between 30 and 60 minutes in length. The participants were 32 dentists, eight oral health therapists (OHTs) (dental therapists, dental hygienists, and oral health therapists) and eight dental prosthetists; which was approximately equivalent to the Australian proportion of the dental practitioner types²⁰. There were 28 male and 22 female dental practitioners and the participants' birth places varied from around the globe: one from Africa, six from Asia, 32 from Australia, eight from Europe, one from North America and two from New Zealand. The age range of participants was 24 to 70 years old.

There were four major themes identified from the interview transcripts: business case, differences in clinical practices, community, and individual factors.

Business case

This theme concerned the participant's feelings towards the business of being a dental practitioner; sustainable income, employment and the business opportunities received from working as a dental practitioner in Australia. This theme was mentioned by all 50 participants a total of 397 times. Business case was not the most commonly mentioned theme, but it was the key overarching theme from the data. The reasons for this will be discussed in further detail. There were four sub-themes identified within business case: sustainability, employment scarcity and security, professional isolation costs, and financial incentives.

Financial viability/sustainability

Financial viability was mentioned 88 times by 37 participants. Due to the high cost of setting up and running a private dental practice, participants were concerned about the future income levels of rural practices. Local area population size was seen as a barrier to rural practice if the local area and the potential patients within it was not large enough to support a dental practice.

There are more issues than just the money to build a clinic. Um... such as how big is the patient base actually going to be and how sustainable is a dental practice going to be in a particular area. (Dentist, female, 40 yo, urban practitioner-has previous rural experience)

Utilisation patterns

Utilisation patterns were mentioned 38 times by 18 participants. Rural populations were considered to be less likely to seek preventative and routine dental treatment like check-ups and cleans, and more likely to seek relief of pain and emergency treatment than urban populations. This pattern of utilisation was considered a barrier to rural practice as it was seen as income limiting and would result in an unviable business opportunity. Dentists mentioned that rural practice had a different clinical focus than urban practice, with rural populations seeking treatment less regularly, having problem orientated visiting patterns and considering oral health less important, than metropolitan populations.

The other thing is that whilst we can talk about shortages and numbers of people, there's still a lot of people who are not choosing to access care so, not all of these small communities can actually realistically sustain a full time practitioner there. (Dentist, female, 52 yo, urban practitioner-no previous rural experience).

Business opportunities

Business opportunities were mentioned 25 times by 13 participants. Dental practitioners outlined the cost benefit analyses included in identifying viable areas for private business opportunities.

I wonder whether, you know, it's financially viable, and for dentists it's more viable to stay in a central area and have people to come to you. To locate outside a central area, it's a little bit like a reverse economy. You don't get as much exposure and you don't, yeah, you don't get the same financial return. (Dentist, male, 44 yo, rural practitioner)

Employment scarcity and security

Employment scarcity and security was mentioned 93 times by 35 participants. Employment scarcity and security represented issues and concerns with securing sufficient employment historically and in the present, and the increasing numbers of registered dental practitioners in Australia in 2014.

... you know that there's going to be an oversupply of graduates, which I think you're going to find its going to be a lot easier to get people to go and do country service, just because, they're going to have to because there's going to be too many unemployed ones in the city. (Dentist, male, 62 yo, urban practitioner-has previous rural experience)

Professional isolation costs

42% of practitioners were concerned about the geographical isolation from urban centres and the professional cost this may incur. Geographical isolation was seen as a barrier for access to professional services due to increased travel time and costs, and increased amount of time taken away from work to attend sessions in urban centres.

I would definitely make sure that there was an education, peer support network for rural practitioners, um, I'd make sure there was some sort of assistance for their greater out of pocket costs. (Dentist, female, 54 yo, urban practitioner-no previous rural experience)

Financial incentives

Financial incentives were mentioned 65 times by 35 participants. There were further, smaller third tier themes identified from financial incentives: money and support packages. This sub-theme represented opinions about financially driven incentives, and the financial support packages provided by the government.

Oh, yeah it would certainly, certainly play into it, it would contribute to a positive decision to work in a rural area, but I think there are other intangibles which are, in my particular ... which are more important than the financial incentives. (Dentist, male, 35 yo)

Differences in clinical practice

When discussing rural recruitment and retention, 86% participants felt that there were differences in clinical practices between urban and rural practice which in turn influenced their decision to move to and stay in a rural area. This included clinical procedures, job satisfaction and professional progression.

Clinical development

Clinical development was mentioned 126 times by 46 participants. There were further, smaller third-tier sub-themes identified from this theme: career progression, professional development, professional mentoring, and professional support. This sub-theme covered issues with dentistry as a career, ongoing education and skill development, mentoring arrangements and support network opportunities and requirements.

That unfortunately dentistry via its nature is a, is a terminal profession. In that there's um not a lot of um opportunities for upward advancement, and that upward advancement is even less so in a rural area. (Dentist, male, 34 yo, rural practitioner, has previous rural experience)

Job satisfaction

Professional rewards

Professional reward was mentioned 31 times by 19 participants. Rural practitioners reported that they felt that they received greater professional rewards from rural practice than would be found in urban practice. These practitioners felt that they were providing a community service in an area of need. They felt more valued for their services to the local community, that they had status in the local community and enjoyed people 'knowing who they are'.

I went out to some really tiny Aboriginal communities for a week at a time, and I just had a ball, I really loved it and you can really tell, like you ask somebody in a small community if you're making a difference and I guess, that played a big part in me choosing to go rural. (New graduate dentist, female, 25 yo, rural practitioner)

Clinical pride

Clinical pride was mentioned 12 times by 12 participants. Rural practitioners felt pride in what they provided to their local communities, which was often enhanced if they were the only services available in the area and had increased their scope of skills as a result.

I found it much more fun to practise in those areas, much more rewarding you'd have people with serious ... um ... dental conditions which were affecting their medical health rather than just a simple broken tooth. (Dentist, female, 32 yo, urban practitioner-has previous rural experience)

Clinical procedures

Clinical procedures were mentioned 43 times by 22 participants. Further, smaller third tier sub-themes also identified: skills and scope, and procedures. Skills and scope were mentioned 31 times by 18 participants. Rural practice was considered an avenue for requiring increased clinical skills, as there was less available referral pathways to other health practitioners. Rural practice for younger practitioners was considered a fast way to up skill and learn clinical treatments quickly. Lacking in clinical experience was a key concern for many younger practitioners. Procedures was mentioned 12 times by 6 participants. Rural practitioners referred to themselves as requiring an increased set of clinical skills due to not having referral opportunities.

Community

Community was mentioned by all 50 participants a total of 273 times. This theme represents participant's opinions about where they live and how they integrate into the community. The participants spoke about who they were and what they valued, how they provided for and were provided for in their social networks and communities. Key factors included: background, social support networks, feeling valued and feeling rewarded. Dental practitioners used comparisons of urban and rural community to discuss their opinions.

Social support networks

Social support networks were rated high on the list of important factors which influenced participants' decisions to move to and stay in rural areas. Regardless of their urban or rural upbringing, participants felt connected and comforted by the presence of family and friends. It was the strength of their connectedness to outside of work social contacts which enabled them to enjoy and value their lifestyles. Family ties were mentioned by 26% of the participants as shaping where they chose to work.

Lifestyle, I think, and family. I think just know where you like to live, I'd prefer to live in a rural area. (Prosthetist, male, 52 yo)

Social isolation

Social isolation was mentioned 41 times by 112 participants. Participants mentioned the increased problems associated with moving away from support areas. Rural practitioners who were working away from family and friends described it as a lifestyle choice, one which was overcome by regular travel to urban areas.

Belonging and fitting in was mentioned 79 times by 31 participants. Rural community engagement was considered a positive factor for rural practice for all rural dental practitioners, providing social support, networking and social activities. Participants believed that rural areas had a stronger sense of community engagement than urban areas, and their rural practice was considered more rewarding than urban practice.

Individual factors

The fourth major theme was individual factors. This theme was mentioned by all 50 participants a total of 440 times. This theme represented participant's opinions about who they are and what they need from their working life. The key themes related to social isolation were physical distance from social support networks (friends, family and social activities) and individual's choice to remain in familiar areas. Key terms were 'moving away' from home, emotional support networks, background and comfort zones. Familiar areas were created through positive exposure and experiences during upbringing and dental school.

The most commonly mentioned social isolation factors of rural practice were decreased access to social support networks, and unwillingness to leave familiar areas. The theme of familiar areas was related to where a dental practitioner grew up, attended dental school or spend a significant and influential amount of time. Rural areas were considered a smaller, more intimate environment. Practitioners without experience of rural areas felt that they would not consider entering rural practice.

Rural background

Rural background was mentioned 79 times by 33 participants. Those who had a rural background were likely to mention the simple enjoyment of living and working in smaller communities. They were quick to label individuals as rural or urban based around the status of their upbringing and practice location choices. Participants who identified as 'rural' were likely to have grown up in a rural area or had spent a major proportion of their working lives in rural areas. Participants who self-identified as 'urban' felt fearful about rural practice as a result of not having had previous experiences or exposure to rural areas. Urban background practitioners mentioned never having considered rural practice due to already having employment opportunities in their local area.

Rural exposure

Rural experience was mentioned 31 times by 22 participants. These were most likely to occur during their education, such as rural placement programs and during previous rural work experiences, such as contractual work. They allowed practitioners to develop a realistic sense of the rural community and the realities of rural practice and community integration.

Family was mentioned 12 times by 9 participants. This sub-theme covered practitioner opinions of rural practice in relation to their families, being close to their families, and the needs of their families. This included family commitments, considerations for the quality of their children's upbringing and their future family aspirations.

...our son's education, he was getting to 12 years of age and it was a choice either he went to boarding school or we would relocate. And we looked at the alternatives and boarding school was not one that we welcomed so we

relocated. (Dentist, male, 70 yo, current urban practitioner-has extensive previous rural experience)

Dental practitioners also identified their partners as having influence over where they chose to work and for how long. Rural areas were considered more difficult for employment opportunities for couples as two professionals. However, having a partner or a spouse with a rural background or upbringing could increase the likelihood of rural practice.

Quality of life

Quality of life was mentioned 88 times by 40 participants. Participants referred to lifestyle rewards and rural enjoyment as quality of life.

Rural practitioners enjoyed what they called a 'rural lifestyle' that was considered separate from a 'city lifestyle'. This term referred to feelings of a more relaxing and laid back daily life. Lifestyle rewards were considered in conjunction to all types of financial incentives, and were thought to be more important than financial incentives, provided the latter allowed a reasonable income. Lifestyle rewards were considered to be of key importance for rural practitioners to facilitate long-term retention.

PHASE 2: SURVEY OF RURAL DENTAL PRACTITIONERS

Demographic characteristics

Through the dental associations, 12,256 invitations were sent to practitioners. A total of 631 questionnaires were completed giving a response rate of 5.6%. Slightly over half (52.9%) of respondents were female. Most of the dental hygienists (96.1%), dental therapists (97.1%), oral health therapists (87.9%), and 14.2% of dental prosthetists were female. Approximately half (49.5%) of the male respondents, and 46.7% of female respondents had an Australian urban background. Only 4.4% of men, and 6.0% of women had a rural background; and 32.0% of men, and 32.9% of women had an overseas background.

Evidence of the effect of rural background on rural practice in Australian dental practitioners: does gender play a role?

There were no demographic characteristics for men that were found to be significantly associated with rural practice. However, in bivariate analysis, four demographic characteristics of women were found to be statistically significantly associated with rural practice: rural background, workplace type (private/public), dental school attended and rural clinical placement. Women with an Australian rural background were more than three times (Prevalence Ratio (PR 3.12, $p=0.02$) as likely to work in rural practice as women with an Australian urban background. Female graduates of Australian rural dental schools were twice (PR 2.04, $p=0.021$) as likely to work in rural practice as those graduates of Australian urban dental schools. Female respondents who had participated in rural clinical placement programs during undergraduate training were also more likely (PR=1.74, $p=0.03$) to work in rural areas than those who had not. Privately-employed female practitioners were less likely (PR=0.58, $p=0.03$) to work in rural areas than those in other (non-private) types of employment (community health clinics/government service/defence/hospitals/universities).

The multivariable analysis after adjusting for other rural exposures (dental school and rural clinical placement), and workplace type, indicated that women with a rural background were more than twice as likely (PR=2.82, $p=0.03$) to work in rural practice than women with an urban background. None of the variables tested were significant predictors for male respondent rural practice.

Factors influencing Australian dental practitioners' decisions on rural practice recruitment, retention and turnover

Rural workforce participation was associated with two attitudinal factors for men, and 12 for women. Work structure factors that were more likely to be considered of lesser importance by female rural practitioners than by female urban practitioners were the desire to set up a new practice (PR=1.05, p=0.020), flexible work hours (PR=1.25, p=0.002), long work hours (PR=1.10, p=0.004), heavy workloads (PR=1.09, p=0.006), and too many on call duties (PR=1.05, p=0.027). Workplace relations factors more often regarded as of lesser importance by female rural practitioners than by their urban counterparts were inadequate supervision (PR=1.07, p=0.002), difficulties recruiting staff (PR=1.07, p=0.012), and issues with colleagues (PR=1.10, p=0.040). Lifestyle factors that were more likely to be rated of lesser importance by female rural practitioners than by their counterparts in urban areas were lack of community (PR=1.09, p=0.016), desire to be close to extended family (PR=1.05, p=0.031), and expectations failing to meet reality (PR=1.07, p=0.009). Poor financial incentives other than income (PR=0.99, p=0.011), were more likely to be rated as being of increased importance by rural male practitioners than their urban counterparts.

Financial issues more likely to be rated as being of lesser importance by rural practitioners were cost of living (men: PR=1.04, p=0.020), and affordable housing (women: PR=1.12, p=0.003). There were not marked differences between the practitioner groups of dentists/specialists and ADPs in the analysis of factors associated with rural practice.

Discussion

FINANCIAL SUSTAINABILITY

The main factor influencing both rural recruitment and retention was financial sustainability of a private dental practice. Dental practitioners felt that it was harder to earn a sustainable income and provide quality lifestyles for their family in some rural areas compared with urban areas. While other factors such as enjoyment of rural lifestyle²¹⁻²⁴, social isolation^{21, 23-28}, limited access to facilities and social activities^{21, 23, 28}, limited access to education services for children^{21, 28}, and limited job opportunities for partners^{21, 22, 25, 29}, could be negotiated or 'solutions' found, the failure to reach an appropriate income level to support one's family was not able to be substituted with other factors.

Participants expressed concern that some rural areas did not have large enough population numbers to adequately financially support a full-time private practitioner. Australia is one of the most sparsely populated countries in the world. Nearly 90% of Australians live in urban areas³⁰ with 1.8 million people (in 2011) living in rural areas outside any defined towns or localities³⁰. Tennant and colleagues³¹ proposed that there is a minimum population level for communities which is required in order to support a full-time dental practitioner and that many areas in Australia do not fulfil this population requirement. Given the manner in which dental care is provided, a private dental practitioner requires a larger patient base in order to financially support their practice than a medical practitioner, and many rural areas in Australia do not have the population concentrations to support a full-time dental practitioner³². The situation is further complicated by differences between urban and rural clinical work, including lower routine visiting patterns³³ and a higher likelihood of emergency treatments³⁴. In Australia dental services are largely provided (85%) in the private sector³⁵ and the burden of payment falls on the individual. The cost of treatment is a common reason for people to avoid dental treatment, leaving a large proportion of the community with untreated dental issues^{21, 36}.

Strategies such as higher salaries and financial remuneration^{21, 22, 25} to encourage rural practice do attract public dental practitioners. A recent program in Australia provides relocation incentives and infrastructure support grants to private dentists who relocate to provide general dental services in regional and remote locations³⁷. However, for many participants, there had to be the assurance of long-term financial security from the work location before other factors were considered. This is a complex issue which requires flexible, practical and different models tailored for rural oral health care delivery for individual communities³⁸.

DIFFERENCES IN CLINICAL PRACTICES

There are differences in clinical practices between urban and rural areas that can influence rural practice decisions. Rural dental practitioners more often service patients seeking emergency pain relief, whereas routine preventative treatment is a feature of urban practice. The type of clinical work more often undertaken by rural dental practitioners is a barrier to rural practice²². A differing range of skills are required to practice successfully in rural areas, and due to the variation in treatments, many of the required skills can only be attained through direct experience in rural practice. Rural dental practitioners, like rural doctors are required to provide a wide range of services in relative professional isolation³⁹. Rural dental practitioners must demonstrate high level clinical skills and competency in a variety of dental treatments, often emergency and pain relief procedures. A rural dental practitioner is more likely to encounter a range of oral issues requiring knowledge, expertise, and treatment competency in a variety of different areas. Rural practitioners also have difficulties accessing further education and professional development opportunities, and have increased travel and access costs to get hands on training compared with urban practitioners^{27, 40}.

The lack of dental treatment services in rural areas and the maldistribution of dental practitioners, as well as the greater distances involved, create a barrier for rural populations to access regular dental care⁷. Access to dental care is a key reason why people outside capital cities have poorer oral health than people living in capital cities, but it is not the only reason⁴¹. These factors can have a compounding effect because some of the most socio-economically disadvantaged rural areas are also the most geographically isolated from health services. This can increase the risks for rural populations of poorer oral health outcomes.

Workplace relationships

There was a barrier to accessing professional relationships and professional support networks in rural areas, this negative factor of rural practice is supported in previous literature^{27, 42}. There are gender differences in workplace relationships between men and women. The relationship between the proportion of office staff who are close friends and affective professional commitment was greater for women than for men⁴³. Women practicing in rural areas were less concerned with workplace relations than their urban counterparts. Workplace relations factors that were associated with rural practice for women were: inadequate supervision, difficulties recruiting staff, and issues with colleagues. For women in rural practice workplace relations factors were of lesser importance than those in urban practice.

Supervision and mentoring

New graduate mentoring and clinical supervision was of particular importance in rural areas. Sole rural positions should not be filled by new graduates with minimal experience and limited access to professional development and support⁴⁴. Attaining employment with adequate supervision to develop new skills for new graduates was considered a barrier to entering rural practice for over half of the interview participants. A positive professional relationship in the workplace can foster positive exposure to rural clinical work and encourage rural recruitment and retention similar to a rural clinical placement during undergraduate training.

Supervision of inexperienced dental practitioners is important in rural areas as rural dental practitioners often see a higher proportion of emergency patients. Diagnosis, treatment, and follow-up of emergency patients can be of increased concern in rural areas compared to urban areas as there are fewer referral pathways for patients to see specialists⁴⁵. The rural practitioner has to diagnose, treat, and follow-up this patient alone, without professional support or help, and this can create fear for the practitioner. This fear is worse for younger practitioners when they are inexperienced or have limited professional support from senior and more experienced rural practitioners. Professional mentoring helps overcome these issues, it provides new graduates with professional support, help should they need it, the ability to treat a wider range of emergency patients, and professional networking outside of work time.

Work structures

Work structures were a factor in rural practice decisions. There was an expectation of an increased workload and wider use of clinical skills in rural practice. This expectation is mirrored in previous literature which found dentists working outside of capital cities supply more patient visits per year and are more likely to be busier than they would like to be than dentists working in capital cities⁴⁶. Rural practice is an avenue for developing clinical skills quickly as rural practitioners provided a wider range of clinical services than urban practitioners^{22, 27}, and often provide one-off emergency treatments³⁴.

Work structural factors: setting up a new practice, flexible work hours, long work hours, heavy workloads, and too many on call duties were of lesser concern for women in rural practice than for women in urban practice. This is not consistent with the previous research

that found that increased workload and inadequate time off duty were negative factors influencing rural practice decisions^{21, 22, 47}, and difficulties accessing flexible work hours can decrease job satisfaction⁴⁸. Hall (2007) found that health professionals who had strong expectations that working in their new environment would be an exciting experience tended to stay for shorter time periods than those who did not, often leaving because of work related stress. These findings suggest that women who worked in rural areas were not concerned with these work structure factors. Female urban practitioners who were more likely than their rural counterparts to consider working structures and conditions important, were more likely to consider them a barrier towards a move into rural practice.

COMMUNITY

The community plays an important role in facilitating recruitment and retention of dental practitioners in rural practice. Rural retention is influenced by the increased sense of community in rural areas compared with urban areas²². Perceptions of rural practice from dental practitioners about what it would be like to live in rural areas shape their willingness to practice in rural areas. Those who chose to do so professed having a sense of belonging to their community, a belief that they are valued by members of their community, and affection for their community. There are in turn heightened social expectations of dental practitioners who live and work in rural areas that may discourage some from doing so. Rural areas had a stronger sense of community engagement than urban areas, rural practitioners placed a higher importance on local community, and local identity than urban practitioners. A 10-year follow up study of rural GPs found that community integration to facilitate personal and professional support networks within the local community was associated with rural retention⁴⁹.

The role of the community is a facilitator for social support and networks. Rural dental practitioners operate with different social relations with their patients than urban practitioners do which can impact confidentiality for both the patients and the dental practitioners⁵⁰. Women in rural practice were less concerned with lack of community, expectations failing to meet reality, and affordability of housing, than women in urban practice.

Social support networks and extended family

Social support networks such as close family and friends living nearby were important factors that influenced participants' decisions to move to different areas for work. Urban and rural participants feel connected and comforted to their local community by the presence of family and friends for support and engaging in social activities. The strength of this connectedness to social contacts outside of work enabled them to enjoy and value their lifestyles. Having established personal and professional support networks can increase retention rates for rural GPs⁴⁹. Rural areas can increase people's sense of isolation when people move away from their support networks making access and communication difficult. Dental practitioners, like many professionals can be unwilling to move away from where they have previously lived into areas that they have no firsthand experience of because they have no pre-established social support networks in those areas. Moving into new geographical areas can require an added incentive to help facilitate the decision to relocate as this can instil feelings of fear and loneliness⁵¹.

Social integration has been previously identified as a rural retention facilitator. Hall (2007) found that dental professionals who had stayed for more than 5 years in a rural area were more involved in local social and cultural activities, and that for those who stayed less than 5 years were less likely to engage in social and cultural activities. One way for dental practitioners to access social support networks is through workplace relationships with other practice staff and local health professionals. The findings of the study revealed that female rural practitioners considered teamwork, staff recruitment, and lack of community to be of lesser importance than urban practitioners did. This finding adds knowledge to an Australian study of the job satisfaction of the oral health workforce which found that women reported

higher levels of satisfaction than men for relationships with colleagues⁴⁸. These combined findings suggest that female dental rural practitioners were less concerned with their relationships with colleagues than were female urban dental practitioners.

INDIVIDUAL FACTORS

Another important finding from this study was that individual factors played an important role in influencing rural retention^{22, 52}. These aspects included the successful formation or pre-existence of strong social bonds to the local community and personal enjoyment of rural lifestyle²². This was facilitated by the local rural area being able to 'provide' certain lifestyle necessities for the individual and their families. The most important of these 'provisions' were family concerns: quality schooling opportunities for children²¹, and sufficient employment opportunities for partners²¹.

Rural Background Effect (RBE)

Having prior rural exposure and positive experiences of rural areas for themselves and their partners influenced later work location decisions for dental practitioners⁵³⁻⁵⁵. This is known as the Rural Background Effect (RBE)^{56, 57}. Strategies which support this factor are: increasing the number of dental students from rural backgrounds at universities^{25, 54, 58}, rural placement programs during undergraduate training^{23, 28, 58} and locating dental schools in rural areas^{54, 58, 59}. Retention issues are extremely complex, with issues to be addressed in the future being the creation of avenues to facilitate employment opportunities for the spouses of relocating dental practitioners and activities to encourage a sense of belonging in rural communities and social engagement with local populations.

RBE stronger for women than men

The survey results of this study indicated that the RBE was positively associated with practicing in a rural area for women, but not for men. This result is important because it gives information to policy makers when designing strategies to increase the rural dental workforce.

Previous studies have found that dental practitioners having a rural background is the key predictor of the likelihood of rural practice^{22, 25, 55}. Australian rural workforce initiatives assume that prior rural exposure (PRE) is also an influential component for dental practitioners, without any empirical evidence supporting this claim⁶⁰. This project tested this theory, and demonstrated that female dental practitioners with a rural background were more likely to work in rural areas than those with urban backgrounds.

Though there are some similarities between the Australian rural medical workforce and the rural dental workforce, there are several key differences. Dental care is provided differently to medical care, the latter being mainly government subsidised. American research demonstrates the theory that having a dental school in a state as well as increasing the percentage of local dental students significantly correlates with the number of dentists in that state⁶¹⁻⁶⁴. Studies of the US dental workforce have also found that female dentists are less likely to work in rural areas than their male counterparts⁶⁵. One study, investigating the gender differences in personal and work characteristics of young dentists found that men worked more hours, saw more patients, and earned higher incomes than women⁴³. This mirrors the traditional model of rural general practice identified in previous gender focused medical workforce literature^{28, 66, 67}.

In most westernised countries there is an increasing percentage of women undertaking dental practitioner degrees in recent years^{59, 68, 69}. Previous research has found that there were different workplace drivers for female practitioners compared with males^{21, 28, 55, 70}. McFarland and colleagues found that female dentists who studied at the University of Nebraska and then practiced in Nebraska after graduation were more likely than men to work in rural areas⁵⁹. In subsequent research, McFarland and colleagues also found that the

likelihood of a rural area having a female dentist increased as the population decreased⁵⁵. Teusner and colleagues found that the percentage of female dentists was higher for those who worked primarily in the most rural of the ASGC remoteness areas classifications⁷¹.

The most striking difference in workplace locations between men and women was that while both genders were strongly influenced by professional issues; women were more likely than men to factor in family considerations, such as flexibility in working hours and access to childcare when making work location decisions. This can be particularly relevant as care and education services for children can be limited in rural areas⁶⁶.

Kruger and Tennant found that there were differences between male and female dentists regarding rural practice recruitment factors, as well as differences between dentists and dental therapists (who in the study were all female)²¹. Women were more likely to follow their partners to a rural area, rather than be the driver of work location movements. Reasons for this were suggested to be because male dentists were more likely to be the main income provider in a relationship and women were more likely to take time away from paid work to raise children^{21, 69}.

Universities and policy makers may find the results of this study very useful as they aim to address the maldistribution of the dental practitioner workforce, and the health needs of rural populations. This study also highlights a key structural change in the future: there is an increase in the proportion of women entering the dental workforce in Australia. The findings from this study indicate that policy makers and universities attempting to increase rural recruitment and retention in the future, could do so by selecting more women with a rural background. Other research suggests that this should be combined with flexible work structure options to address the needs of female dental practitioners.

Our survey results indicate that female rural practitioners were less concerned with work structure, workplace relations, and cost of living than female urban practitioners. Understanding the work and social factors which affect rural practice choice for dental practitioners is a key part in developing effective long-term incentive programs and strategies to increase access to dental health services for rural populations. There are several aspects of the ever-changing and gendered makeup of the dental practitioner workforce.

A career as a dental practitioner can provide women with flexible work time. This has been found to be one of the most important factors for career choice of female dental students⁷². Female rural respondents in this survey indicated that they were more than twice as likely to rate flexible work hours as an important factor influencing rural retention than female urban practitioners, but there were no differences between urban and rural participants. The working structure of dental practitioners provide opportunities rare in other health professions for both flexible working hours and workplace autonomy⁷².

There has been an implication in gendered dentist research that male dentists can provide more dental care than women, and therefore could better serve the needs of a community⁷³. The average work patterns of dental practitioners in Australia have reflected this model. Male dental practitioners traditionally worked longer hours^{43, 74}, see more patients^{43, 75}, have higher incomes^{43, 76}, and are more likely to own a practice than women^{75, 77}. Female dentists may view practice ownership as incompatible with child-rearing and family responsibilities. This research suggests that, even if male dentists can provide more dental care than women, the greater female to male RBE may counter this aspect of rural practice.

The major strength of the study was that this was the first that investigated recruitment and retention of rural dental practitioners in the Australian context. It included not just dentists as in previous studies, but also dental therapists, dental hygienists, oral health therapists and dental prosthetists. It used a mixed method approach that allowed an ability to gain practitioner insights that would not have been possible using a simpler methodology.

The limitations of this study were due to the nature of volunteer participants; there was a higher than average proportion of rurally experienced dental practitioners donating their time for the interviews. Using snowball sampling could have introduced selection bias as individuals who know each other could share similar characteristics and opinions. The higher number of dentists compared with OHTs and prosthetists could mean that factors which were influential for dentists may have been overly addressed. In addition, the relatively low response rate to the survey increased the possibility of bias. The issue of poor response rates by health practitioners to surveys is an increasing problem for researchers. The fact that the survey was cross-sectional was a limitation because it was impossible to determine cause and effect.

Further rural dental practitioner workforce research with a larger sample size is required to assist policy makers plan for equitable access to oral health care for rural Australians. Further research could entail a larger sample size and a longitudinal study following the practice location movements of dental practitioners from graduation onwards.

CONCLUSIONS

The long-term income security of a private rural practice was the main factor concerning dental practitioners about moving to, and staying in, rural areas, and was the hurdle that had to be satisfied before other factors were considered.

There is a rural background effect whereby rural dental practitioners were more likely to have had a rural background than urban practitioners. This effect was particularly strong for Australian born women.

Complex factors such as lifestyle, life stage and family concerns can influence rural retention. Retention of dental practitioners in rural areas is based on a combination of the ability to acculturate to the local community, personal/family satisfaction, and job satisfaction within the rural context.

Financial incentives, such as the Dental Infrastructure Relocation Support Scheme (DRISS), will encourage dental practitioners to move to rural areas, but not necessarily encourage dental practitioners to stay in rural areas.

A current oversupply of dental practitioners in Australia has seen an easing of rural recruitment but possibly not retention problems, and could be creating a high turnover of dental practitioners, where new graduates and young dental practitioners enter rural areas to gain experience and then move back to urban areas. This high turnover may result in a concentration of less experienced dental practitioners in rural areas and is a concern as less experienced dental practitioners often require mentoring and on the job training from senior practitioners, which can be difficult to acquire as there are fewer practitioners in rural areas.

Rural dental practitioners need to have a broader scope of practice as there are often no dental specialists nearby.

Rural practice is considered by some to be a limiting factor to career progression and advancement.

Rural practitioners felt valued for their services to the local community and had a great sense of clinical pride and job satisfaction. They felt that they had status in the local community and enjoyed people 'knowing who they are'.

Support from professional associations, professional networking and peer group support is harder to access in rural areas.

Supplying dental care is expensive, especially in rural areas, and hence, prevention of dental diseases, and minimally invasive dentistry needs to be encouraged.

When first moving to rural areas, there was initial sense of isolation and loneliness, but with social and community integration, individuals can assimilate into the community and gain a sense of belonging. This can result in an increase in job satisfaction.

POLICY OPTIONS

Policy options to prevent dental diseases:

- > In all areas with reticulated water supplies that can feasibly be fluoridated, ensure that Commonwealth funding for State Government supplied dental care is linked to the local water supply being fluoridated.
- > The responsibility for water fluoridation be made the responsibility of State and not Local Governments.
- > Oral health promotion in rural areas be included as part of systemic health promotion (hygiene, diet, anti-smoking, regularly visiting health practitioners).
- > Improve education levels in rural areas to decrease the influence of social determinants of health on both oral and systemic health.

Policy options to improve access to dental care:

- > Focus on long-term retention rather than short-term recruitment of the rural dental workforce.
Ways to do this include:
 - Restructuring the Dental Relocation Infrastructure Support Scheme (DRISS) to:
 - include dental specialists, allied dental practitioners, and existing rurally-based dentists (so they can expand their dental practices),
 - allow the dental practitioners buy existing rural practices,
 - give a greater consideration of the long- term viability of new rural dental practices and their effect on existing rural dental practices prior to support being given, and
 - include assistance for social and community integration of new dental practitioners into the local rural community.
 - Before removing existing Commonwealth dental schemes, policymakers could investigate the effect of such removal on the viability of retaining dental services for people in rural areas.
 - Encourage universities to develop postgraduate programs specifically for rural dental practitioners, but also open to urban dental practitioners, to undertake procedures at subspecialist level, mentoring less experienced dental practitioners, and to gain an understanding of population oral and systemic health.
 - Encourage universities and training institutions to select women with Australian rural backgrounds for undergraduate dental programs as this cohort is more likely to work in rural practice after graduation.
 - In small rural and remote towns encourage public dental services to utilise local rural private-sector dental practitioners to supply dental care to eligible children and adults.
 - Facilitate mentoring and networking of less experienced dental practitioners by senior dental practitioners by supporting professional association, professional networking and peer group support in rural areas.
- > In remote areas where a dental practice is not viable, local physicians, nurses, Aboriginal health workers and pharmacists could be taught to:
 - undertake dental screening for dental diseases and oral cancer,
 - understand which oral conditions:
 - - require urgent dental practitioner referral and how to establish such referral pathways,

- - can be treated by antibiotics and other medical procedures,
 - - can be treated using minimally-invasive dental techniques, and how to
 - - undertake minimally-invasive dental techniques.
- > Encourage further research into improving rural oral health and on the key retention factors of dental practitioners in Australian rural areas.

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