



Research article

Motivations of postgraduate dental students in Australia and New Zealand to pursue a dental specialty training program and their concerns

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ABSTRACT

Objectives: To determine the motivations of postgraduate dental students to pursue a specialist dental career and their concerns prior to and during the program.**Methods:** A 3-part online survey comprising of participants' background, motivations and concerns and quality of life during the program, was distributed to students enrolled in the Doctor of Clinical Dentistry program in Australia and New Zealand from April to May 2018. Participation was voluntary and anonymous. Two separate reminders were provided two and four weeks after the initial survey was distributed.**Results:** There was a 53.6% response rate (97/181 participants). The main factor for pursuing a dental specialist degree was intellectual stimulation. Participants who were aged 40 years and above and those who were divorced/separated were most concerned about the amount of study required and finances during the program. Participants in their final year were most concerned about their personal relationships during the program. Orthodontic, oral medicine and paedodontic trainees reported concerns about the lack of exposure of their specialty during undergraduate training while periodontics and orthodontic trainees reported having the least exposure while working.**Conclusion:** This study showed that dental specialist trainees in Australia and New Zealand were primarily motivated to pursue a specialty for intellectual stimulation. Most students were concerned about the amount of study required, finances and having a work/life balance during the training program. Most students planned to work as associates in private practice upon graduation. Financial benefits may be required to stimulate an interest in academia.**Clinical significance:** An understanding of the motivations of postgraduate students is important to help dental programs mentor students in their future career pathway, improve the selection of candidates for the specialty programs and identify key areas to provide support, prior to, or during the program.

1. Introduction

A specialty demands the learning of new and the enhancement of current specific skills. A career change from general to specialist dentistry requires a significant investment and commitment in time, finances and lifestyle [1]. Saeed et al reported that having unique special skills, intellectual stimulation and challenging diagnostic problems were common factors that have influenced a dental students' decision to select a specialty [2]. Financial gain is also a common reason. as specialties which are perceived to have higher salaries are more popular choices among dental students [3]. However, the cost of training and high educational debt can also discourage graduates from pursuing academia, research or

specialty training and instead commence private general dental practice after undergraduate dental training [3].

The lifestyle of postgraduate dental specialty students can be stressful. High levels of stress and burnout are prevalent among dental residents, which is attributed to the intense workload and lack of time for relaxation [4]. However, there is little information on their concerns about commencing and being within the specialty training such as the unease about finances, work/life balance, expectations about the training program or personal relationships.

Many studies on these topics only reflect interests from dental students and recent graduates who have not yet been accepted into a specialty program [2,3] or individuals from a single specialty field [1,5,

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6, 7, 8]. Research is lacking regarding trainees in other specialty training programs including those in Australia and New Zealand. It is important to determine the motivations and concerns of current trainees within a specialty program because the responses to these topics are more likely to be substantiated instead of the specialty intentions from undergraduate dental students. The knowledge surrounding their motivation to specialise is important to help improve dental programs to mentor students in their future career pathway, improve the selection of postgraduate dental specialty candidates and identify key areas to provide support prior to, or during, the program [2]. The aim of the present study was to assess the motivation factors of postgraduate dental trainees in Australia and New Zealand to pursue specialty dental training and identify concerns prior to commencement.

2. Method

The study received approval from the Human Research Ethics Committee of the University of Adelaide (Ethics ID- H-2017-159).

A 3-part online survey examining motivations to specialize, concerns about specializing and quality of life of specialist trainees. The Motivations aspect of the questionnaire (See Supplementary Table S1) was formulated based on the primary author's personal considerations when applying for the orthodontic training program. This was a preliminary and basic questionnaire which was not validated and thus may have some potential bias in it. The responses were structured by dividing them into subtopics within the main topic of "Motivations to Specialise" including the timing to specialise, factors influencing the decision and participant concerns about specialising which may have been partly influenced by the amount of exposure in terms of knowledge and experience the participants had prior to commencing the training program. The questions about the future needs of the specialty and the long-term plan after completing the specialty training program were included as items of interest.

The questionnaire was distributed to all trainees enrolled in a dental specialty training program recognized by the Australian Dental Council. The sample involved students enrolled in the Doctor of Clinical Dentistry (DCD) programs based in universities in Australia and New Zealand. Seven universities were included; These included University of Queensland, University of Sydney, University of Melbourne, University of Adelaide, University of Western Australia, Griffith University and University of Otago. The oral maxillofacial surgery specialty training program was not included in this study because it had a non-university hospital-based training program which differed from other dental specialties and included on-call work as part of a college training system.

The total number of potential participants was obtained via email from the Heads of Department of each dental specialty program or Course Coordinator of the DCD course in each university two months prior to survey distribution. The dental departments that did not respond to the initial email were sent 2 subsequent reminder emails.

During the survey period, an author (CD) emailed each Head of Department or Course Coordinator to invite their department to participate and distribute the email containing a "Participant Information" document including participants' consent and a questionnaire link to their students' individualised university emails. Trainees read the document and needed to provide consent prior to being able to access the questionnaire link. Reminder emails were sent 2 and 4 weeks later. The deadline for the survey was reached 8 weeks after the last (3rd) reminder email was sent. There was no direct contact between the researchers and participants during the survey period. The survey was completed anonymously, and no personal identification was collected, except gender, age range and marital status. This was documented in the Participant Information aspect of the email.

The survey was designed to explore various topics including motivations and quality of life. The present paper will focus on the motivational aspects of the questionnaire. The Qualtrics program was selected as the online platform to conduct the survey. Data was collected between

March–April of 2018. The data was compiled into an Excel spreadsheet (Microsoft) and categorized by demographic variables. The questionnaire responses were analysed using the Statistical Package for the Social Sciences (version 14, SPSS, Chicago, Ill). Associations between categorical variables were tested for statistical significance ($p < 0.05$) with Chi-squared analysis.

3. Results

3.1. Response rate & demographics

Ninety-seven responses were available for analysis. This was out of a potential 181 responses (the total number of specialty trainees enrolled in Semester 1, 2018, according to the specialty departments that responded). Half of the participants were between 25–29 years old. There were 59 men and 38 women (Table 1).

3.2. Motivations for choosing to pursue a dental specialty

Intellectual stimulation, passion for that specialty, lack of enjoyment as a general dental practitioner, mentorship and personal experience in that specialty were the top five reasons that influenced most trainees to pursue postgraduate specialty training. The main factor for pursuing a specialty was intellectual stimulation (Figure 1 and Supplementary Table S2).

The majority of participants noted that they had decided to specialise only after undergraduate dental school (62.5%), some decided during dental school (30.2%) and a small percentage had decided before dental school (7.3%)

3.3. Concerns about postgraduate dental specialty training (Table 2)

3.3.1. Amount of study required

Although trainees aged >40 years were the most concerned about the level of study required in the course, the difference in concern levels between the age groups, was not significant. The number of years since undergraduate training was not a significant factor linked to the concerns about the amount of study required. An interesting finding was the close correlation between personal relationship status and concerns about the amount of study. Participants who were divorced/separated were the most concerned, while their single counterparts were the least concerned (41.5%) about the study requirements. While this was significant in the statistical sense, it is critical the small sample size (2 out of 97 participants), meaning the estimates may be unstable and thus need to be interpreted with caution.

3.3.2. Finances

More than three-quarters of participants (77.1%) reported having concerns about their finances during the program. However, the age range was a significant factor associated with financial concerns ($P < 0.05$). All participants aged 40 + years old were "moderately or extremely concerned" with finances, followed by those in the age range of 30–34 years old (90.9%) and 35–39 years old (77.8%). Participants aged 25–29 years were the least concerned about their finances (66%) during the course. There was a significant association between personal relationship status and financial concerns. Trainees who were 'in a relationship' were the least concerned about their finances (61.5%) compared to their 'single' colleagues (66.7%). However, participants who were married (90.9%) or divorced (100%) were the most apprehensive about finances.

3.3.3. Work/life balance

Males and females had similarly high levels of concern about work/life balance during their training. More than half of the trainees had high levels of concerns with finding an equilibrium between work and studies and maintaining their personal life. Interestingly, trainees in different

Table 1. Sample demographics of postgraduate dental students.

| Variable | Number (%) |
|---------------------------------|------------|
| AGE | |
| <25 years | - |
| 25–29 years | 51 (52.6) |
| 30–34 years | 33 (34) |
| 35–39 years | 9 (9.3) |
| >40 years | 4 (4.1) |
| GENDER | |
| Female | 38 (39.2) |
| Male | 59 (60.8) |
| PROGRAM | |
| Periodontics | 12 (12.4) |
| Prosthodontics | 10 (10.3) |
| Endodontics | 9 (9.3) |
| Oral Medicine | 4 (4.1) |
| Oral Pathology | - |
| Orthodontics | 42 (43.3) |
| Special Needs Dentistry | 10 (10.3) |
| Dento-Maxillofacial Radiology | 2 (2.1) |
| Pediatric Dentistry | 8 (8.2) |
| UNIVERSITY | |
| University of Queensland | 16 (16.5) |
| University of Sydney | 16 (16.5) |
| University of Melbourne | 29 (29.9) |
| University of Western Australia | 6 (6.2) |
| University of Adelaide | 18 |
| Griffith University | - |
| University of Otago | 12 (12.4) |
| YEAR IN PROGRAM | |
| 1 | 41 (42.3) |
| 2 | 28 (28.9) |
| 3 | 28 (28.9) |
| RELATIONSHIP STATUS | |
| Single | 24 (24.7) |
| In a Relationship | 27 (27.8) |
| Married | 44 (45.4) |
| Divorced/Separated | 2 (2.1) |

specialty programs had varying levels of concerns about work/life balance during the course ($P < 0.05$) (100%; prosthodontic, special needs, dento-maxillofacial radiology, 75%; oral medicine, 64.3%; orthodontics, 55.6%; endodontics, 50%; periodontics and 25% paediatric dentistry).

3.3.4. Personal relationships

The effects of the program on personal relationship was significantly correlated with the number of years in the program. Trainees in their final year were the most concerned about their relationship (64.3%) followed closely by those in the first year (56.1%). Participants in their second year of training were the least concerned (33%).

All trainees who were divorced/separated were highly concerned about the effects of the program on their personal relationships compared to almost half of the trainees who were either single or in a relationship. However, the association between relationship status and concerns about personal relationships was not significant.

3.3.5. Knowledge in undergraduate training and experience while working

There was a significant association between the various specialty programs and trainee perceptions of the level of knowledge that they

received, related to their specialty, during undergraduate training. Eighty-three percent of orthodontic trainees felt like they had minimal knowledge of their specialty. Similarly, high levels of concern were noted by paediatric dentistry and oral medicine trainees. Endodontics and prosthodontic trainees had better familiarity with their specialty, with only approximately one-third (33% and 44% respectively) reporting that they had “not a lot” or “a little” knowledge about their respective specialties in undergraduate training.

The majority of periodontic and orthodontic trainees felt like they had limited experience in their specialty while working as general dentists (91.7% and 90.5% respectively). Similarly, most oral medicine specialist trainees (75%) also noted a lack of experience in their specialty. In contrast, most trainees in the endodontic and special needs program felt adequately exposed to their specialties while working as general dentists (11.1% and 20% respectively) ($p < 0.0001$).

4. Discussion

While previous studies have provided a valuable insight into a dental student's perception of postgraduate dental studies, these reports are from dental students and recent graduates who are not enrolled in a specialty program and only indicate an intention to specialise with most studies being based in the Northern Hemisphere [2,3,9,10]. The objectives of the present study were to identify the motivational factors of postgraduate specialist dental trainees in Australia and New Zealand to specialise and their concerns of specialising.

4.1. Motivations for pursuing a dental specialty

The findings involved current trainees within the nine dental specialty training programs in Australia and New Zealand to ascertain their motivations for, and concerns about, the pursuit of specialty training. “Intellectual stimulation” and a “passion for that specialty” were the two most important motivators noted by specialist trainees for pursuing a dental specialty. Although, there was limited scope to extrapolate the sources of this passion, this shared commonalities in motivations among dental students and orthodontic residents in the UK, USA and Canada [2, 5,6,10]. Approximately half of the dental students in a sample of final year dental students at the University of Pennsylvania noted that they planned to specialise while 21% made this decision even before commencing dental school while the remaining 28% decided during undergraduate training [10]. However, questions could be raised as to how this passion developed in undergraduate dental school with the limited clinical exposure to certain specialties such as orthodontics during this period. In contrast, most trainees from the current study (62.5%) decided after completing their undergraduate training. While personal experience prior to or during undergraduate training could potentially influence this decision, it is reasonable to assume that many only appreciated the various specialties while working as a general dentist. Alternatively, positive mentors were cited as notable influences to specialise among dental students [11]. Yet interestingly, this was not a strong motivator among postgraduate trainees, the current trainees from this sample, or among orthodontic residents in the US and Canada [5,6].

Financial benefits were not important motivators for specialising determined from the present study. This is dissimilar to dental students' preference of particular specialties due to their perceived higher income [10] or orthodontic residents who selected orthodontics partially due to lifestyle and financial benefits [1,5]. However, a high educational debt can also discourage students from a career in academia, research or specialty training [3,12–14]. This is attributed to the perception that despite the lower average income of general dentists, dental students can enter the workforce earlier rather than study for another 3 years to pursue a dental specialty. The variations in findings may be explained by

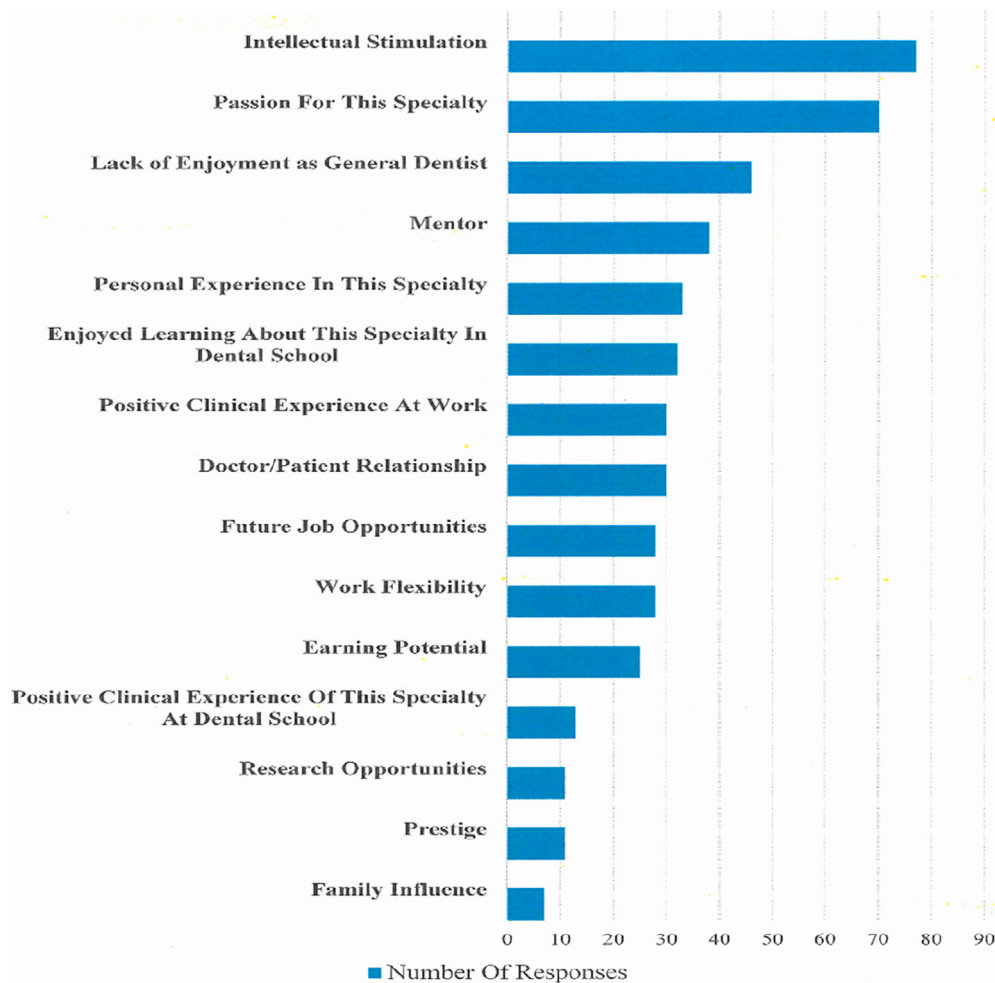


Figure 1. Five main factors influencing respondents decision to pursue this dental specialty.

the change in perspective and priorities between individuals, but the current data did not allow for further extrapolation of these motivational results.

4.2. Concerns during postgraduate dental specialty training

4.2.1. Amount of study required

Slightly more than half of the trainees (61%) were highly concerned about the level of study required. While it could be attributed due to a variety of reasons, including the concern about the ability to balance their personal life and the demands of the specialty program, it is important to consider this in the management of the trainees in the training program. The level of concern with study was significantly associated with variables such as the number of years since completing undergraduate dentistry or age range. Studies investigating stress levels in undergraduate dental students reported students having an overall high stress levels especially related to academic and clinical pressures but there are varying stress levels between the year levels. A “lack of time for relaxation” was the main stressor among first- and fourth-year undergraduate students, which is likely correlated with the start of their dental studies and the initiation of clinical training, respectively [15]. However, it was not possible to directly compare these results to that of the present study because of the difference between the undergraduate and postgraduate dental curricula. The former starts with academic studies and gradually incorporates clinical training while the latter incorporates both simultaneously. A contrary interpretation is that almost half of the

trainees (49%) were not concerned about the amount of study required in the training program as they had already anticipated the work required.

Relationship status was a significant variable for the level of study concerns. All trainees who were divorced or separated had the highest level of study concerns compared to single trainees (41.5%). This could be due to additional personal commitments of trainees who are divorced/separated but the current data did not allow for further analysis of this finding nor were there previous studies to corroborate these results.

4.2.2. Finances

Most participants (77%) had high levels of financial concern related to the program. In Australia, although trainees who are Australian citizens are entitled to a FEE-HELP loan, the loan threshold is significantly less than the total course amount, which is substantial for the duration of the 3-year training program [16, 17, 18]. One-third of orthodontic trainees in the UK worked part-time during their training despite the use of personal savings and family and bank loans as potential supplementary income sources [1]. This can contribute to the overall stress levels with less time for study, research or leisure [1]. Internal medicine residents with higher educational debt (>\$200 000) tended to have higher rates of burnout, lower QOL and satisfaction with work/life balance [18]. It is important for universities to acknowledge this concern and to consider avenues to facilitate financial assistance for specialist trainees. Interestingly, trainees who were aged >40 years old and 30–34 years old reported the highest level of concern about finances at (100% and 90.9% respectively) compared to 25–29 years old age. This could be attributed

Table 2. Concerns about and during postgraduate dental training.

| | N | Concern Amount of Study (Moderately/ Extremely concerned) | Concern About Finances (Moderately/ Extremely concerned) | Concern About Work/Life Balance (Moderately/ Extremely concerned) | Concern About Personal Relationships (Moderately/ Extremely concerned) | Knowledge in Undergraduate School (Not a lot/ a little) | Experience While Working (Not a lot /a little) |
|---|----|---|--|--|---|--|---|
| | | % | % | % | % | % | % |
| Total | 97 | 61.5 | 77.1 | 66.7 | 52.1 | 68.8 | 63.5 |
| Age (Years) | | | | | | | |
| <25 | 0 | 0.0 | 0.0* | 0.0 | 0.0 | 0.0 | 0.0 |
| 25–29 | 51 | 56.0 | 66.0* | 60.0 | 48.0 | 70.0 | 66.0 |
| 30–34 | 33 | 69.7 | 90.9* | 72.7 | 54.6 | 66.7 | 63.6 |
| 35–39 | 9 | 55.6 | 77.8* | 66.7 | 44.4 | 77.8 | 55.6 |
| ≥40 | 4 | 75.0 | 100.0* | 100.0 | 100.0 | 50.0 | 50.0 |
| Gender | | | | | | | |
| Female | 38 | 55.3 | 71.1 | 63.2 | 44.7 | 71.1 | 71.1 |
| Male | 59 | 65.5 | 81.0 | 69.0 | 56.9 | 67.2 | 58.6 |
| Program | | | | | | | |
| Periodontics | 12 | 50.0 | 66.7 | | | | |
| Prosthodontics | 10 | 66.7 | 100.0 | 100.0* | 66.7 | 50.0* | 41.7 |
| Endodontics | 9 | 44.4 | 66.7 | 55.6* | 44.4 | 33.3* | 11.1*** |
| Oral Medicine | 4 | 75.0 | 75.0 | 75.0* | 75.0 | 75.0* | 75.0*** |
| Oral Pathology | 0 | 0.0 | 0.0 | 0.0* | 0.0 | 0.0* | 0.0*** |
| Orthodontics | 42 | 66.7 | 78.6 | 64.3* | 52.4 | 83.3* | 90.5*** |
| Special Needs | 10 | 70.0 | 80.0 | 100.0* | 60.0 | 60.0* | 20.0*** |
| Dentomaxillofacial Radiology | 2 | 100.0 | 100.0 | 100.0* | 50.0 | 50.0* | 50.0*** |
| Pediatric Dentistry | 8 | 37.5 | 62.5 | 25.0* | 37.5 | 75.0* | 25.0*** |
| Postgraduate Training (University) | | | | | | | |
| Queensland | 16 | 75.0 | 81.3 | 81.3 | 62.5 | 62.5 | 68.8 |
| Sydney | 16 | 60.0 | 86.7 | 60.0 | 40.0 | 80.0 | 66.7 |
| Melbourne | 29 | 65.5 | 75.9 | 75.9 | 58.6 | 65.5 | 55.2 |
| Western Australia | 6 | 50.0 | 83.3 | 50.0 | 50.0 | 83.3 | 100.0 |
| Adelaide | 18 | 55.6 | 72.2 | 66.7 | 50.0 | 66.7 | 55.6 |
| Griffith | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Otago | 12 | 50.0 | 66.7 | 41.7 | 41.7 | 66.7 | 66.7 |
| Years in program | | | | | | | |
| 1 | 41 | 53.7 | 82.9 | 61.0* | 56.1 | 70.7 | 51.2 |
| 2 | 28 | 70.4 | 74.1 | 66.7* | 33.3 | 66.7 | 70.4 |
| 3 | 28 | 64.3 | 71.4 | 75.0* | 64.3 | 67.9 | 75.0 |
| Relationship Status | | | | | | | |
| Single | 24 | 41.7* | 66.7* | 58.3 | 46.8 | 91.7* | 66.7 |
| In a Relationship | 27 | 61.5* | 61.5* | 65.4 | 50.0 | 69.2* | 57.7 |
| Married | 44 | 75.0* | 90.9* | 72.7 | 54.6 | 54.6* | 63.6 |
| Divorce/Separated | 2 | 100.0* | 100.0* | 50.0 | 100.0 | 100.0* | 100.0 |
| Years Since Undergraduate Training | | | | | | | |
| 0–3 | 7 | 57.1 | 85.7 | 57.1 | 71.4 | 71.4 | 85.7 |

(continued on next page)

Table 2 (continued)

| N | Concern Amount of Study (Moderately/Extremely concerned) | Concern About Finances (Moderately/Extremely concerned) | Concern About Work/Life Balance (Moderately/Extremely concerned) | Concern About Personal Relationships (Moderately/Extremely concerned) | Knowledge in Undergraduate School (Not a lot/a little) | Experience While Working (Not a lot/a little) |
|-----|--|---|--|---|--|---|
| | % | % | % | % | % | % |
| 4-5 | 51.7 | 69.0 | 58.6 | 37.9 | 69.0 | 58.6 |
| ≥6 | 66.7 | 80.0 | 71.7 | 56.7 | 68.3 | 63.3 |

Notes: *p < 0.05, **p < 0.001, ***p < 0.0001 (X² test & Fisher's Exact Test for cell less than 5).

to trainees at this age have family commitments, children or have other financial responsibilities like mortgages but it is uncertain why those aged between 30-35 years were not as high. But, further studies are required to verify these results.

4.2.3. Work/life balance

Having a work/life balance during the program was a significant concern among postgraduate trainees. There was a close correlation between the specialty program and difference in work/life balance concerns. All trainees in the prosthodontics, special needs dentistry and dento-maxillofacial radiology programs had high levels of concern on this issue compared to the paedodontic trainees (25%). This was a surprising finding considering that most paedodontic trainees also have on-call work outside the regular working hours while none of the other specialties have this additional clinical requirement. Therefore, it was not possible to extrapolated the reasons from the current data so additional studies are required to further investigate this association.

The number of years in the program was also a significant variable associated with the different level of concerns about having work/life balance during the program. Trainees in their third year had the highest concerns about this (75%) compared to those in their first and second year of training (66.7% and 61%), respectively. A possible explanation could be that third-year trainees had already endured these stresses for the past 2 years. This may have already impacted their personal relationships, which may be compounded by the additional stresses of completing their mandatory clinical and academic requirements and possibly even job prospects.

4.2.4. Knowledge in undergraduate training

Overall, 68.8% of trainees felt that they had minimal knowledge about their specialty during their undergraduate dental training. Interestingly, the difference in this perception was significant between the various specialties. Of the specialties, orthodontics, oral medicine and paediatric dentistry trainees felt that they had the most limited exposure to their respective specialties as dental students in contrast, to the endodontic and prosthodontic trainees. As most students graduate to become general dentists, program directors needed to prioritise and ensure competency in certain areas of dentistry that are routinely performed in general practice such as endodontics and prosthodontics. Therefore, dental students may only be introduced to theoretical concepts of the other specialties but their requirements for clinical practice may be excessive for what the undergraduate curriculum can accommodate. This could be possible for orthodontics and oral medicine. With regards to paedodontic training, while dental students are exposed to treating children, additional aspects of the specialty training program is on-call work and working within a hospital may be an unfamiliar experience. However, adequate exposure to the various specialties via clinical experience and mentorship contributes to a well-rounded dental education and may even stimulate and nurture interests in these areas [2,10]. In a sample of dental students, there was no interest in oral maxillofacial radiology or oral pathology which was attributed to the lack of mentors in, and clinical exposure to, these specialty departments at that institution [10]. Evidently, clinical tutors and meaningful clinical experience are formative influences over the future career selection of new graduates [2,19].

4.2.5. Experience in the specialty while working

The type of dental specialty was the only significant variable associated with the perception of the trainees' clinical experience in their respective specialties while working. Periodontic and orthodontic trainees felt that they had the least clinical exposure in their specialty (91.7% and 90.5% respectively). This may stem from the fact that complex treatment in periodontics (i.e. surgical debridement and implants) and orthodontics is not a significant component within the undergraduate clinical curriculum and was not routinely performed by general dentists, although this has changed with increasing surgical

periodontal and orthodontic courses catered for general dentists. In contrast, endodontic trainees did not report significant deficiencies in their endodontic clinical exposure while working as dentists. This is not unexpected as in general, common endodontic procedures such as root canal treatment are within the scope of general dentistry.

4.2.6. Future aspirations

The present results demonstrated that 85% of trainees planned to work in private practice while 42% said that they would consider academia, which appears to be promising but a follow up study is required to determine if these academic aspirations come into fruition. Increased debt strongly influences the post-specialty training career path options and accounts for a decreased interest in academics and research [13, 15, 21, 22]. The number of orthodontic trainees willing to consider academia ranged from 3-21% although 40% noted that they would consider full-time teaching if there were increased financial incentives [20,22]. Academics are critically endangered but are essential for the future of dental programs and the specialties [23,24].

4.3. Limitations and strengths of the study

The present study has a few important limitations to consider. The low response rate (51%) is common in survey-based studies, and may not be representative of the total DCD sample. The representativeness based on the year of completion had marginally higher response from first year trainees but this was not found to be a significant factor. This was a similar finding across universities. However, it is important to acknowledge that not all universities offer all or the same number of specialty programs.

In future studies, incentivising participation could encourage more responses. Also, the long method of survey distribution involved multiple parties at various timepoints and risked the survey links not reaching the potential sample target. However, this was necessary to ensure anonymity between the primary author and participants. Using a third party could address the logistical issue but will likely encounter privacy and ethical concerns to obtain personal emails of participants. The timing of the survey conducted at the beginning of the year may skew the results for the first-year trainees as they are becoming acclimatized to the program and all the trainees are unlikely to have exams or deadlines during that time period. A future longitudinal study of the same respondents as they progress through the course could assess the changes in their concerns over time. This study was not validated using a proportion of the target sample because there was a risk that there would be fatigue responses. The content of the survey was created with the guidance of expert opinion from the two researchers involved in this study, with extensive experience on conducting survey-based research. The validation of this survey would require testing this questionnaire on the next group of postgraduate specialist dental trainees who would not have been part of this survey. There are likely many barriers, such as financial issue, family burden, or language barriers, regarding those who might wish to pursue a specialty, there is not research on this topic to date.

A strength of the present study was that it was a national survey of the motivations of all dental specialty trainees across Australia and New Zealand which has never been performed before. As a novel research topic, a follow up study of postgraduate dental students during their training program should be conducted based on the preliminary findings from this study. Also, a valid future study would be to assess how many of the specialty intentions of dental students translate into careers in that specialty.

5. Conclusion

Dental specialty training requires dedication, commitment and sacrifices from the trainees who therefore require the right motivation. The present study highlights that passion for the specialty and intellectual stimulation were the main motivators for trainees to specialise. However,

there were concerns about the amount of study required, finances and work/life balance during the training program. Most trainees planned to work in private practices after graduation with only a few willing to consider academic positions. Considering candidates who have a passion for research or academia during the selection process or encouraging an interest in these areas during the training program may improve this issue. Specialist trainees are valuable members of the dental profession who will contribute to the greater dental community. Proper candidate selection by understanding their motivation to pursue this pathway and caring for their overall wellbeing during the course in these demanding periods could help support the next generation of dental specialists.

Declarations

Author contribution statement

Amy Vei Li Ho, Xiangqun Ju: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Craig Dreyer, Lisa Jamieson: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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References

- [1] O. Keith, C. Stephens, W.R. Proffit, K. O'Brien, A survey of the opinions of orthodontic specialist trainees in the UK, *Br. J. Orthod.* 24 (2) (1997) 163–168.
- [2] S. Saeed, M. Jimenez, H. Howell, N. Karimbux, C. Sukotjo, Which factors influence students' selection of advanced graduate programs? One institution's experience, *J. Dent. Educ.* 72 (6) (2008) 688–697.
- [3] J.H. Shin, T.H. Kinnunen, M. Zarchy, J.D. Da Silva, B.M.W. Chang, R.F. Wright, Factors influencing dental students' specialty choice: a survey of ten graduating classes at one institution, *J. Dent. Educ.* 79 (4) (2015) 369–377.
- [4] K. Divaris, A. Polychronopoulou, K. Taoufik, C. Katsaros, T. Eliades, Stress and burnout in postgraduate dental education, *Eur. J. Dent. Educ.* 16 (1) (2012) 35–42.
- [5] J. Noble, F.J. Hechter, N. Karaiskos, W.A. Wiltshire, Motivational factors and future life plans of orthodontic residents in the United States, *Am. J. Orthod. Dentofacial Orthop.* 137 (5) (2010) 623–630.
- [6] J. Noble, N. Karaiskos, W.A. Wiltshire, Motivations and future plans of Canadian orthodontic residents, *Am. J. Orthod. Dentofacial Orthop.* 136 (5) (2009) 644–650.
- [7] N. Al-Hamlan, M.M. Al-Ruwaithi, N. Al-Shraim, A. El-Metwaaly, Motivations and future practice plans of orthodontic residents in Saudi Arabia, *J. Ortho. Sci.* 2 (2) (2013) 67.
- [8] T.A. Yemitan, O.J. Bamgbose, D.A. Fadeju, Motivational factors and future plans of Nigerian orthodontic residents, *J. Dent. Educ.* 77 (2) (2013) 176–181.
- [9] M. Zarchy, T. Kinnunen, B.M. Chang, R.F. Wright, Increasing predoctoral dental students' motivations to specialize in prosthodontics, *J. Dent. Educ.* 75 (9) (2011) 1236–1243.

- [10] M. Dhima, V.C. Petropoulos, R.K. Han, T. Kinnunen, R.F. Wright, Dental students' perceptions of dental specialties and factors influencing specialty and career choices, *J. Dent. Educ.* 76 (5) (2012) 562–573.
- [11] M. Scarbez, J.A. Ross, The relationship between gender and postgraduate aspirations among first-and fourth-year students at public dental schools: a longitudinal analysis, *J. Dent. Educ.* 71 (6) (2007) 797–809.
- [12] C. Douglass, R. Fein, Financing dental education, *J. Dent. Educ.* 59 (1) (1995) 185–202.
- [13] J.N. Walton, I.R. Matthew, C. Dumaesq, W. Sudmant, The burden of debt for Canadian dental students: part 4. The influence of debt on program and career decisions, *J. Can. Dent. Assoc.* 72 (10) (2006).
- [14] M.A. da Fonseca, M. Pollock, R. Majewski, R. Tootla, C.A. Murdoch-Kinch, Factors influencing candidates' choice of a pediatric dental residency program, *J. Dent. Educ.* 71 (9) (2007) 1194–1202.
- [15] A. Government, Study Assist- FEE-HELP Australia, Australian Government, 2019 [FEE-HELP].
- [16] Queensland Uo, Doctor of Clinical Dentistry, 2019 [Accessed 2019 Jan 21], <https://future-students.uq.edu.au/study/program/Doctor-of-Clinical-Dentistry-5616>.
- [17] Adelaide Uo, Degree Finder Doctor of Clinical Dentistry, 2019 [Accessed 2019 Jan 21], https://www.adelaide.edu.au/degree-finder/drcd_drclinden.html#df-acc-fees_scholarships.
- [18] C.P. West, T.D. Shanafelt, J.C. Kolars, Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents, *J. Am. Med. Assoc.* 306 (9) (2011) 952–960.
- [19] V. Boyle, B. Shulruf, P. Poole, Influence of Gender and Other Factors on Medical Student Specialty Interest, 2014.
- [20] M.K. Bruner, K.K. Hilgers, A.M. Silveira, J.M. Butters, Graduate orthodontic education: the residents' perspective, *Am. J. Orthod. Dentofacial Orthop.* 128 (3) (2005) 277–282.
- [21] S.J. Lindauer, S.L. Peck, E. Tufekci, T. Coffey, A.M. Best, The crisis in orthodontic education: goals and perceptions, *Am. J. Orthod. Dentofacial Orthop.* 124 (5) (2003) 480–487.
- [22] O. Keith, W.R. Proffit, Orthodontic training: the residents' perspective, *Am. J. Orthod. Dentofacial Orthop.* 106 (6) (1994) 649–653.
- [23] C. Drugan, I. Chestnutt, J. Boyles, The current working patterns and future career aspirations of specialist trainees in dentistry, *Br. Dent. J.* 196 (12) (2004) 761.
- [24] R.J. Anning, W.M. Thomson, A.N. Quick, Orthodontic education programs: an international comparison of students' views and experiences, *Am. J. Orthod. Dentofacial Orthop.* 139 (2) (2011) 220–227.