

Career aspirations of dually trained dental therapy and dental hygiene students from one London dental institute



By **Athina Belsi**,¹ **Swapnil Ghotane**,² **Koula Asimakopoulou**³ and **Jennifer E. Gallagher**⁴

Summary

Dental therapists (DTs) and dental hygienists (DHs) are playing an increasingly important role in the UK dental workforce; however, little is known about students' expectations regarding their professional career, despite the importance of workforce retention within dentistry. The aim was to explore career expectations of dually trained dental therapy and dental hygiene students from one London dental institute. A mixed methods approach was used including a self-completion questionnaire and focus group discussions for students in their final year of training. Quantitative data were analysed descriptively using SPSS v.20 and qualitative data using framework methodology. A response of 82% (n = 56) was achieved for the questionnaire survey. Six focus groups were conducted (n = 30). Most students (95%; n = 53) reported being certain about their career plans, anticipating working in a mixed system (state/private care; 79%; n = 44) and providing primary dental care (73%; n = 41). In the longer-term, over two thirds (71%, n = 40) anticipated working full time with an average of eight sessions per week. Almost all (96%, n = 54) aspired to work in both dental hygiene and therapy with a ratio of three days hygiene: two days therapy per week. Long term career

preferences were influenced by four main drivers: 'market needs'; 'job availability'; 'minimising commuting'; and 'personal circumstances'. The most important influences on career choices overall were 'financial stability' (88%; n = 49), 'balance between life and work' (82%; n = 46), 'good lifestyle' (80%; n = 44) and 'gaining professional experience' (64%; n = 36). The findings suggest that these students from one dental school appear committed to a career in dentistry with expectations of achieving financial security, meeting personal goals, and achieving career progression.

Introduction

The nature, role and responsibilities of the dental workforce within the United Kingdom (UK) have been evolving,^{1,2} with increasing emphasis on training, developing and utilising skill-mix.^{3,4,5} Dentists and dental care professionals (DCPs), within a professionalised workforce, are required to register with the UK General Dental Council (GDC).⁶ DCPs in the UK currently include dental nurses, dental hygienists, dental therapists, orthodontic therapists, dental technicians and clinical dental technicians.^{1,6} The role of DCPs such as dental hygienists (DHs) and dental therapists (DTs) has been

Author information

¹Senior Teaching Fellow in Clinical Communication, Department of Surgery and Cancer, Paterson Centre, St Mary's Hospital, Imperial College London, London, UK; ²Research Associate, Department of Women & Children's Health, Faculty of Life Sciences and Medicine, King's College London, London, UK; ³Visiting Professor in Health Psychology, Faculty of Dentistry, Oral and Craniofacial Sciences, Centre for Host Microbiome Interactions, King's College London, London, UK and Professor of Health Psychology, Associate Dean for Research and Knowledge Exchange for the Faculty of Health and Life Sciences, Oxford Brookes University; ⁴Dean for International Affairs, Newland-Pedley Professor of Oral Health Strategy, Honorary Consultant in Dental Public Health, Faculty of Dentistry, Oral and Craniofacial Sciences, Centre for Host Microbiome Interactions, King's College London, London, UK

Correspondence to: Dr Swapnil Ghotane PhD, MSc DPH, BDS, DDPH RCS (Eng)

Email: swapnil.ghotane@kcl.ac.uk

acknowledged by many countries as vital for the future due to the changing nature of oral health needs.^{3,7,8,9}

In the UK, the 'scope of practice' of a DH involves the prevention of oral disease and is clinically focused on hygiene treatments, whereas a DT can additionally provide restorations and other items of treatment such as extraction of primary teeth.² Most dental schools in the UK offer an opportunity to train as a dually qualified DH or DT; their 'scope of practice' is equivalent to a dental therapist,¹⁰ with the advantage that they can work in either DH or DT positions or qualifications. A dually qualified DH or DT is similar to a dental therapist in New Zealand, Australia, USA, Malaysia, Canada, Tanzania, oral health therapist in the Netherlands and oral health technician in Brazil, with variations in their role, scope of practice and regulation among these countries, most notably relating to whether or not patients have direct access to care.^{8,11,12,13,14,15}

The majority of dental services in England are delivered within primary dental care, ie general dental practice and mostly through the public sector (NHS).^{16,17} Within the NHS in England, there is a three-tier banded remuneration system, with co-payments required by adult patients within this banded system of care unless they are in categories specifically exempt from making payments.^{16,17} The delivery of dental care through the NHS in England differs from other UK countries (Northern Ireland, Scotland and Wales) in relation to payment systems, organisation and delivery, although the workforce is registered to work across the UK.

Over the last two decades there has been enhancement in the role of DTs in the UK, particularly through the significant policy changes which facilitated DTs to work in general dental practice since 2002, rather than being confined to working in salaried and hospital services.^{18,19} A significant development post 2013 has been the professional policy approval for DTs and DHs to see patients directly, provided they have been trained and are competent to do so, as well as by delegation from dentists.²⁰ A dually qualified DH or DT can therefore potentially play an increasingly wider role in the oral healthcare team,³ and assist in reducing the workload of dentists.^{15,21,22} However, DHs and DTs account for only 8% and 5% of the total dental workforce in the UK respectively,²³ with most DTs also registered as DHs currently meaning that numbers of mid-level providers are not as high as they first appear.

A dually qualified DH or DT evolved

initially as a diploma course delivered by dental hospitals and is now increasingly a degree course (BSc) delivered by universities. NHS health policy in England is progressively embracing the role of DTs delivering care by direct access.²⁴ Considering the increasing importance of DTs in the workforce, it is important to explore and understand their career expectations as these could assist with future planning, engagement and retention within the profession.²⁵ There has been extensive research on career expectations of dental students,^{26,27,28,29,30} however, there is a dearth of studies for other members of the oral healthcare team.^{31,32,33}

In addition, various economic, political and societal factors could have implications on the future career of DT students.³⁴ For example, government policies in the UK have led to an increase in the cost of university education, and therefore, an increase in student debt; this could impact on future career expectations of students, given that some take significant loans to obtain a university degree.³⁵ DT students in the UK can either opt for university degree or diploma programmes and may, or may not, receive financial support for their academic course, albeit most programmes are now university degree based and attract standard fees. These external factors, outside of the domain of dentistry, could potentially affect the aspirations of the emerging workforce.^{36,37} Furthermore, these expectations may differ from previous cohorts and from dental students.^{34,38,39} Therefore, exploring the expectations of students provides useful insight into their future career orientation.⁴⁰

Aim

The aim of this study was to explore the career expectations of Dental Therapy & Hygiene students training at King's College London Dental Institute (KCLDI) which combines the dental school and hospitals. This study is part of a larger body of research on students trained at the dental institute.^{41,42}

Study population and methodology

All students, and participants of this research, were enrolled on a 27-month diploma course run by the King's College Hospital trust in London. This study used a mixed methods approach.^{43,44} The career expectations of students were explored quantitatively and qualitatively (2010–11); first, a self-completion questionnaire survey; and second, focus groups discussions. Approval for the research was granted by both the King's College Hospital Research Ethics Committee (Ref. No. 07/H0808/138) and Research

Governance Committee (Ref. No. 07DS09).

All final year students (n = 66) completing their dual training as DTs and DHs in the academic years 2010 (n = 28) and 2011 (n = 38) at the dental hospital were contacted by an email in the second term of their respective final year regarding this research. Students were subsequently approached at the end of an academic session, provided with face-to-face explanation of the study, and given the opportunity to ask questions. They were assured of their right to withdraw from the research programme at any point. Students who provided written consent to participate were approached together in their classroom on a pre-agreed date and time for completion and return of the questionnaire in one sitting as outlined by Belsi *et al.*⁴¹ The questionnaire was developed, and used, with dental students,^{34,45} and early career dentists.^{46,47} The instrument examined respondents' demography (age, sex, and ethnicity), motivation to study on a dental programme, and their career expectations, both short- and long-term. Minor changes were to the instrument to ensure it was applicable to students by including a section on their 'programme of study'. The instrument was piloted with dually trained dental therapist and dental hygienist students not participating in the study and, following feedback, a section of 'other' was added to the responses on the question regarding future career plans. The findings on motivation to study on a dental programme have been published,⁴¹ and thus, this paper reports on career expectations which were explored through open and closed questions.

The qualitative component consisted of six focus groups involving a total of 30 students, which provided an opportunity to explore student views on career expectations and future professional plans in-depth. All students were invited to participate with their peers in focus group discussions. The focus groups took place during the students' lunch break with refreshments being provided. Students were notified that discussions were going to be audio-taped and verbatim transcribed, whilst maintaining the confidentiality of the participants. Each focus group lasted approximately 30–40 minutes. The topic guide was developed in line with previous research (topic guide for undergraduates and new graduates),^{46,47,48} and following initial analysis of questionnaire survey responses. Students' career expectations, the proposed nature and mode of their work, vision for their professional career, and perceived influencing factors were explored in turn. In line with accepted

Table 1 Demographic characteristics of students

Characteristics			
1. Respondents		% (n)	82% (56)
2. Gender	Female	% (n)	89% (50)
	Male	% (n)	11% (6)
3. Age	Range	years	18-50
	Mean	Years	27.45
	Median	Years	27
4. Ethnicity	British	% (n)	46% (25)
	Indian	% (n)	11% (6)
	Other White	% (n)	17% (9)
	Other Asian	% (n)	7% (4)
	Other	% (n)	17% (9)
6. Qualifications held	Diploma in dental nursing	% (n)	48% (27)
	Other	% (n)	32% (18)
	BSc	% (n)	20% (10)
	Diploma in either hygiene or therapy	% (n)	2% (1)

approaches to the conduct of focus groups,⁴⁷ participants were not provided with a copy of the transcripts for validation purposes. First, this was not a requirement of ethics approval; second, a focus group transcript is a product of interactions among the participants and therefore any alteration would affect the integrity of content. Validity of transcripts was ensured by the facilitator of focus group

discussions who clarified participant views during the session. Students were, however, made aware that they could obtain a copy of findings if they so wished prior to publication.

The quantitative data were analysed descriptively using SPSS v.20. The data from focus groups were analysed using Framework Methodology, a matrix-based approach for qualitative analysis described by Ritchie

and Lewis,⁴⁹ and a common method used in previous workforce research.^{46,47,48,50}

Results

Demographic characteristics of students

Of the 66 students invited to complete a questionnaire, 56 responded giving a response rate of 82%. The average age of respondents

Table 2 Students’ reasons for choice of system and setting

Key themes	
<p>1. Financial</p> <ul style="list-style-type: none"> a. Increased income opportunities b. Benefit packages 	<p>2. Professional Development</p> <ul style="list-style-type: none"> a. Work experience b. Training opportunities
<p>3. Working Environment Considerations:</p> <ul style="list-style-type: none"> a. Job satisfaction b. Pleasant working environment c. Building patient rapport 	<p>4. Practical</p> <ul style="list-style-type: none"> a. Job availability near home b. Commuting

Note: 30 students contributed across six focus groups

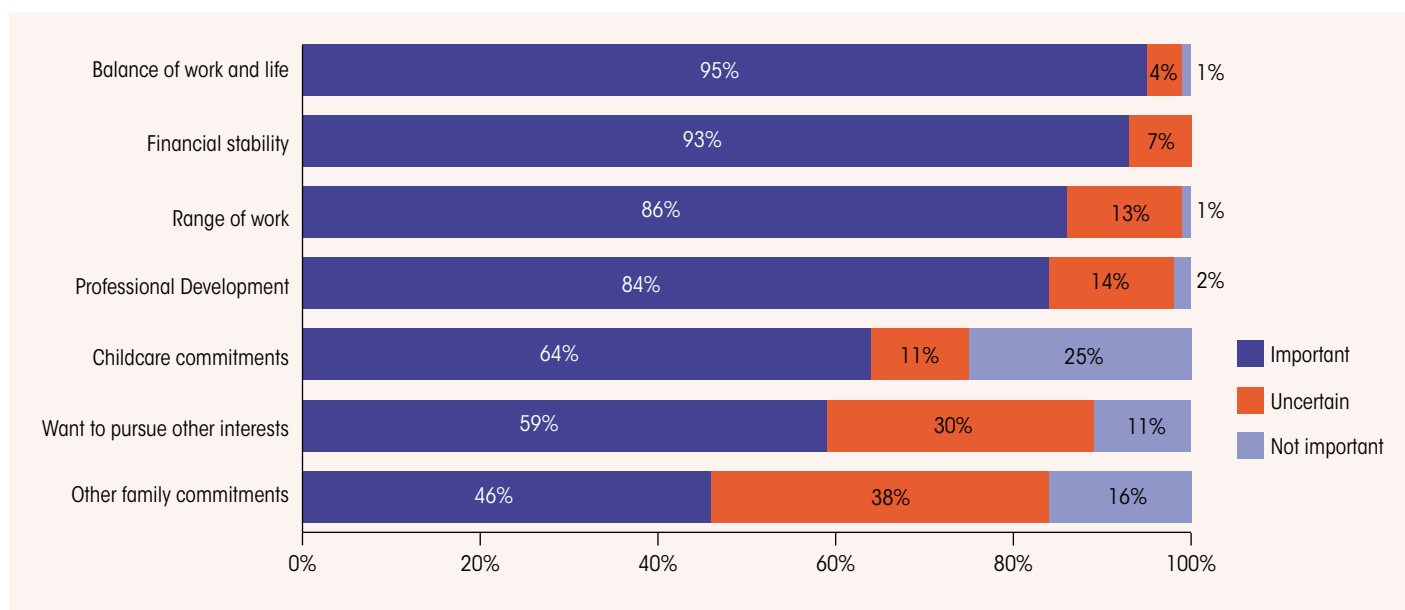


Fig. 1 Perceived influences on the number of sessions per week students anticipate working in the long term, by level of importance (n = 56)

was 27.5 years (range: 19–50 years). The majority (89%; n = 50) were female and the largest ethnic group was ‘White British’ (46%; n = 25); almost half (48%; n = 27) of the respondents reported having a dental nursing qualification prior to commencing dual training (Table 1).

Certainty over future plans

Almost all students (95%; n = 53) reported knowing what they wished to do on completion of training. On a scale, from 1 to 10, with 1 representing ‘uncertain’ and 10 ‘certain’; students scored an average of 8.2 (SD = 1.3) demonstrating high levels of certainty regarding their future career plans.

Students’ views on system and setting

Most respondents intended working in a mixed system (79%; n = 44), involving NHS and private care, preferably in a practice setting (88%; n = 49), and were most likely to anticipate working in primary dental care (73%; n = 41). The reasons behind these choices were further investigated through focus groups; student responses suggested a realistic approach highlighting financial opportunities, professional development, appropriate working conditions and practical concerns, such as commuting within a local area and personal preferences, as outlined in Table 2.

Dual qualification

The students were asked how they intended to use their dual qualification in the future. The vast majority (96%; n = 54) aspired to work as both DTs and DHs, practising an average of three days as DH and two days as DT. The

rationale behind their responses was explored further during focus groups. For those who hadn’t decided whether they wanted to focus more on DH or DT, practising their dual role meant that they could explore both options; whilst other students’ choices stemmed from taking account of market needs, commuting and job availability pressures as outlined below:

‘I’d like more therapy, but I don’t think ... the current climate is going to dictate that really, so it will probably be more hygiene to start with...’ (FS1, Group 1)

‘I would like to [work] ideally as both, but I know there’s a shortage of therapy in London, and the first year I don’t want to commute too much, so I’ll probably work on hygiene ... but definitely therapy as well’ (FS2, Group 1)

There were also participants who reported that they would delay decisions on their dual remit depending on their individual circumstances and personal preferences as illustrated by the following quotation:

‘Ideally, I would be both as well, but I think it’s down to your priorities in terms of personal commitment. For example, there might be more hygienists... flexible for, a certain range of people who... [become] single mothers, or, once I start a family, I would probably choose one or the other. But at the moment when I graduate, I would like to do both. I think the more you progress into the course, you start to realise what you find most satisfying, whether hygiene or therapy...’ (FS4, Group 3)

Mode and number of work sessions

Following students’ views on dual qualification, the mode of work and number

of sessions they anticipated to work was explored. Nearly two thirds of students (71%; n = 40) reported that they would prefer to work full-time, compared with 20% (n = 11) part-time, or being unsure 9% (n = 5). Regarding the number of sessions per week (on a scale of 1 to 10), with 10 equalling full-time working (five days a week), students indicated they would like to work an average of just over eight sessions (SD = 1.9) per week, with 71% (n = 39) reporting a range of eight to ten sessions, whilst the remainder (29%; n = 16) wished to work five to seven sessions.

Influences on students’ choice of sessions

Subsequently, students were asked to rate a series of influences which could affect their working pattern in relation to the number of sessions. Top in their choices were items related to balance of work and life, financial stability, possibility of an array of opportunities in dentistry along with professional development; however, items such as family commitments and childcare scored relatively low in comparison (Fig. 1).

Influences on students’ choice of place of work

Students’ reasons for choosing their place of work were explored through a series of questions, whereby they rated items by level of importance. Their responses revolved around ‘job availability’ (96%; n = 54), ‘career opportunities’ (91%; n = 50), and ‘training opportunities/CPD’ (88%; n = 49); whereas items such as ‘working in areas where trained’ (14%; n = 8), and ‘rural areas’ (16%; n = 9) were rated least important.

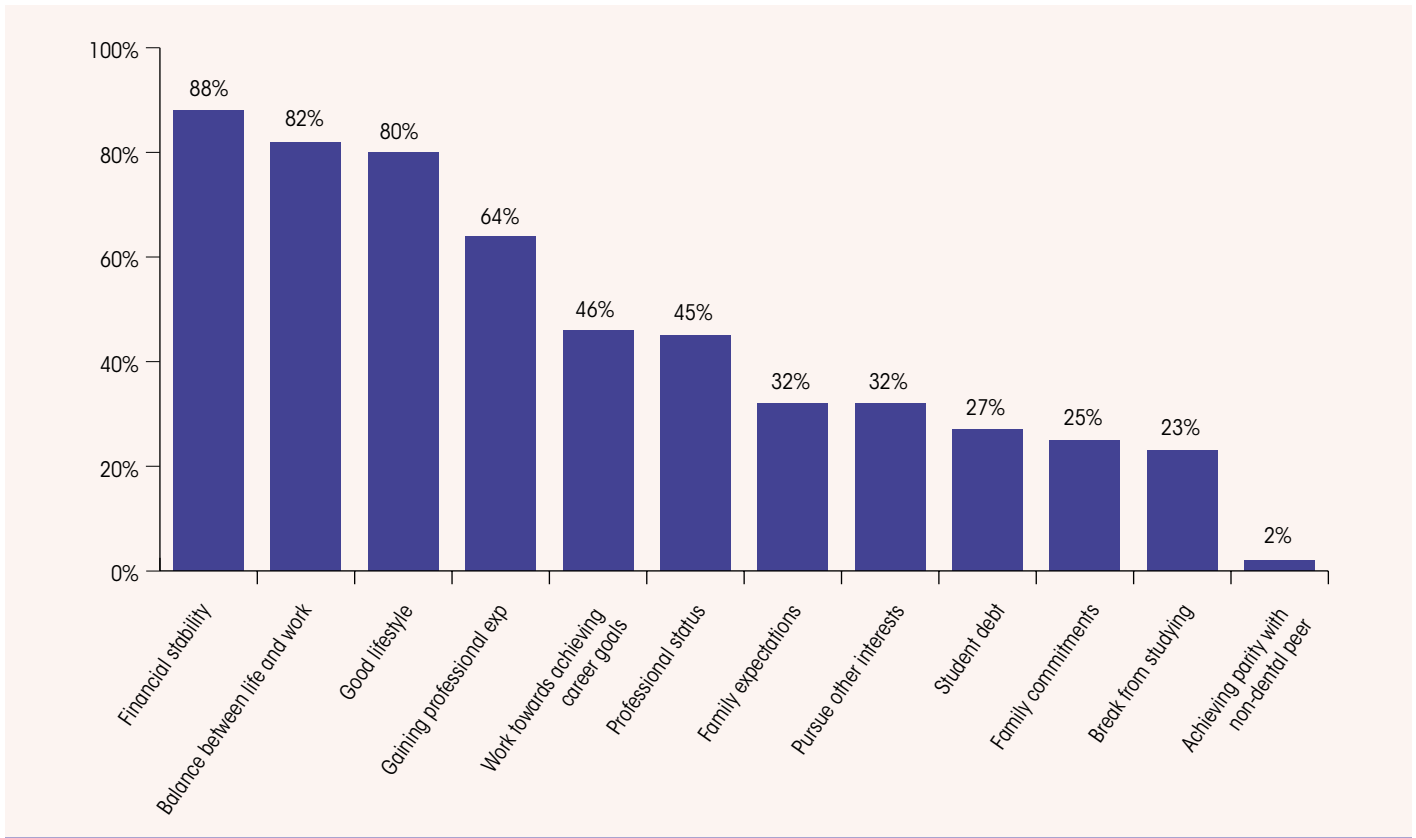


Fig. 2 Important influences on students' decisions about their professional career (n = 56)

Influences on their career decisions overall

Students were asked to rate important influences on their future career plans. Issues such as 'financial stability', 'work and life balance' and a 'good lifestyle' were revealed as the most important influences, whilst 'achieving parity with non-dental peers' and 'having a break from studying', were least important (Fig. 2).

Similar themes arose from focus groups discussions on the number of work sessions per week, place of work and overall career decisions as presented in Table 2, emphasising their personal need for a fulfilling job in a pleasant environment as illustrated by the following quote:

'... I personally want to work four days a week, having a day off in the week so that I can organise things like paying bills if I need to, or ring people, because you don't get the opportunity when you give, six days a week' (FS1, group 1)

Students were asked whether their views on their professional career had changed since they started their dual training. Practical issues relating to their dual remit and the difficulty of practising dental therapy were highlighted. These realities seemed to temper their views on their professional choices as suggested below:

'Therapy was harder than I expected it to be... which kind of scared me a bit to do

'However, when questioned, most students did not report a considerable change in their views between the beginning and end of their studies.'

therapy outside. Yeah, I just never imagined it would be, I'd find it as hard as I did so I kind of imagined that when I finished, I'd be perfectly happy and confident to do hygiene or therapy but I'm little bit unconfident... with therapy still so...' (FS1, Group 2)

'...my views were different.... I thought I was going to work a lot more in therapy' (FS2, Group 3)

However, when questioned, most students did not report a considerable change in their views between the beginning and end of their studies as illustrated by the following responses:

'At the beginning, no I wanted to always do therapy more than hygiene... Um so that hasn't changed...' (FS2, Group 2)

'I'm thinking the same as when I started this course [in terms of hygiene and therapy work]' (FS3, Group 1)

Discussion

This study reports career expectations and influences of dually training dental therapist and dental hygienist students undertaking a diploma programme at KCLDI, therefore addressing a gap in the literature for this important group of dental care professionals in training. Those students who responded to the study held either a diploma or other preliminary qualification. Almost half of the respondents had previous experience of dental nursing and therefore, perceived dual training as a natural career progression. Furthermore, the average age of this cohort was 27 years, which is higher than dental students in Europe;⁵¹ hence, it could be suggested that they have had more dentistry and life experience which together may have accounted for students' level of

certainty about future career plans. Previous research on perceptions of dental hygiene students reports the effect of maturity and social experiences on career choices which may explain the above.⁵²

The majority of respondents reported a desire to work in a mixed system in future, ie across both NHS and private sectors, which was similar to views of dental students at the same institute.²⁹ More than two thirds of students reported plans to work in primary dental care. This favours the recent developments in the scope of practice of DTs implemented by the GDC,² as well as the policy for patients to have direct access to them for care.^{20,53} In addition, a national survey of DHs and DTs in 2011 indicated a similar inclination towards working in primary dental care within a mixed system; however, dually qualified DTs reported treating almost twice the volume of patients (40%) under the NHS contract, compared with singly qualified DHs (15.5%).^{54,55,56} Given their aspirations and relatively low numbers, the NHS in England possibly may find it difficult to attract DTs to make up the workforce shortfall and deliver frontline care.⁵⁷

Furthermore, whilst in this study almost all of the responding students aspired to remain in dentistry and use both aspects of their dual qualification, recent research suggests that in reality DTs and dually qualified DTs do not necessarily use their full skills,^{58,59} performing mostly dental hygiene duties, thereby resulting in under-utilisation of their skills in general dental practice.^{58,59} Consideration should, therefore, be given to enabling dual trained DTs to make greater use of their therapy skills within the healthcare system. Additionally, given that research suggests that considerable levels of primary dental care could be delegated to dental therapists (43% to 46% respectively) and therefore help reduce dentists' workload,^{15,60} it becomes all the more important to utilise the full potential of dually qualified DTs⁶¹ and minimise their frustrations regarding under-utilisation of their skills.^{21,22,61} Whilst enabling 'direct access' for patients nationally has been advocated and facilitated in the private sector,^{20,53} this is now becoming a reality within NHS England.⁶² In addition, Health Education England's (HEE) Advancing Dental Care (ADC) Review supports widening access to dental careers and producing a skilled multi-professional oral healthcare workforce to respond to the needs of patients.⁶³

In relation to the mode and number of working sessions, more than two thirds of

'The majority of respondents reported a desire to work in a mixed system in future, ie across both NHS and private sectors, similar to dental students'

students anticipated working full-time; this is similar to previously reported views of dental students in the UK.^{27,29,64} Interestingly, items of childcare and family commitments scored relatively low. This finding contrasts with previous studies on dental students which suggest that anticipated childcare and family commitments affect the career choice and anticipated working patterns of female dental students.^{29,64,65,66} It is all the more surprising, given that almost 90% of study participants were female. This difference in views between dental and DHT student needs to be explored further; however, one possible explanation may be that the students surveyed were older (mean age 27 years, range 18–50 years), compared with dental students and therefore could have already been successfully managing childcare and family responsibilities in their life.

The findings from both the focus groups and questionnaire survey further suggest that these dual training students anticipated financial stability, job availability, personal goals and professional development as the main items affecting their career choices and are similar to those reported by dental students.^{29,34,45} Dentistry has been considered a profession in which to achieve financial stability or economic rewards by dental students/foundation trainees^{67,68,69,70} and dual training students are no exception. Similarly, features of the job and career prospects appear to be important generally affecting the choice of a career in dentistry.^{27,30,31,32,64,65,67,71,72}

Strengths and limitations

This research contributes to the literature through investigating the views of this important section of the dental workforce; however, there are limitations which need to be considered. First, the research was conducted at one out of a possible 23 institutions in the UK, and these findings, therefore, cannot be considered representative of the UK students and schools which differ in whether they offer a diploma or degree course. Nonetheless, the approach could be replicated nationally using these research instruments. The fieldwork

was conducted during the academic years 2010/11 and may not be representative of current students as views may differ in light of their expanding scope of practice;² the move to a bachelor's degree programme from 2020 onwards; and national policy to facilitate direct access to dually trained DTs in the state sector.⁶² Finally, the study provides views of students through both quantitative and qualitative methods. Focus groups with peers might have resulted in assumptions being made by students, and/or led to under-representation of certain divergent views; however, the findings from the two stages of the research do provide similar perspectives and the combination of approaches provides triangulation. Given the issues raised by this study, this research should be replicated nationally and indeed internationally to provide further insight on this important branch of the oral and dental workforce in the current context.

Conclusion

The findings from this study provide insight to dual training students' views regarding their career plans and influences; students from one London institution appear to be committed to a career in dentistry with career expectations mainly revolving around achieving financial stability along with personal goals and career progression.

Acknowledgements

The authors would like to thank the Department of Dental Hygiene & Therapy at King's College Hospital and all the students who participated in the study.

Source of funding and conflict of interest

The study was funded by King's College London. All authors are, or have been, involved in dental education at King's College London Dental Institute but are not responsible for the dental education of dental hygiene/therapy.

Data availability

Data related to this article will be available upon request to the corresponding author.

Author contributions

AB, KA and JG conceptualised and co-designed the project. SG collected data and completed data analysis. All authors contributed on drafting the final manuscript for the project.

References

- General Dental Council. *Standards for the dental team*. 2013. Available at: <https://www.gdc-uk.org/standards-guidance/standards-and-guidance/standards-for-the-dental-team> (accessed June 2024).
- General Dental Council. *Scope of Practice Review: Final Report*. 28 May 2020. Available at: https://www.gdc-uk.org/docs/default-source/research/scope-of-practice-guidance.pdf?sfvrsn=7b3d8e58_4 (accessed June 2024).
- Gallagher J E, Lim Z, Harper P R. Workforce skill mix: Modelling the potential for dental therapists in state-funded primary dental care. *Int Dent J* 2013; **63**: 57–64.
- NHS Commissioning Board. *Securing Excellence in commissioning NHS dental services*. 13 February 2013. Available at: <https://www.england.nhs.uk/2013/02/dental/> (accessed June 2024).
- Department of Health. *Delivering high quality, effective, compassionate care: Developing the right people with the right skills and the right values*. March 2015. Available at: https://assets.publishing.service.gov.uk/media/5a750047e5274a59fa7169fc/HEE_Mandate.pdf (accessed June 2024).
- General Dental Council. *Preparing for practice. Dental team learning outcomes for registration (2015 revised edition)*. Available at: [https://www.gdc-uk.org/docs/default-source/quality-assurance/preparing-for-practice-\(revised-2015\).pdf](https://www.gdc-uk.org/docs/default-source/quality-assurance/preparing-for-practice-(revised-2015).pdf) (accessed June 2024).
- Virtanen J I, Pellikka E, Singh S, Widström E. The professional role of a dental hygienist in Finland – educators' views. *Int J Dent Hyg* 2016; **14**: 231–238.
- Nash D A, Friedman J W, Mathu-Muju K R *et al*. A review of the global literature on dental therapists. *Community Dent Oral Epidemiol* 2014; **42**: 1–10.
- Gallagher J E, Wilson N H. The future dental workforce? *Br Dent J* 2009; **206**: 195–199.
- Ross M K, Ibbetson R J, Turner S. The acceptability of dually-qualified dental hygienist-therapists to general dental practitioners in South-East Scotland. *Br Dent J* 2007; doi: 10.1038/bdj.2007.45.
- Tseveenjav B, Virtanen J I, Wang N J, Widström E. Working profiles of dental hygienists in public and private practice in Finland and Norway. *Int J Dent Hyg* 2009; **7**: 17–22.
- Satur J, Gussy M, Mariño R, Martini T. Patterns of dental therapists' scope of practice and employment in Victoria, Australia. *J Dent Educ* 2009; **73**: 416–425.
- Coates D E, Kardos T B, Moffat S M, Kardos R L. Dental therapists and dental hygienists educated for the New Zealand environment. *J Dent Educ* 2009; **73**: 1001–1008.
- Sanglard-Oliveira C A, Werneck M A F, Lucas S D, Abreu M. Exploring professionalization among Brazilian oral health technicians. *Hum Resour Health* 2012; doi: 10.1186/1478-4491-10-5.
- Wanyonyi K L, Radford D R, Gallagher J E. Dental skill mix: a cross-sectional analysis of delegation practices between dental and dental hygiene-therapy students involved in team training in the South of England. *Hum Resour Health* 2014; doi: 10.1186/1478-4491-12-65.
- Tickle M, McDonald R, Franklin J, Aggarwal V R, Milsom K, Reeves D. Paying for the wrong kind of performance? Financial incentives and behaviour changes in National Health Service dentistry 1992–2009. *Community Dent Oral Epidemiol* 2011; **39**: 465–473.
- The Health and Social Care Act 2012 (Commencement No.2 and Transitional, Savings and Transitory Provisions) Order 2012 (2012).
- Godson J H, Williams S A, Csikar J I, Bradley S, Rowbotham J S. Dental therapy in the United Kingdom: part 2. A survey of reported working practices. *Br Dent J* 2009; **207**: 417–423.
- Smith C, Council G D. *Developing the dental team: curricula frameworks for registrable qualifications for Professionals Complementary to Dentistry (PCDs)*. General Dental Council, 2004.
- General Dental Council. *Guidance on Direct Access*. November 2020. Available at https://www.gdc-uk.org/docs/default-source/direct-access/direct-access-guidance.pdf?sfvrsn=f45d8a83_4 (accessed June 2024).
- Turner S, Ross M K, Ibbetson R J. Job satisfaction among dually qualified dental hygienist-therapists in UK primary care: a structural model. *Br Dent J* 2011; doi: 10.1038/sj.bdj.2011.50.
- Turner S, Ross M K, Ibbetson R J. Dental hygienists and therapists: how much professional autonomy do they have? How much do they want? Results from a UK survey. *Br Dent J* 2011; doi: 10.1038/sj.bdj.2011.387.
- General Dental Council. *Registration Report – July 2023*. Available at: https://www.gdc-uk.org/docs/default-source/registration-reports/registration_report_july_2023.pdf?sfvrsn=36b83b35_3 (accessed June 2024).
- NHS England. *First stage of dental reform*. 19 July 2022. Available at: <https://www.england.nhs.uk/publication/first-stage-of-dental-reform/> (accessed June 2024).
- Ayers K M S, Meldrum A, Thomson W M, Newton J T. The working practices and career satisfaction of dental therapists in New Zealand. *Community Dent Health* 2007; **24**: 257–263.
- Rashid H H, Ghotane S G, Abufanas S H, Gallagher J E. Short and long-term career plans of final year dental students in the United Arab Emirates. *BMC Oral Health* 2013; doi: 10.1186/1472-6831-13-39.
- Stewart F M J, Drummond J R, Carson L, Theaker E D. Senior dental students' career intentions, work-life balance and retirement plans. *Br Dent J* 2007; **203**: 257–263.
- Khami M R, Murtomaa H, Jafarian M, Vehkalahti M M, Virtanen J I. Study motives and career choices of Iranian dental students. *Med Princ Pract* 2008; **17**: 221–226.
- Gallagher J E, Patel R, Wilson N H. The emerging dental workforce: long-term career expectations and influences. A quantitative study of final year dental students' views on their long-term career from one London Dental School. *BMC Oral Health* 2009; doi: 10.1186/1472-6831-9-35.
- Banabill S M. Career decisions of undergraduate dental students at the University of Science and Technology, Yemen. *J Dent Educ* 2013; **77**: 331–336.
- DeAngelis S, Dean K, Pace C. Career choice and perceptions of dental hygiene students and applicants. *J Dent Hyg* 2003; **77**: 97–104.
- Monson A L, Cooper B R. Career influences and perceptions of pre-dental hygiene students. *J Dent Hyg* 2009; **83**: 126–133.
- Durkan C, Belsi A, Johnson R, Gallagher J. Career choice, pathways and continuing professional development of dental nurses at one institution. *Br Dent J* 2012; doi: 10.1038/sj.bdj.2012.663.
- Gallagher J E, Patel R, Donaldson N, Wilson N H. The emerging dental workforce: why dentistry? A quantitative study of final year dental students' views on their professional career. *BMC Oral Health* 2007; doi: 10.1186/1472-6831-7-7.
- Browne J, Barber M, Coyle D *et al*. *Securing a sustainable future for higher education: an independent review of higher education*

- funding and student finance [Browne report]. Available at: <https://www.gov.uk/government/publications/the-browne-report-higher-education-funding-and-student-finance> (accessed June 2024).
36. Johnson T, Larkin G, Saks M. *Health professions and the state in Europe*. London: Routledge, 1995.
 37. Allsop J, Saks M. *Regulating the health professions*. Sage Publications Ltd, 2003.
 38. Gibbons D E, Corrigan M, Newton J T. Dental therapists: The working practices and job satisfaction of dental therapists: findings of a national survey. *Br Dent J* 2000; **189**: 435–438.
 39. Gibbons D E, Corrigan M, Newton J T. Dental hygienists: A national survey of dental hygienists: working patterns and job satisfaction. *Br Dent J* 2001; **190**: 207–210.
 40. Järnlström M. Personality preferences and career expectations of Finnish business students. *Career Development International* 2000; **5**: 144–154.
 41. Belsi A, Asimakopoulou K, Donaldson N, Gallagher J. Motivation to study dental professions in one London Dental Institute. *Eur J Dent Educ* 2014; **18**: 24–30.
 42. Belsi A, Gallagher J E, Asimakopoulou K. Personality profile of students entering dentistry, hygiene/therapy and dental nursing at one London dental institute. *Eur J Dent Educ* 2011; **15**: 80–84.
 43. Creswell J, Plano Clark V. The nature of mixed methods research. In: Creswell J, Plano Clark V (editors). *Designing and conducting mixed methods research*. 2nd edition. pp 1–18. London: Sage, 2011.
 44. Johnson R B, Onwuegbuzie A J. Mixed methods research: A research paradigm whose time has come. *Educational Researcher* 2004; **33**: 14–26.
 45. Gallagher J E, Clarke W, Wilson N H. The emerging dental workforce: short-term expectations of, and influences on dental students graduating from a London dental school in 2005. *Prim Dent Care* 2008; **15**: 93–101.
 46. Gallagher J E, Clarke W, Eaton K A, Wilson N H. A question of value: a qualitative study of vocational dental practitioners' views on oral healthcare systems and their future careers. *Prim Dent Care* 2009; **16**: 29–37.
 47. Gallagher J E, Clarke W, Eaton K A, Wilson N H F. Dentistry – A professional contained career in healthcare. A qualitative study of Vocational Dental Practitioners' professional expectations. *BMC Oral Health* 2007; doi: 10.1186/1472-6831-7-16.
 48. Gallagher J, Clarke W, Wilson N. Understanding the motivation: A qualitative study of dental students' choice of professional career. *Eur J Dent Educ* 2008; **12**: 89–98.
 49. Ritchie J, Spencer L, O'Connor W. Carrying out qualitative analysis. In: Ritchie J, Lewis J (editors). *Qualitative research practice*. London: SAGE, 2003.
 50. Newton P, Cabot L, Wilson N H F, Gallagher J E. The graduate entry generation: A qualitative study exploring the factors influencing the career expectations and aspirations of a graduating cohort of graduate entry dental students in one London institution. *BMC Oral Health* 2011; doi: 10.1186/1472-6831-11-25.
 51. Mattheos N, Nattestad A, Schitteck M, Attström R. Computer literacy and attitudes among students in 16 European dental schools: current aspects, regional differences and future trends. *Eur J Dent Educ* 2002; **6**: 30–35.
 52. Saito A, Tomita C, Sato Y, Cathcart G. Perceptions of Japanese and Canadian dental hygiene students towards their profession. *Int J Dent Hyg* 2009; **7**: 188–195.
 53. Wake C. Direct access for dental therapists and hygienists – when do we refer? *Prim Dent J* 2014; **3**: 77–79.
 54. Eaton K A, Harris M, Ross M K, Arevalo C. A survey of dental hygienists in the United Kingdom in 2011. Part 1 - demographics and working patterns as dental hygienists. *Br Dent J* 2012; doi: 10.1038/sj.bdj.2012.1041.
 55. Hillam D G. Career development: A survey of hygienists qualifying from the Liverpool School of Dental Hygiene 1977–1998. *Br Dent J* 2000; **188**: 150–153.
 56. Turner S, Ross M K, Ibbetson R J. Dental hygienists and therapists: how much professional autonomy do they have? How much do they want? Results from a UK survey. *Br Dent J* 2011; doi: 10.1038/sj.bdj.2011.387.
 57. Evans D, Mills I, Burns L, Bryce M, Hanks S. The dental workforce recruitment and retention crisis in the UK. *Br Dent J* 2023; **234**: 573–577.
 58. Jones G, Evans C, Hunter L. A survey of the workforce of dental therapists/hygienist-therapists employed in primary care settings. *Br Dent J* 2008; doi: 10.1038/bdj.2007.1205.
 59. NHS Workforce Review Team. Workforce summary – dental therapists and dental hygienists 2008 – England only. London: Centre for Workforce Intelligence, 2008.
 60. Evans C, Chestnutt I G, Chadwick B L. The potential for delegation of clinical care in general dental practice. *Br Dent J* 2007; **203**: 695–699.
 61. Csikar J I, Bradley S, Williams S A, Godson J H, Rowbotham J S. Dental therapy in the United Kingdom: part 4. Teamwork – is it working for dental therapists? *Br Dent J* 2009; **207**: 529–536.
 62. Holland C. New guidance on skill mix from NHS England greeted with cautious optimism. *BDJ Team* 2023; **10**: 16–17.
 63. Health Education England. HEE's Advancing Dental Care Review: Final Report. 2021. Available at: <https://www.hee.nhs.uk/sites/default/files/documents/Advancing%20Dental%20Care%20Report%20Sept%202021.pdf> (accessed June 2024).
 64. Stewart F M J, Drummond J R, Carson L, Hoad Reddick G. A survey of dental school applicants' career intentions and the balance with family life. *Br Dent J* 2005; **198**: 713–717.
 65. Baldwin P J, Dodd M, Rennie J S. Careers and patterns of work of Scottish dental graduates: 1991 and 1994. *Br Dent J* 1998; **185**: 238–243.
 66. Matthews R W, Scully C. Working patterns of male and female dentists in the UK. *Br Dent J* 1994; **176**: 463–466.
 67. Hallissey J, Hannigan A, Ray N. Reasons for choosing dentistry as a career – a survey of dental students attending a dental school in Ireland during 1998–99. *Eur J Dent Educ* 2000; **4**: 77–81.
 68. Vigild M, Schwarz E. Characteristics and study motivation of Danish dental students in a longitudinal perspective. *Eur J Dent Educ* 2001; **5**: 127–133.
 69. Crossley M L, Mubarik A. A comparative investigation of dental and medical student's motivation towards career choice. *Br Dent J* 2002; **193**: 471–473.
 70. Bernabé E, Icaza J L, Delgado-Angulo E K. Reasons for choosing dentistry as a career: a study involving male and female first-year students in Peru. *Eur J Dent Educ* 2006; **10**: 236–241.
 71. Dastjerdi M V, Mandian M, Dastjerdi E V, Namdari M. Study motives and career choices of Iranian medical and dental students. *Acta Medica Iranica* 2012; **50**: 417–424.
 72. Dos Santos B F, Nicolau B, Muller K, Bedos C, Zuanon A C C. Brazilian dental students' intentions and motivations towards their professional career. *J Dent Educ* 2013; **77**: 337–344.

<https://doi.org/10.1038/s41407-024-2691-2>