
Article:
Serban, C. orcid.org/0000-0002-0026-9021, Dixon, J. orcid.org/0000-0002-3499-175X, Adam, M. orcid.org/0000-0002-5009-2359 et al. (3 more authors) (2024) The views of European students on the inclusion of research in undergraduate Oral Health Professional curricula. European Journal of Dental Education, 28 (1). pp. 86-93. ISSN 1396-5883

https://doi.org/10.1111/eje.12917

Received: 11 November 2022 | Revised: 7 March 2023 | Accepted: 16 April 2023

DOI: 10.1111/eje.12917

ORIGINAL ARTICLE

WILEY

The views of European students on the inclusion of research in undergraduate Oral Health Professional curricula

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Abstract

Introduction: The education of Oral Health Professionals (OHPs) is variable across Europe and consequently, there is concern that research skills are not consistently or optimally integrated into European OHP curricula. The aim of this study is to investigate the perspectives of European OHP students regarding the inclusion of research in the undergraduate curriculum.

Materials and Methods: A 21-question online survey was administered to dental, dental hygiene, and dental hygiene and therapy students across Europe. Informed consent was obtained from participants and all responses remained confidential. Quantitative and qualitative methods were used to analyse the data.

Results: A total of 825 student responses to the survey from 33 European countries were eligible for inclusion. The results demonstrated that OHP students recognise the importance of research in the dental field and value the inclusion of research in the curriculum. Although students indicated that they are interested to learn more about research, the survey results also showed that students had neutral opinions towards the existing curriculum providing enough training about research.

Conclusion: European OHP students agree on the need for an open and explicit research curriculum in OHP education. The development of a research domain within an open curriculum framework would help to harmonise the teaching and assessment of OHP research skills across Europe and ultimately improve graduating OHP's research skills.

KEYWORDS
curriculum, dental education, dental research, needs assessment, oral health professional students

1 | INTRODUCTION

Across Europe, the education of oral health professionals (OHPs) shows a high degree of variation within and between countries.[1,2] OHPs encompass the clinical members of the oral healthcare team including dentists, hygienists, therapists, nurses and clinical dental technicians.[3] In the European Union, the education of dentists is regulated by the European directive on the recognition of professional

qualifications (2005/36/EC).[4] Although the directive provides overarching guidelines regarding the length and type of training that should be given to dentists, details concerning the content and mode of delivery are open to broad interpretation by dental educators across Europe and decided at a national or local level.[1] Training of other oral health professionals such as dental hygienists or therapists (DHTs) is not regulated by a European directive and is often managed nationally by individual regulators.[1,2]

The Association for Dental Education in Europe (ADEE) has formed a large network of dental educators in Europe and has supported work aiming to harmonise OHP education through taskforces, annual meetings and special interest groups.[1] Through an international task force and consultation, the Graduating European Dentist (GED) curriculum was developed and published in 2017 to provide recommendations for best academic practices in dental education.[5] The four current domains of GED are Professionalism, Safe and Effective Clinical Practice, Patient-Centred Care and Dentistry in Society.[5]

Scientific advancements and research in dentistry are essential in driving improvements in patient care. Research inclusion in OHP education is regarded as important because it trains future clinicians to implement evidence-based practices.[6–8] Due to the variation in OHP education across Europe, there is concern that research is not consistently and optimally integrated into the OHP curricula. Whilst learning outcomes relating to research are included in the current GED curriculum, these are broadly separated across multiple domains. As there is no separate domain within the GED curriculum that focuses on research and explicitly outlines the expected research skills of graduating OHPs, the inclusion of research within the curriculum is open to interpretation by dental educators across Europe. OHP institutions have demonstrated various approaches to including research as part of their curricula ranging from student research clubs, mandatory theses, research projects and research methodology courses and electives.[9,10]

Due to the mutual recognition of qualifications of European graduates in the EU, the mobility of students and OHP professionals across Europe may bring together professionals with different experiences and skills sets.[1] The development of a research domain could help harmonise the teaching and assessment of OHP research skills across Europe. To account for differences in healthcare settings and individual professional expectations, an open curriculum approach could enable a framework that also allows for flexibility and customization to meet the needs of individual learners, institutions and healthcare systems across Europe. In an open curriculum, there are fewer prescribed courses or requirements, and students and institutions have greater freedom to explore various educational pathways.[11]

In an effort to develop an optimised approach to the inclusion of research in European OHP education, the perspectives of dental, dental hygiene and dental therapy students towards research in the OHP curricula are to be considered in this study. The successful implementation of educational research outcomes relies upon the understanding of how students experience and perceive their studies.[12,13] Student feedback related to learning experiences at European OHP institutions can provide valuable insight into enhancing research-related learning experiences in OHP curricula. Students' attitudes towards research inclusion in the OHP curriculum can be gauged to better understand student needs and interest. By understanding the student perspective, relevant student-centred strategies for research inclusion in OHP curricula and improved learning outcomes that help harmonise dental education in Europe can be developed.

The aim of this exploratory study is to investigate the perspectives of European OHP students regarding the inclusion of research in the undergraduate curriculum. The study was initiated by the European Dental Students' Association (EDSA) which serves as the representative body for dental students across the WHO European Region and advocates for their views in national and international forums. Attitudes of European students towards research and its inclusion in the OHP curriculum and their perspective regarding research knowledge, teaching and assessment will be explored.

2 | METHODS

The study was conducted under the basic principles and ethical standards of the Declaration of Helsinki. The study was approved by the Ethics Committee of Victor Babeș University of Medicine and Pharmacy Timișoara, Romania (Nr. 58/22.12.2021).

An online survey was developed, and after undergoing a pilot stage it was administered to dental, and dental hygiene and therapy (DHT) students. The survey was distributed through peer dissemination by EDSA representatives and national delegates from 33 countries across the WHO European Region. The survey was also disseminated through EDSA's member email list and was advertised in EDSA's newsletter. All communication regarding the survey highlighted that completion of the survey is voluntary, confidential and anonymous.

Survey participants were provided with an information document that outlined the project aims, the methodology, data storage and disposal and any potential risks and how these were mitigated. All the participants subsequently provided online informed consent for the survey. The survey was open from 12 February 2022 until 15 May 2022.

2.1 | Inclusion criteria

Undergraduate students enrolled in dentistry or dental hygiene and dental therapy programs at a registered university in the European Region. The WHO definition of the European Region was used which includes "53 countries, covering a vast geographic region from the Atlantic to the Pacific Ocean".

2.2 | Exclusion criteria

Undergraduate students studying in non-clinical dental courses (such as doctoral research, dental public health or dental technology),

dental assistant students, students of unrelated courses, OHP students enrolled on programmes at institutes not designated as universities, and OHP students from countries outside the WHO definition of Europe.

2.3 | Instrument development

The questions of the survey were developed by the authors of this manuscript which consisted of a team of dental students, early career dentists and experienced educators. The questions were developed by identifying important topics and categories of questions that would enable investigation of European OHP students' perspectives regarding the inclusion of research in the undergraduate curriculum. The questions were divided into categories: demographic information and participant profile (gender, country of origin, university, year of study, prior involvement in research); attitudes towards research in dentistry, research in the OHP curriculum; exposure to research and perspective regarding personal research knowledge, as well as, existing teaching and assessment methods and future needs. The survey contained 21 questions of varied type: demographic questions, Likert scale questions, multiple-choice questions and open-ended questions (Appendix 1). Completion of all questions was required for survey submission.

2.4 | Instrument pilot stage

To ensure validity before distribution to the study sample, the survey was first filled out by a sample of dental student representatives from 33 European region countries. Upon completion of the pilot survey, the dental student representatives were asked to leave written feedback so that the survey could be improved prior to the final release. Based on the feedback of the dental student representatives two co-investigators (CS, JF) made minor modifications to the survey. Any disagreements between the two co-investigators were solved by consensus.

2.5 | Quantitative data analysis

All Likert-scale statements used a five-point scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The categorical data were presented as frequencies and ratios, whilst the scores obtained using the Likert scale represented pseudo-interval data and were shown descriptively as mean, mode and standard deviation. Normal *Q*–*Q* plots and formal normality tests (Shapiro–Wilk) indicated significant departures from normality; hence, all statistical comparisons were performed using non-parametric tests. The level of agreement for the following two Likert-scale statements "Knowing how to interpret research is an important skill to have as an OHP" and "Knowing how to conduct research is an important skill to have as an OHP" was compared using related samples Wilcoxon signed rank test. Scores on Likert-scale statements were compared regarding the respondent's exposure to research methodology courses within the dental curriculum (exposed vs. unexposed) using independent-samples Mann–Whitney *U* test. In analogy, scores on the statement "I feel confident in my abilities to interpret scientific literature about dentistry" were compared regarding prior involvement in scientific activities (involved vs. uninvolved) using independent-samples the Mann–Whitney *U* test. All the statistical analyses were performed at a significance level of 0.05 using SPSS version 25 (IBM).

2.6 | Qualitative data analysis

Two co-investigators were involved with the qualitative analysis (CS, IL). Qualitative analysis was required for the open-ended questions "What do you think dental students should know about research before they graduate", "How do you think research skills should be taught", "How do you think research skills should be assessed?" and "What are your thoughts on an open curriculum for research in OHP education and do you have any suggestions?". A content analysis of the grounded theory approach was carried out manually for word and phrase frequency.[14,15] Any disagreements were resolved by consensus between the co-investigators.

The software WordArt.com was used to develop word clouds for the open-ended questions "What do you think dental students should know about research before they graduate", "How do you think research skills should be taught", "How do you think research skills should be assessed?". Word clouds have been incorporated to represent a corpus of the linguistics used by students in their responses as a crude way of displaying common words.

3 | RESULTS

A total of 841 students responded to the survey, of which 825 were eligible for inclusion. The sample consisted of respondents from 33 countries in the European Region. More than half of the sample was female (69%) and most respondents (93%) had not been involved in research before starting their undergraduate oral health professional studies. Table 1 describes the demographics of the study participants. The results for all Likert questions in the survey are presented in Table 2 and the results of the open-ended questions are presented as word clouds. The modal year of study was the fourth year for dental student participants and the second year for DHT student participants.

3.1 | Attitudes towards research skills

There was strong agreement with the statement "keeping up to date with published research is important for delivering effective oral health care as an OHP" among both dental and DHT students (mode = 5).

TABLE 1 Demographics of the study participants.

Variable	Number of respondents	% of respondents
Gender		
Male	251	30.4
Female	571	69.2
Other	3	0.4
Program of study		
Dentistry	759	92
Dental hygiene or therapy	66	8
Year of study		
1st	97	12
2nd	138	17
3rd	189	23
4th	194	24
5th	145	17
6th	62	7
Prior research involvement		
Yes	56	7
No	769	93
Research exposure during OHP studies (multiple answers possible)		
Attendance of scientific conferences, seminars, workshops	418	51
Student research clubs	132	16
Involvement with research projects	210	25
Research methodology courses within the dental curriculum	270	33
No exposure to research opportunities	200	24

Responses from dental and DHT students showed agreement with the importance of knowing how to conduct (mode = 4) and interpret research (mode = 5) as an OHP (Figure 1). Dental and DHT students showed more agreement with the importance of knowing how to interpret research rather than knowing how to conduct it ($p < .001$). Dental students who were exposed to research methodology courses within the dental curriculum were more likely to agree with the importance of knowing how to conduct research as a dentist ($p = .026$).

Dental and DHT students showed agreement with the statements "I am interested in learning more about research" (mode = 4) and "I would like more training on interpreting scientific literature about dentistry" (mode = 4). Female dental students showed a statistically significant higher agreement to wanting more training on interpreting scientific literature about dentistry than male dental students ($p = .007$).

Responses were slightly skewed towards an agreement with the statement "I feel confident in my abilities to interpret scientific literature about dentistry" (mode = 4) for both dental and DHT students; Dental students who had involvement in research prior to undergraduate dental studies ($p = .015$); attendance or involvement with scientific conferences, seminars, or workshops ($p = .008$); and involvement in research projects in their current dental studies ($p < .001$) were more likely to show agreement to feeling confident in their abilities to interpret scientific literature about dentistry. Conversely, dental students who reported no exposure to dental research opportunities were more likely to show disagreement ($p = .001$) with this statement. DHT students who reported attendance or involvement with scientific conferences, seminars, workshops or research projects were more likely to feel confident about their abilities to interpret scientific literature about dentistry ($p = .021$).

3.2 | Research in the OHP curriculum

Dental and DHT students had neutral opinions to the statements "My dental program has made me more enthusiastic about research" (mode = 3) and "I feel that my dental curriculum provides me with enough training regarding research" (mode = 3).

For both dental and DHT students, there was disagreement with the statement "My OHP program provides clear guidance on how to get involved with extracurricular (outside of the normal programme) research activities" (mode = 2) (Figure 2).

3.3 | Perspective regarding research skills, teaching and assessment

The qualitative data were presented using word clouds. Responses of students to the question "what do you think dental students should know about research before they graduate" are compiled in Figure 3. The answers of students were centred on knowing how to find reliable sources, interpret, understand and apply research to patient care in daily clinical settings.

Responses expressed by students on how they think research skills should be taught and assessed are reported in Figures 4 and 5. Students indicated that research skills should be taught through discussion groups, workshops, projects, seminars and practical activities. Students expressed that final theses, exams, presentations, essays and critical appraisals were appropriate methods for the assessment of research skills. When asked about their thoughts on an open curriculum for research in Oral Health Professional Education, the responses of students were largely positive (86%), showed support for the initiative and would value a collaborative approach to developing the curriculum (Figure 3). Students suggested that any future open curricula should consider the challenging nature of dental education and the limited time with the curriculum (Figure 6).

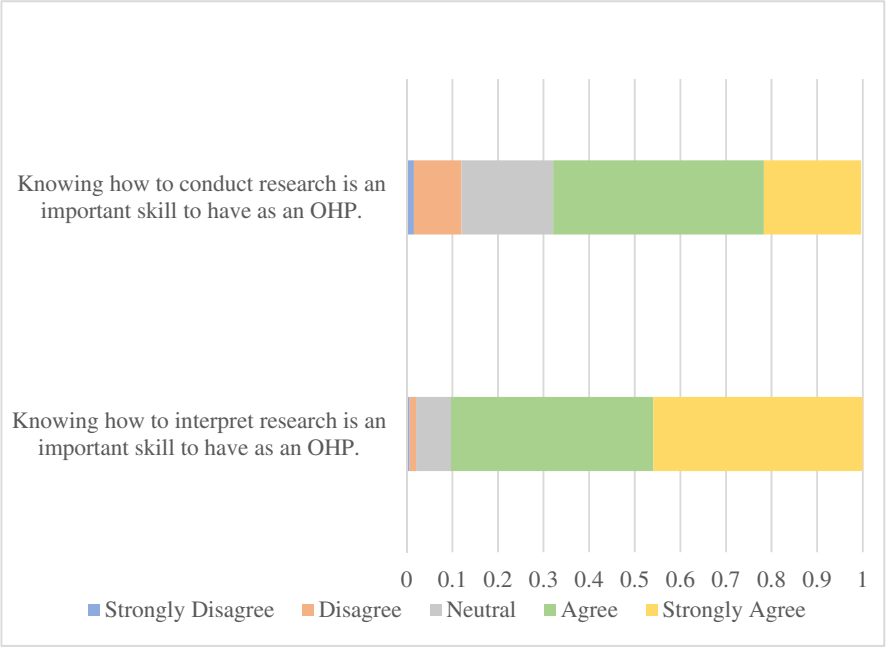
4 | DISCUSSION

This study shows that OHP students recognise the importance of research skills for their future careers and value the inclusion of research in the OHP curricula. These results are similar to a survey study that found that US dental students' response to research integration in the dental curricula was largely positive.[16] Similarly, previous studies related to medical education found that medical students also have a positive outlook on scientific research.[17–20]

TABLE 2 Mean and mode for Likert Scale Questions.

Likert Scale Question	Mean		Mode		Standard deviation	
	Dental	DHT	Dental	DHT	Dental	DHT
Keeping up to date with published research is important for delivering effective oral health care as an OHP	4.47	4.53	5	5	0.66	0.85
Knowing how to conduct research is an important skill to have as an OHP	3.75	3.85	4	4	0.96	1.00
Knowing how to interpret research is an important skill to have as an OHP	4.34	4.29	5	5	0.72	0.84
I am interested in learning more about research	4.02	3.95	4	4	0.87	0.81
I would like more training on interpreting scientific literature	4.00	3.98	4	4	0.89	0.81
I feel confident in my abilities to interpret scientific literature about dentistry	3.28	3.35	4	4	0.95	1.05
My OHP program has made me more enthusiastic about research	3.06	3.15	3	3	1.03	1.10
I feel that my OHP curriculum provides me enough training regarding research.	2.83	3.33	3	3	1.03	1.01
My OHP program provides clear guidance on how to get involved with extracurricular (outside of the normal programme) research activities	2.63	2.80	2	2	1.08	1.06

FIGURE 1 Conducting and interpreting research.



Although the students indicated they are interested to learn more about research, the survey results showed that students had neutral opinions towards the curricula making them more enthusiastic about research and providing enough training about research. Based on the student responses, it is clear that many students do not feel confident in their existing research skills and would like further exposure to this in the curriculum.

It is worth noting that results of the survey found that OHP students recognise the importance of knowing how to conduct and interpret research, however, preference was shown towards the importance of interpreting rather than conducting research. Previous studies with medical students have found that there are positive outcomes to having medical students conduct research during undergraduate studies.[21] Benefits include increased research output, improved patient care, professional satisfaction and career development.[21–24] As a result, the value of having undergraduate OHP students conduct research should be considered, however, this should be balanced with existing challenges – principally time in an overloaded curriculum. Future studies could investigate the benefits of having students conduct research in an OHP context.

A large majority of student responses demonstrated disagreement towards OHP programs providing clear guidance on extracurricular research involvement. Based on these findings, a future curriculum should strive to improve students' research skills, but also find ways to provide clear guidance and potential opportunities for students motivated to pursue extracurricular research.

Students expressed positive opinions regarding a future open curriculum for research in OHP education and would value a collaborative approach to developing one. Given the positive outlook of OHP students on research, a separate, fifth, domain of the GED curriculum could help in clarifying the expected learning outcomes for research and may support a harmonised approach

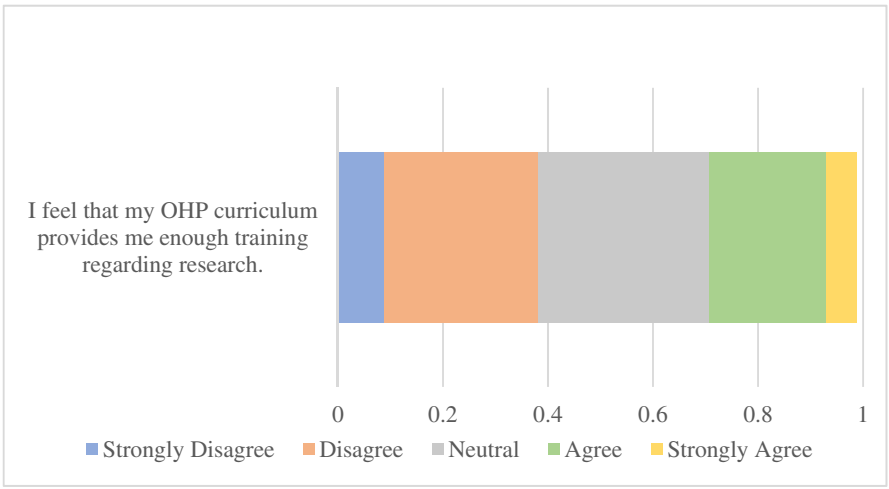


FIGURE 2 Research training in the OHP curriculum.

FIGURE 3 Word cloud of responses to the question of what OHP students should know about research before they graduate.

FIGURE 4 Word cloud of responses expressed by students on how they think research skills should be taught.

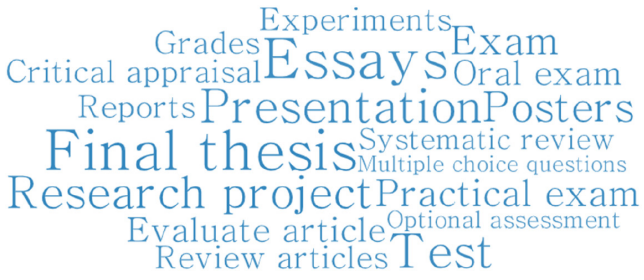


FIGURE 5 Word cloud of responses expressed by students on how they think research skills should be assessed.

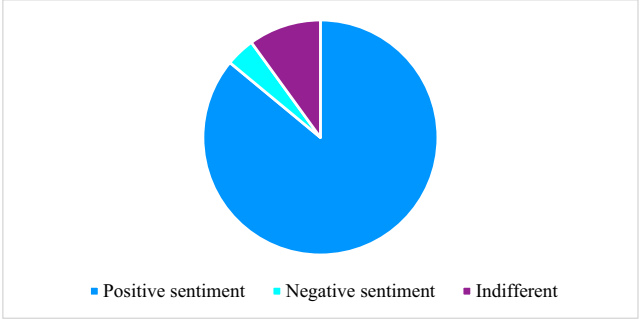


FIGURE 6 Sentiments expressed by students on an open curriculum for research in Oral Health Professional Education.

to teaching and assessment across Europe. To account for regional differences in healthcare settings and individual professional expectations of students, an open curriculum model would enable flexibility and customization for both students and OHP institutions across Europe.

This study provides useful insight regarding the students' perspective on research skills, teaching and assessment which can be considered during the development of an open curriculum for research in the OHP curriculum. Based on the student's responses, research curricula should aim to enable OHP students to effectively interpret research, find reliable sources and apply research to daily clinical practice. Students' answers varied on how research skills should be taught and assessed but common themes included: projects, practical work, presentations, exams, final theses, and critical appraisal exercises.

Some of the limitations of the current study include the differences in various educational models in the European Region and the lack of statistical power in the sample size of survey participants. Future studies are recommended that include the perspectives of dental educators and that report on regional, local and professional differences. Previous analyses have found word clouds to be a potentially unreliable method of data presentation, particularly for the identification of main themes and contextualization of findings. However, in this initial exploratory study, the word clouds simply display the words and phrases that were most often used by students to respond to open-ended essay questions. Given the objectives and scope of the study, there was no effort to contextualise these responses. As the first European-scale survey of OHP students' perception towards research inclusions in the OHP curriculum, the

responses to curricular research inclusion were largely positive and highlighted the need and possible directions for improvement.

5 | CONCLUSION

European OHP students value the presence of research in the curriculum and agree on the need for a European-wide open curriculum framework for research. Existing learning, teaching and assessment methods appear to be highly variable across Europe and may not be preparing graduates sufficiently in this area. An open and explicit curriculum framework that details learning outcomes and provides recommendations for teaching and assessment for research could help to better define and harmonise education in this area.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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How to cite this article: Serban C, Dixon J, Adam M, Par M, Ligusovà I, Field J. The views of European students on the inclusion of research in undergraduate Oral Health Professional curricula. *Eur J Dent Educ*. 2023;00:1-8. doi:10.1111/eje.12917

APPENDIX 1

SURVEY QUESTIONS

Question	Response
Part I	
Participant profile and demographic questions	
1. Please state the country within which you are studying	[type an answer]
2. Please state the name of your university	[type an answer]
3. Please state the gender that you most identify with	Female Male Other: please state
4. Year of study	1st 2nd 3rd 4th 5th 6th
5. Were you involved in research before starting undergraduate OHP studies?	Yes → Please explain how [type an answer] No
Part II	
Question section 1: Attitudes towards research in dentistry (perceived importance and interest)	
6. Keeping up to date with published research is important for delivering effective oral health care as an OHP.	Strongly disagree Disagree Neutral Agree Strongly agree
7. Knowing how to conduct research is an important skill to have as an OHP.	Strongly disagree Disagree Neutral Agree Strongly agree
8. Knowing how to interpret research is an important skill to have as an OHP.	Strongly disagree Disagree Neutral Agree Strongly agree
9. I am interested in learning more about research.	Strongly disagree Disagree Neutral Agree Strongly agree
10. I would like more training on interpreting scientific literature.	Strongly disagree Disagree Neutral Agree Strongly agree
11. I feel confident in my abilities to interpret scientific literature about dentistry.	Strongly disagree Disagree Neutral Agree Strongly agree
Question section 2: Research in your dental curriculum	
12. My dental school program has made me more enthusiastic about research.	Strongly disagree Disagree Neutral Agree Strongly agree
13. I feel that my dental curriculum provides me enough training regarding research.	Strongly disagree Disagree Neutral Agree Strongly agree
Question section 3: Exposure to research	
14. My dental school provides clear guidance on how to get involved with extracurricular (outside of the normal programme) research activities.	Strongly disagree Disagree Neutral Agree Strongly agree
15. As an undergraduate dental student, I have been exposed to dental research through: (*Multiple answers possible*)	Attendance or involvement with scientific conferences, seminars or workshops Student research clubs Involvement in research projects Research methodology courses within the dental curriculum I have not been exposed to any dental research opportunities Other: [please specify]
Question section 4: Perspective regarding the research knowledge, teaching and assessment.	
16. What do you think OHP students should know about research before they graduate?	[type an answer]
17. How do you think research skills should be *taught*? (What methods should be used to teach you about research and how to carry it out)	[type an answer]
18. How do you think research skills should be *assessed*? (What methods should be used to test your research knowledge and abilities)	[type an answer]
19. In the future we are hoping to create an open curriculum for research in Oral Health Professional Education. What are your thoughts on this and do you have any suggestions?	[type an answer]
END OF THE SURVEY Thank you for participating in our survey. If you have any further enquiries please contact research_officer@edsaweb.org	