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ORIGINAL ARTICLE

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O-HEALTH-EDU: A viewpoint into the current state of Oral Health Professional education in Europe: Part 1: Programme-level data

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Abstract

Introduction: Current legislation leaves Oral Health Professional (OHP) education open to wide interpretation and may result in significant variation in educational practice and resultant professional attributes across Europe. Data regarding the current state of OHP education across Europe is limited. The aim of Part 1 of this series is to provide programme-level data for Primary Dental Degree Programmes, Dental Hygiene and Postgraduate Education.

Methods: A 91-item questionnaire was developed following the Delphi method. The questionnaire and the Articulate glossary of OHP education terms were developed concurrently to facilitate a common understanding of language. Piloting was performed in multiple stages and included institutions internal and external to the research group. The questionnaire was uploaded online and converted to a data hub, allowing dental schools to control their own data and update the data provided whenever they wish. All ADEE member schools ($n = 144$) were invited to provide data. Forty questions relating to school details, Primary Dental Degree Programmes, Dental Hygiene and Postgraduate Education were included in this part of the series.

Results: Seventy-one institutions from 25 European countries provided data between June 2021 and April 2023, which represents a response rate of 49.3% of ADEE members. Programme-level data for Primary Dental Degree Programmes, Dental Hygiene and Postgraduate Education is presented including programme length, funding, languages and fees, student numbers and demographics, student admission and selection processes and permission to practice after graduation.

Conclusion: This series of papers, as far as the authors are aware, are the first attempts to build a comprehensive picture of the current state of OHP education in Europe. A comprehensive view of the state of OHP education in Europe is not yet *available* but the O-Health-Edu data hub provides a means for all education providers

in Europe to contribute data to reach this goal. It is anticipated that the data hub will be updated and *built* upon over time to continually establish a clearer picture of the state of OHP education in Europe.

KEYWORDS
dental education, dental hygienists, Europe, Oral Health Professionals, survey

1 | INTRODUCTION

The education of Oral Health Professionals (OHPs) is extremely important as, through developing the future workforce, it directly influences the adequacy and efficiency of oral health care services delivered to populations.[1]

1.1 | Regulation of Oral Health Professional education in Europe

OHP education is an umbrella term that reflects the diversity of the Oral Health workforce. It refers to qualified members of the Oral Healthcare team and usually includes dentists, hygienists, therapists, assistants and clinical dental technicians, although regulation across European countries varies.[2] The term "Dentist" is a protected title and the EU directive 2005/36/EC on the recognition of professional qualifications defines the education of dentists across Europe.[3] Currently there are no European directives to outline the education of other OHPs, including dental hygienists; this is managed at a national level, often with large variation.[4]

The directive for the education of dentists defines the length and level of study and the credits required to graduate in the EU and other recognised countries.[3,5] The Annex V3/5.3.1 of the directive defines a "study programme for dental practitioners".[3] It has been acknowledged that this annex does not reflect current practice in dental education with the Council of European Dentists (CED) and the Association for Dental Education in Europe (ADEE) proposing changes.[6] The limited information communicated in existing European regulations leaves dental education open to wide interpretation and may result in significant variance in practice across Europe.

1.2 | European OHP education – Current climate

There is limited knowledge of the current state of OHP education across Europe. This is emphasised by the fact that there is no data confirming the exact number of OHP schools across the European continent. The most recent Council of European Chief Dental Officers (CECDO) database recorded 220 'dental' schools and the CED's EU Manual of Dental Practice identified 200.[7,8] However, these sources only include 34 EU/EEA members and the World Health Organisation's (WHO) broader definition of Europe comprises 53 countries.[9] Previous studies to provide data on programme structures and educational practices are limited at a European level, as evidenced in two recent reviews.[10,11] Shanley et al.[12] published one of the first reports on educational practices from dental schools across Europe in 1997, although it is now considered largely outdated and had a limited sample size. The CED's EU Manual of Dental Practice and the CECDO database provide data regarding the number of public and private institutions, annual intakes, course duration and percentage of female graduates.[7,8] Naturally these two documents focus on the OHP workforce and therefore only gather educational data that provides insight into future workforce demographics. For dental hygiene, Luciak-Donsberger and Eaton[13] published data from a European survey regarding programme structure, curricula and professional regulation in 2009. Other educationally focused data for dental hygiene exist but these are mostly outdated.[14–16]

It is a concern that European-wide data is not available to facilitate visibility and transparency of educational structures and practices. Higher education institutions have an important role in protecting the population by ensuring all OHP graduates are safe to practice. As qualified dentists can move freely to live and work across many European countries, any variances in graduate skill-sets may result in inequities in both quality of care and healthcare coverage.[10]

1.3 | The O-Health-Edu project

O-Health-Edu is an EU-funded collaborative Erasmus + project that commenced in 2019. The overarching aims of the project are to better understand the existing state of OHP education in Europe and to develop a common vision of this education and support changes by 2030. The project commenced with a scoping review to uncover current reporting of OHP education in Europe.[10] The review identified four broad reporting themes:

- Dental education at a programme-level
- Dental education at a discipline-level
- Other OHP education
- Postgraduate education and continuous professional development (CPD)

The scoping review concluded that there is limited reporting of current educational practices in OHP education. Additionally, whilst there are numerous publications that provide recommendations

on teaching practice, there is little data regarding implementation of these practices. Recommendations for future reporting of OHP education were provided including a call for the collection of comprehensive, educationally driven programme-level data on OHP education across Europe. Further work from the O-Health-Edu project resulted in a consensus-agreed vision for OHP education in Europe[17] and Articulate – a glossary of OHP education terms.[2]

To achieve the aims of the O-Health-Edu project by understanding the current state of OHP education in Europe, a data collection process was required. Surveys are a common instrument used to collect data in dental education due to their relative ease of use and the ability to cover wide geographical areas.[18,19] However, surveys are cross-sectional, and data is controlled by the administrator of the instrument. The partners of the O-Health-Edu project decided to act upon the recommendations from the scoping review, to create a centralised online data hub to facilitate collection, organisation and analysis of pan-European data relating to OHP education.[10] This still conforms to accepted standards for survey methodologies but enables respondents (in this case OHP institutions) to be data controllers and therefore update the information provided when necessary. The online data hub also provides information that is visible to the public in the form of a European map and "report cards" (Figure 1). The map and report cards are accessible via the O-Health-Edu website (https://o-health-edu.org/report-cards-map).

The aim of this two-article series is to present data regarding OHP education from institutions representing a variety of geographical locations across Europe and to establish commonalities and trends. A specific objective of this paper is to provide programme-level data for Primary Dental Degree Programmes, Dental Hygiene and Postgraduate education.

2 | METHODS

This study received ethical approval from the Ethics Committee of the Universitat de Barcelona (IRB00003099, 5th October 2020).

2.1 | Instrument development and piloting

A 91-item questionnaire was developed by the O-Health-Edu project team. The topics of interest were conceptualised during an in-person meeting and stemmed from existing literature and the experiences of the group and ADEE. The questions were separated into the following groups:

- General Information on Survey Respondent (6)
- School Details (14)
- Programmes Offered (10)
- Primary Dental Degree Programme (20)
- Curriculum (14)
- Facilities (6)
- Quality Assurance (5)
- Dental Hygiene Programme (16)

The design phase of this ad-hoc questionnaire followed the Delphi method. The purpose of this method is to gather expert opinion on a specific topic and establish consensus by subjecting experts to successive waves of questioning.[20] Thus, the design of the questionnaire was carried out with a group of 11 European experts (O-Health-Edu project members that represented a range of geopolitical contexts and locations) who were iteratively solicited to reach a consensus for an initial version of the questionnaire. At each stage, a given version of the questionnaire was discussed with all experts and the opinions of each person and/or the justifications for the choices made or to be made were gathered. From then on, experts were invited to work together to come up with a new version according to the opinions collected, and this repeated until a final version was unanimously agreed. The objective was to develop questions that were understandable and valid for all respondents, regardless of their country of origin, the health care system in place in the country or the context of OHP education.

The content of the questionnaire was shaped by the scoping review, previous curriculum documents and topics of interest raised at ADEE meetings.[10,21–30] The writing of the Articulate glossary of OHP education terms occurred concurrently to the questionnaire development and all key terms within the questionnaire were included in the glossary.[2] This allowed consensus-agreed definitions to be linked to each question to facilitate a common language and uniformity in the understanding of key terms.

The questionnaire was first tested for face and content validity with the members of the O-Health-Edu steering & quality committee (17 members). The data and comments from this phase were analysed to develop an updated version of the questionnaire. A second stage of piloting occurred with a second group of 35 European OHP academics. Respondents were invited to complete the questionnaire and to evaluate the language used and the validity of the questions. Moreover, before the survey was distributed, a consultation phase was carried out with OHP stakeholders including CED (Council of European Dentists), FEDCAR (Federation of Regulatory Authorities), EDSA (European Dental Student Association) and ADEA (American Association of Dental Education). These pilot phases allowed for the development of a final version of the questionnaire that ensured quality and ease-of-use.

The questionnaire was subsequently uploaded onto the O-Health-Edu website (https://o-health-edu.org/ohe-datahub-directory) and developed into a data hub. The data hub allows institutions to access and control their own data by creating an account and completing the questionnaire online. Users (designated contacts from OHP institutions) can answer and edit any responses at any time to keep information up to date. An additional pilot was performed on the web-based system to ensure ease-of-use.

A total of 40 questions from the 91-item questionnaire are included in this part of the series as they related to school details (1), Primary Dental Degree Programme (18), Dental Hygiene (16), Postgraduate Education (5). All questions were in English; no

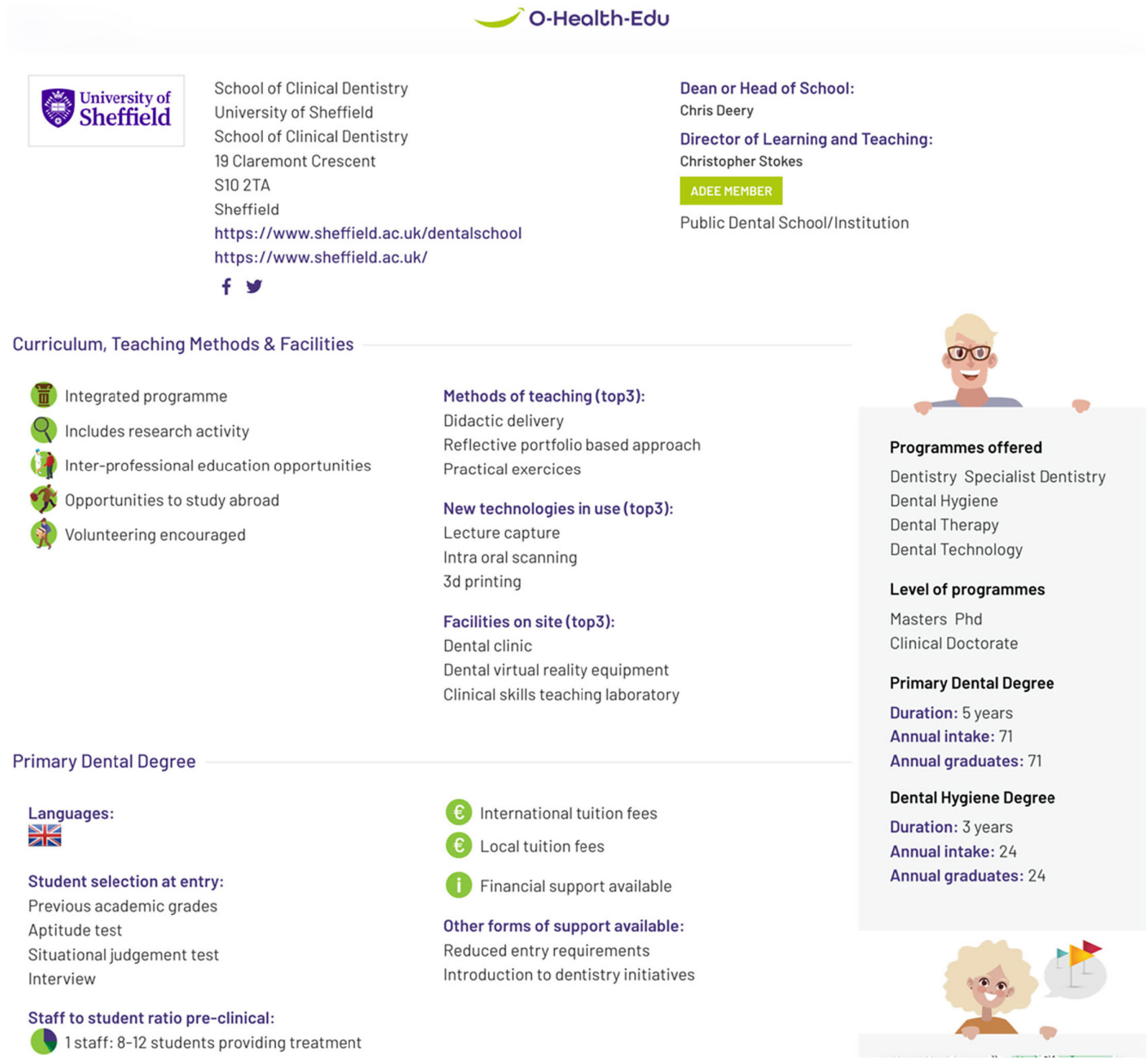


FIGURE 1 A screenshot of the report card from the University of Sheffield.

translations were made available. The questions used in this manuscript can be found in Appendix S1.

2.2 | Recruitment and data collection

All OHP schools in Europe were eligible to provide data for their institution, however as the exact number of OHP schools is not known, reaching all schools was impossible. All ADEE registered schools ($n = 144$) were sent an email invitation to register on the O-Health-Edu website and to provide educational data for their institution. Institutional contacts (either the Head of School/Dean or their designated contact) provided data for their institution. Emails were followed up regularly and ADEE members were supported to register during annual ADEE meetings. The initial objective was to obtain a response rate of 50% of ADEE member schools. Thus, efforts were made to increase the response rate. The survey was repeatedly offered by email to the ADEE member list as well as during face-to-face academic and research meetings using tablets. The distribution of the survey was also promoted on social media (LinkedIn, Twitter, Facebook and Instagram) from the accounts of ADEE, the O-Health-Edu project, project member accounts and European partner organisations.

Data from non-ADEE member institutions was included but these institutions were not directly invited due to challenges in locating them and finding relevant contact details. Technical experts and experienced academics were available if any institutional contact had any queries during data submission. Whilst data collection continues

indefinitely for the data hub, a cut-off period of 17th April 2023 has been used for the purposes of the data reported in this manuscript. Any data provided from institutions outside of the 53 European countries set out in the WHO definition of Europe was excluded.

2.3 | Statistical analysis

Descriptive statistical analysis was performed using the IBM SPSS Statistics program (version 26) to present data in counts and percentages. Microsoft Excel 2017 was used to represent the results in tables and graphs. Owing to the small and non-representative sample of the many schools throughout Europe, few comparisons between groups of schools were made.

3 | RESULTS

A total of 71 institutions from 25 countries provided complete data between 8th June 2021 and 17th April 2023. This represents a response rate of 49.3% of ADEE member institutions. All countries represented in the data are included in Table 1. Countries with the most respondents were France and Spain, with 11 and 10, respectively. Eight schools from each of Great Britain, Italy and Turkey also participated. Programme-level data for OHP programmes will be presented in two sections: (i) Primary Dental Degree Programmes (71 submissions) and Dental Hygiene (25 submissions) and (ii) Postgraduate Degree Programmes (64 submissions).

To facilitate organisation of content and ease of reading, the results have been categorised into the following:

Primary Dental Degree and Dental Hygiene Programmes:

- Programme Length
- Programme Funding and Fees
- Extra Costs
- Student Numbers and Demographics
- Student Admission and Selection
- Language of Study
- Permission to Practice after Graduation

Postgraduate Education

- Language of Study
- Programme Fees
- Postgraduate Study Programmes

3.1 | Primary Dental Degree and Dental Hygiene Programmes

In Articulate, a Primary Dental Degree Programme (PDDP) is defined as "A course of study resulting in qualification as a dentist".[2] The definition or scope of practice for dental hygiene (DH) is not as well-defined but Jongbloed-Zoet et al.[4] established two core activities for dental hygienists in Europe: education and promotion activities relating to preventive oral health and examination, diagnosis and provision of preventive dental care.

3.1.1 | Programme length

More than three-quarters of dental schools ($n = 54$) deliver their PDDP over 5 years, 16 schools deliver it over 6 years, and one school in 4 years (Table 1). Institutions within the same country mostly align in programme duration although a few exceptions were noted. Twenty-five of the 71 respondent schools also provided data about their DH programmes. The most common programme duration is 3 years (68%) and to a lesser extent 2 years (20%) (Table 1).

3.1.2 | Programme funding and fees

The majority of respondent OHP schools (71.8%) are publicly funded, with 12.7% privately funded and 15.5% of schools receive a combination of state and private funding. When asked to provide information regarding the fees associated with PDDP and DH programmes, between 14 and 18 schools selected the not applicable option and the rest selected the fee range pertaining to their school. Data for tuition fees across all programmes are included in Figure 2. Of those schools, approximately 50% request fees of less than €5000 per year for home students in pre-clinical years, with the remainder requesting up to €15 000 except for one school which charges fees between €20 000 and €25 000 per year. In clinical years, almost 50% of schools still request fees of less than €5000, but three schools charge between €20 000 and €25 000. For international students, the fee ranges are distributed across all response options; however, 12.7% of schools request fees of greater than €20 000 in pre-clinical years and 18.3% request greater than €20 000 in clinical years. The home fees associated with DH degree programmes are less than €15 000 per year, with 60% requesting less than €5000. The international fees range from €500 or less to a maximum of €50 000, although 40% of schools still request fees less than €15 000.

3.1.3 | Extra costs

In addition to tuition fees, many schools also reported imposing extra costs associated with dental materials and/or equipment use for their PDDP (Table 2). The median amounts charged are €1000 for pre-clinical activities and €1500 for clinical activities in total. Eighteen schools offer financial support for pre-clinical activities and seven offer support for clinical activities. Further, five schools report that

TABLE 1 Duration of primary dental degree and dental hygiene programmes by country.

	Primary Dental Degree Programme				Dental Hygiene Programme					
Country	5 years	6 years	Other	Total	1 year	2 years	3 years	4 years	Other	Total
Belgium	1	0	0	1						
Croatia	0	1	0	1						
Cyprus	1	0	0	1						
Denmark	0	1	0	1	0	0	1	0	0	1
Estonia	1	0	0	1	0	0	1	0	0	1
France	11	1	0	12						
Georgia	1	0	0	1						
Germany	1	0	0	1						
Greece	1	0	0	1						
Hungary	2	0	0	2	1	0	0	0	0	1
Ireland	2	0	0	2	0	2	0	0	0	2
Israel	0	1	0	1	0	1	0	0	0	1
Italy	0	8	0	8	0	0	7	0	0	7
Lithuania	2	0	0	2	0	0	0	1	0	1
Latvia	1	0	0	1	0	1	0	0	0	1
Malta	1	0	0	1	0	0	1	0	0	1
Netherlands	0	1	0	1						
Norway	1	0	0	1	0	0	1	0	0	1
Poland	0	1	0	1						
Portugal	3	0	0	3	0	0	1	0	0	1
Romania	0	1	0	1	0	0	1	0	0	1
Spain	9	1	0	10						
Sweden	1	0	0	1						
Turkey	8	0	0	8						
United Kingdom	7	0	1	8	0	1	4	0	1	6
Total	54	16	1	71	1	5	17	1	1	25

Note: Of the Other responses for PDDP: 1 respondent = 4 years graduate entry programme. Of other responses for DH programme: 27 months.

there are extra fees associated with dental materials and/or equipment for their DH programme (Table 2); and of these, four state that financial support is available to help students pay these fees.

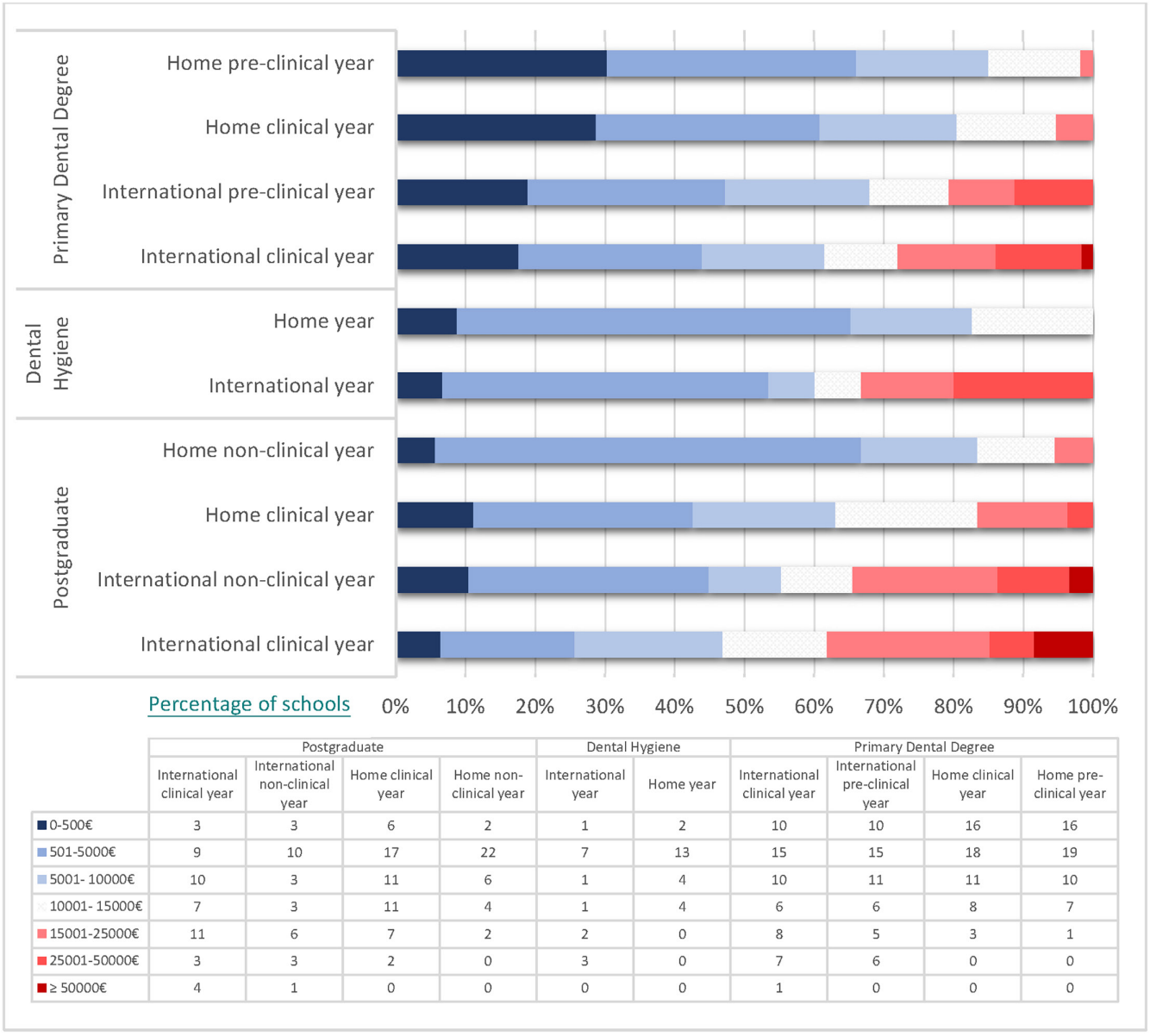
3.1.4 | Student numbers and demographics

Over 57% of schools accept between 61 and 150 students per year in their PDDPs (Table 3), and over 56% of schools estimated their percentage of female graduates to be between 51% and 70% (Table 4). Indeed 80% of schools estimated more than half the graduating class will be female. In contrast, two schools estimate 10% or less of their graduates will be female. For DH programmes, class sizes appear comparatively smaller with 92% of schools accepting 40 or fewer and 48% accepting 20 or fewer students per year (Table 3). Eleven schools estimated that more than 90% of their DH graduating class is female, and 23 estimate their female graduates outnumber their males (Table 4). In contrast, two schools estimate that females will only make up 21%–30% of graduates.

With respect to the nationality of graduates, the mean and median percentage of PDDP graduates of those from other EU countries outside of where the school is located is 7.7 (CI: 4.5, 10.9) and 2.3. The mean and median percentage from non-EU countries is 13.9 (CI: 7.9, 19.9) and 5.0.

3.1.5 | Student admission and selection

Student admission numbers in PDDPs are set by national or regional bodies for most schools (73.2%), while they are set locally by the university for the rest. A similar majority of schools (76.1%) recruit most of their students from secondary school, while 19.7% recruit mostly from university level pre-dental programmes and 4.2% have other recruitment pathways (Table 5). Student selection is conducted by different organisations but most often by a national body (41.3%) or the university and/or partner university (36%) (Figure 3). Dental schools select their prospective students in only 19% of respondent institutions.



	Postgraduate				Dental Hygiene		Primary Dental Degree			
	International clinical year	International non-clinical year	Home clinical year	Home non-clinical year	International year	Home year	International clinical year	International pre-clinical year	Home clinical year	Home pre-clinical year
0-500€	3	3	6	2	1	2	10	10	16	16
501-5000€	9	10	17	22	7	13	15	15	18	19
5001- 10000€	10	3	11	6	1	4	10	11	11	10
10001- 15000€	7	3	11	4	1	4	6	6	8	7
15001-25000€	11	6	7	2	2	0	8	5	3	1
25001-50000€	3	3	2	0	3	0	7	6	0	0
≥ 50000€	4	1	0	0	0	0	1	0	0	0

FIGURE 2 Comparison of tuition fees across programmes, Home or International, clinical and non-clinical years.

TABLE 2 Extra costs associated with dental materials and/or equipment in Primary Dental Degree ($n = 71$) and Dental Hygiene programmes ($n = 25$).

	Primary Dental Degree Programme			Dental Hygiene Programme		
	Count (*n*)	%	Mean, median amounts	Count (*n*)	%	Mean, median amounts
No	23	32.4		20	80.0	
Yes for pre-clinical activities	42	59.2	1178, 1000 (SD = 1120)	5	20.0	612, 260 (CD = 611)
Yes for clinical activities	21	29.6	1601, 1500 (SD = 1314)			

Student numbers in DH programmes are most often dictated by a national body (60%) or set locally by the university (40%). DH students are mostly recruited from secondary school (84%), although four schools report alternative pathways (Table 5). The selection of students into DH programmes most often is determined by the universities and/or dental schools themselves (Table 6). For five DH programmes, a national body is involved in student selection; and in another case, selection is performed through a national third level application service.

Several different criteria are used in the selection of students for the PDDPs (Figure 4). Most commonly, previous academic grades (50.7%) and written examinations conducted by the region/country (46.5%) are used. Further, only 10 of the 71 participating schools require some post-high school study prior to enrolment on a PDDP. These requirements vary and some range from a single year of study in health sciences to completion of an undergraduate degree.

Similarly, DH students are selected using a variety of methods (Figure 4). The most common criteria used to select DH students include academic grades (56%) and written examinations (40%). No schools use a practical test. Further, three schools require that students complete some post-secondary school study prior to beginning their DH programme: college level education in nursing or dental assisting, dental assistant qualification or study at a pre-university college that leads to European Qualification Framework (EQF) level 5.

OHP schools use many different strategies to widen participation in PDDP and DH programmes from under-represented groups (Figure 5). Most often, PDDPs use scholarships (66.2%) and to a lesser extent: community engagement (28.2%), reduced entry requirements (23.9%) and introduction to oral healthcare initiatives (21.1%). DH programmes use similar strategies.

TABLE 3 Students accepted into Primary Dental Degree ($n=71$) and Dental Hygiene programmes ($n=25$) each year.

	Primary Dental Degree Programme		Dental Hygiene Programme	
	Count (*n*)	%	Count (*n*)	%
Fewer than 10	1	1.4	3	12.0
11–20	3	4.2	9	36.0
21–40	9	12.7	11	44.0
41–60	10	14.1	1	4.0
61–80	13	18.3	1	4.0
81–100	14	19.7		
101–150	14	19.7		
151–200	5	7.0		
201–250	2	2.8		

TABLE 4 Estimated percentage of female graduates in Primary Dental Degree ($n=71$) and Dental Hygiene programmes ($n=25$).

	Primary Dental Degree Programme		Dental Hygiene Programme	
	Count (*n*)	%	Count (*n*)	%
0–10	2	2.8		
11–20	2	2.8		
21–30	0	0.0	2	8.0
31–40	1	1.4		
41–50	9	12.7		
51–60	16	22.5		
61–70	24	33.8	1	4.0
71–80	12	16.9	6	24.0
81–90	4	5.6	5	20.0
91–100	1	1.4	11	44.0

3.1.6 | Language of study

Thirteen schools (18.3%) offer PDDPs in a different language from the main language of instruction. At least one school in each of the following countries offers instruction in English: Croatia, Hungary, Latvia, Lithuania, Poland, Romania, Spain and Turkey; while one school in Hungary also offers instruction in German, and a school in Spain offers Catalan.

3.1.7 | Permission to practice after graduation

Upon graduation from PDDPs, 54 schools (76.1%) report that their students are permitted to practice immediately (Table 7). For five schools, permission depends on which health system the student is wanting to work in. Two schools stated that their students need to complete 1 year of vocational training. Ten schools stated that their

TABLE 5 Most common source of recruitment of students in Primary Dental Degree ($n=71$) and Dental Hygiene programmes ($n=25$).

	Primary Dental Degree Programme		Dental Hygiene Programme	
	Count (*n*)	%	Count (*n*)	%
High school	54	76.1	21	84.0
University level pre-dental programme	14	19.7	0	0
Other	3[a]	4.2	4[b]	16.0

[a]Of the Other responses for PDDP: 1 respondent = Colleges that provide EQF Lev 5; 1 respondent = DH and prosthesis, vocational training; 1 respondent = majority are recruited after compulsory military service following secondary school.

[b]Of the Other responses for DH: 1 respondent = Mix of school leavers and professionals; 1 respondent = Nurses, dental assistants; 1 respondent = Pre-University College that leads to EQF Level 5; 1 respondent = must have EQF Level 4, although many work as dental assistants prior to studying dental hygiene.

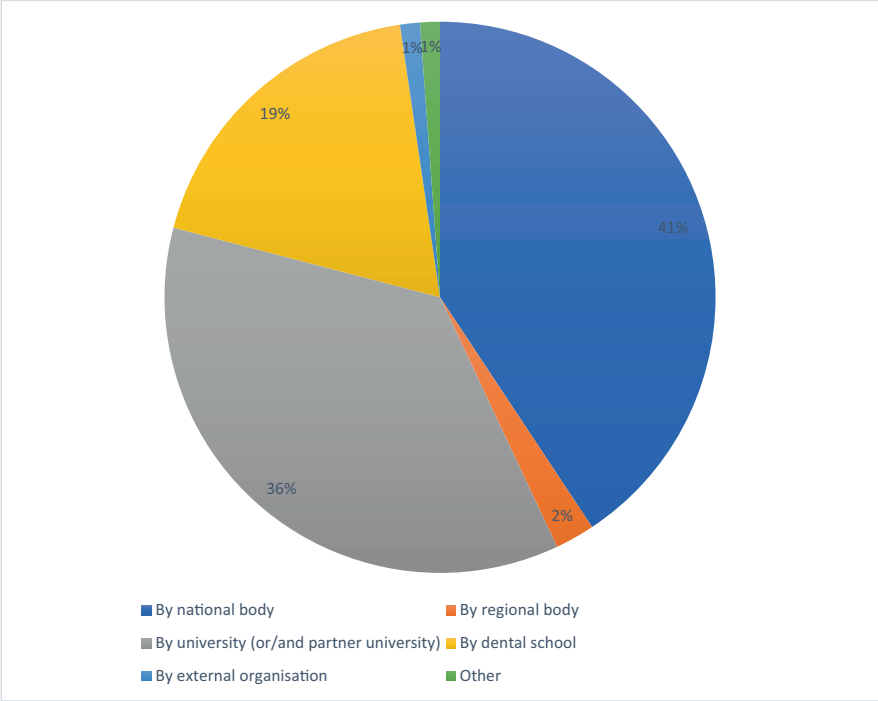


FIGURE 3 Student selecting bodies on Primary Dental Degree Programmes. Of the Other responses: 1 respondent = CAO (Irish Central Applications Office); 1 respondent = TMS (Test for Medical Studies).

TABLE 6 Selection of students in Dental Hygiene programmes ($n = 25$).

N = 25	Count	%
By national body	5	20
By regional body	0	0
By university (or/and partner university)	12	48
By dental school	12	48
By external organisation	0	0
Other	1	4

Note: Of the Other responses: 1 respondent = CAO (Irish Central Applications Office).

students must pass a state examination to practice. One school stated that further formal study is required.

Upon completion of their DH programmes, graduates from 24 of the 25 schools who participated are permitted to practice immediately (Table 7), although at least one school report that graduates must complete one year of post-graduate vocation training.

3.2 | Postgraduate degree programmes

3.2.1 | Language of study

Postgraduate dental programmes are delivered in 16 different languages by the 64 schools that provided information about their post-graduate programmes. Sixteen schools offer programmes in a language other than the primary language of instruction. In Italy, five schools offer instruction in English as well as in Italian. In Spain, two schools offer instruction in English in addition to Spanish, and one school whose primary language is English offers alternative instruction in Spanish. One school in each of the following countries offers alternative instruction in English: Croatia, Greece, Sweden, Hungary, Lithuania, Poland, Portugal and Romania.

3.2.2 | Programme fees

The home fees associated with post-graduate non-clinical years or programmes most commonly are between €2001 and €5000 per year (21.9%) (Figure 2). That said, 28 of the 64 schools selected the 'Not applicable' response option. For clinical years, only 10 schools selected the Not applicable response option; and 53.2% of schools report their tuition fees to be less than €10001 per year. The upper range of fees is €25001–€50000.

The most common range for international fees associated with post-graduate non-clinical years is also between €2001 and €5000 (14.1%) (Figure 2). However, more schools request fees greater than €20000 for international fees compared to home students. The most common range for postgraduate clinical years is higher between €5001 and €10000 (15.6%); but 40% of schools reported higher tuition fees than this range.

3.2.3 | Postgraduate study programmes

A variety of levels of post-graduate programmes are offered (Table 8). Fifty-six of the 64 schools offer PhD research programmes (87.5%) and the next most common programmes are Masters (65.6%)

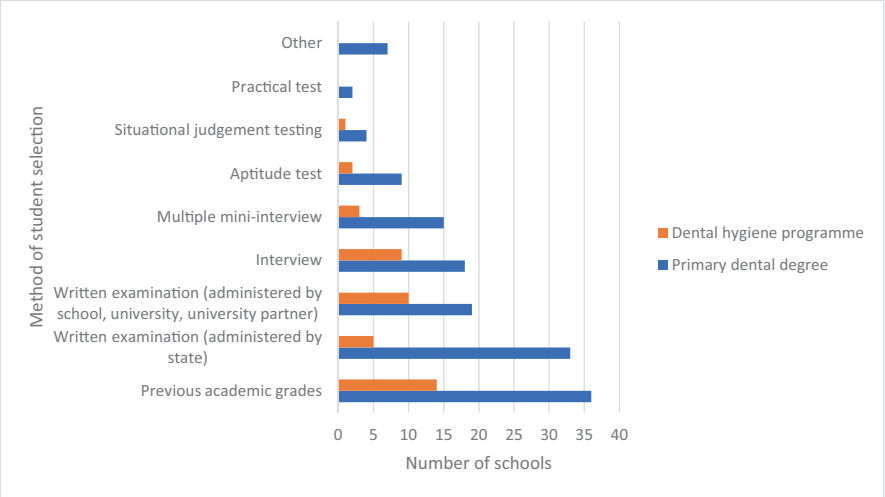


FIGURE 4 Number of schools using these methods of student selection in Primary Dental Degree and Dental Hygiene programmes. Of the Other responses: 1 respondent = ?; 1 respondent = A-level (Abitur), test for medical studies (TMS), years in PQE (Berufserfahrung), apprenticeship in medical field; 1 respondent = Academic test; 1 respondent = Information provided in application forms; 1 respondent = National University Entrance Exam; 1 respondent = personal portfolio; 1 respondent = Written and oral examination; 1 respondent = Written examination administered by our regional body.

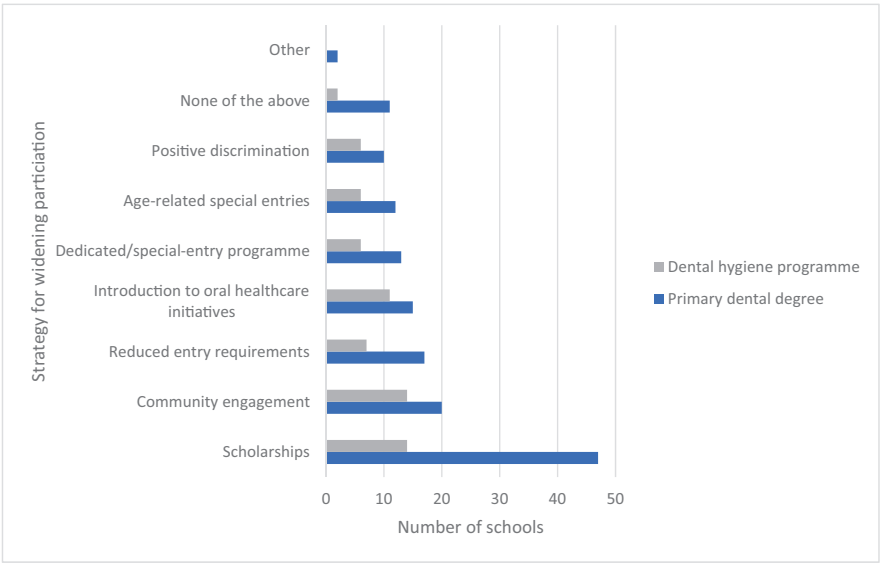


FIGURE 5 Strategies for widening participation of under-represented groups in Primary Dental Degree and Dental Hygiene programmes. Of the Other responses: 1 respondent = Places are reserved for people wishing to make a professional reconversion and who already have a university education; 1 respondent = University provides a pre-dental year foundation programme.

TABLE 7 Permission to practice as a dentist ($n = 71$) or dental hygienist ($n = 25$) immediately after graduation from respective programmes.

	Primary Dental Degree Programme		Dental Hygiene Programme	
	Count (*n*)	Percent (%)	Count (*n*)	Percent (%)
Depends in which health system they want to work	5	7		
No	12	16.9	1	4
Yes	54	76.1	24	96

Note: 1 respondent for a DH programme reported that one year of post-graduate vocational training is required.

and postgraduate diplomas (59.4%). Further, schools offer a wide variety of programmes across the disciplines of dentistry (Table 9). The two most common postgraduate programmes offered and associated with specialist status are Orthodontics and Oral Surgery, while the four most common not associated with specialist status are Implantology, Endodontics, Periodontics and Prosthodontics.

4 | DISCUSSION

This study achieved the aim of presenting data regarding OHP education from institutions representing a variety of geographical locations across Europe. Further data regarding curriculum structure, facilities, staffing (faculty) and quality assurance are presented in Part 2 of this series.

4.1 | Primary Dental Degree Programme and Dental Hygiene

Institutions from 25 European countries, including 20 European Union member states, provided data for their respective programmes. Within these countries there were no submissions for DH programmes in Belgium, Croatia, Cyprus, France, Georgia, Germany, Greece, Netherlands, Poland, Spain, Sweden and Turkey. DH regulation varies across Europe and some countries do not recognise the profession (e.g. France). The profession of DH has been increasingly adopted across European countries since the early 2000s with the European Federation of Periodontology and the European Dental Hygienists Federation stating that 26 EU/EEA countries recognised DH in 2018.[13,31] Adding further complexity, DH forms a group of wider professions in some countries – termed dental hygiene and dental therapy. In the UK, dental hygiene and dental therapy are separate professions with different scopes of practice, with many programmes offering dual qualification.[13,32] The terminology and scope of practice of these professionals vary on a country-by-country basis. These diverse terms are replicated across OHP programmes and therefore presence or absence of data submissions may be related to the challenges in understanding and terminology.

TABLE 8 Levels of postgraduate OHP programmes offered ($n = 64$).

	Count	%
Postgraduate diploma	38	59.4
Masters	42	65.6
PhD	56	87.5
Clinical doctorate	15	23.4
Doctor of Education (EdD)	1	1.6

4.1.1 | Programme length

The EU directive 2005/36/EC, and the amendment 2013/55/EU, state that PDDPs must have a minimum duration of 5 years and 5000 hours full-time theoretical and practical training.[3,5] In this dataset, most schools deliver 5-year programmes with less than a quarter of schools delivering 6-year programmes. Programme lengths tend to cluster by country in response to national regulations. According to the CED's Manual of Dental Practice, 10 EU/EEA countries deliver their PDDPs over more than 5 years and countries within this dataset include Croatia, Estonia, France, Germany, Netherlands and Romania.[8] The data presented within the CED's Manual of Dental Practice aligns with some of our findings, although there are some inconsistencies across countries. Within our dataset it can be noted that some respondents from the same country provided different information for PDDP duration. This may be an accurate representation of variation within countries or there

TABLE 9 Postgraduate programmes offered ($n = 64$).

	Not offering this programme (*n*)	Available but not associated with specialist status (*n*)	Available and associated with specialist status (*n*)
Orthodontics	8	12	43
Oral surgery	11	15	36
Periodontics	13	25	21
Implantology	15	30	7
Endodontics	16	26	21
Paediatric dentistry	16	19	27
Prosthodontics	16	25	20
Restorative dentistry	22	22	11
Aesthetic dentistry	25	21	6
Oral medicine	27	14	10
Oral pathology	29	16	5
Occlusion/TMD	29	15	5
General clinical dentistry	30	12	9
Special care dentistry	30	11	7
Radiology (dental and maxillofacial)	33	8	10
Dental Public Health	37	8	4
Oral microbiology	43	1	3

may be confusion between programme length and the expected length of study. Attempts were made by the research team to avoid this confusion by providing links in the questionnaire to the exact definitions within the Articulate glossary.[2] Some countries require prospective dental students to undertake a basic science or foundation year, and this may be perceived as a component of dental programmes. Additionally, some respondents provided details of 4-year graduate-entry programmes and in essence these are 5-year programmes with approved prior learning from previous terms of study. The length of study for DH is also variable and will likely reflect the differences in the scope of practice across countries – with a more limited scope of practice potentially requiring shorter periods of study. Three-year Bachelor length programmes are the most common within this dataset.

4.1.2 | Programme funding

The percentage of schools that are privately funded within this dataset is similar to the CECDO database and the CED Manual of Dental Practice that estimated 14% and 9%, respectively.[7,8] Importantly, these results reflect the opinions of staff who feel their institution is funded in this way. There may be differences in interpretation of the question as some institutions are predominantly funded by the state and this funding enables them to deliver their core programmes; however, these same institutions may have commercial agreements with other stakeholders or receive funding through donations.

4.1.3 | Programme fees

It is interesting that a high number of schools (between 14 and 18) selected the 'not applicable' option with regard to home and international fees for both PDDP and DH programmes. The reasons for this may be that participants do not offer the programme, could not answer the question or did not want to share this information. By way of an example: in Ireland tuition is free for most EU students, although there is a "student contribution" of a maximum of €3000 – thereby making completion of this question challenging.[33] It is evident that fees vary significantly across Europe for OHP programmes, but it is positive that 50% (PDDPs) and 60% (DH) of respondent schools reported tuition fees of less than €5001. International fees are commonly higher than home fees across all programmes. It appears from the data that very few schools charge extra tuition fees for the clinical years of PDDP or DH. However, many institutions ask students to pay additional fees for pre-clinical and clinical activities. These fees present a substantial additional cost to students and financial support is not available in many contexts. Considering the high fees associated with OHP programmes and limited uptake of widening participation strategies in some contexts, existing inequalities in the profession may remain.

4.1.4 | Student numbers

Across Europe, OHP student numbers are predominantly determined by national or regional bodies (e.g. regulators, governmental departments), with a smaller proportion determined locally by the university or school. Regardless of who determines the student admission numbers, programmes should be aligned with future visions for the workforce to avoid inequity in the distribution of OHPs and resultant services across the continent. Student admission numbers were reported between 61 and 150 students per year across most PDDPs. It is of note that one school admits fewer than 10 students and two schools admit more than 200 students per year. It would be of interest for future work to note how programme structure, curricula, facilities and staffing differs in institutions with such vast disparities in admission numbers. There is less variance in DH, with generally smaller student cohorts. The difference in students admission numbers between PDDPs and DH is of interest and is likely to change in the future in light of the recent WHO Global Strategy on Oral Health.[1] This report recommends changes to the OHP workforce by increasing 'mid-level oral health care providers' to respond to population oral health needs.[1] Due to the evolving nature of the data hub, institutions can change the data they have provided, which will enable stakeholders to follow changes in OHP workforce numbers.

4.1.5 | Student demographics

With regard to gender distribution of students on dental and DH programmes, there appears to be a higher reported proportion of females on both programmes. There are exceptions within both programmes and trends across Europe will replicate cultural differences across the European continent. This data aligns with the CED Manual of Dental Practice and the CECDO database that estimate the number of female graduates from PDDPs to be between 60% and 70%.[7,8] In the early 2000's it was estimated that 96.5% of European dental hygienists were female.[34] Our data suggests that most graduates of DH in Europe will continue to be female; however, male numbers may be increasing compared to previous estimates. Two recent narratives uncovered existing inequalities in the oral health workforce that have persisted irrespective of the increase in female OHPs, particularly across different ethnic groups.[35,36]

4.1.6 | Student admission and selection

Most students reportedly enter their PDDP and DH programmes directly from high-school and this differs to models in other regions of the world such as North America.[37] Almost 20% of schools delivering PDDPs recruit primarily from university level pre-dental programmes. These may include foundation or basic science years, or graduate entry programmes whereby students must demonstrate

approved prior learning through the completion of a university level degree. DH follows a similar trend – most institutions recruit students directly from high-school. Sixteen percent of respondent DH schools selected 'other' which included recruiting qualified OHP professionals (nurses/assistants, technicians) and other post-high school study. It is acknowledged that recruitment regulations are often managed by universities for DH and the level of programme (EQF level 5 or 6) will impact on the entrance requirements and therefore the nature of the cohort admitted. There is a risk of excluding valuable members of the current OHP workforce if entrance requirements are too restrictive.

The management of student selection is variable across Europe for PDDPs with an interesting observation that most European OHP schools do not select their own students. The data is different for DH where universities and dental schools predominantly control the student selection process. Methods of student selection for both programmes appear similar, with previous academic grades, written examinations and interviews being the most reported. Other means of student selection including situational judgement aptitude tests were administered by less than 10 OHP schools. It is of interest that a very low number of schools ($n=2$) include practical tests in their selection processes considering the practical nature of the profession.

There is limited evidence and few recommendations on student selection processes in the dental education literature. A report by a group of international educators that stemmed from the DentEdEvolves Thematic Network Project considered best practices in student selection including aptitude tests, written examinations, and interviews.[38] According to our data, these practices appear to be adopted for the most part across Europe – although these recommendations are now more than 20 years old. Additionally, a factor analysis study in the UK utilising a multiple mini-interview approach to student selection demonstrated the importance of assessing both 'soft' skills (e.g. communication, empathy) and sensorimotor abilities.[39] Due to the popularity of OHP programmes and resultant applicant numbers, bodies that govern student selection will inevitably need to find a balance between idealism and feasibility.

With regard to strategies of widening participation of underrepresented groups in higher education, scholarships are most common within this dataset. Scholarships largely refer to support measures to overcome financial barriers that may impact one's ability to enrol on an OHP course. These approaches are important as financial reasons are perceived as a significant barrier by prospective OHP students from underrepresented groups.[40,41] However, financial concerns are not the only barrier – limited exposure to the oral health professions, a lack of community support and role models are also significant issues. Methods to confront these barriers that focus on education and opportunities (community engagement, reduced entry requirements and introduction to oral healthcare initiatives) appear less common. More than 10 OHP schools either do not offer widening participation strategies or do not undertake any of the methods outlined in the questionnaire.

4.1.7 | Language of study

Most OHP schools offer programmes in a single language, most commonly the national language of the country. However, there is a significant proportion of schools that offer programmes in multiple languages which may help in attracting international students and provides opportunities for institutions to grow. Some institutions within countries that have a second national (or regional) language may offer students opportunities to sit certain components of their programme in another language, although many do not deliver a whole programme in these languages. Additionally, some institutions deliver theoretical components in multiple languages but often conduct clinical education in the national language to support communication with the local patient population.

4.1.8 | Permission to practice after graduation

Approximately 78% of schools reported their graduating dentists can practice immediately after graduation from their respective programmes. The remaining schools reported that either state examinations or a period of vocational training must be completed prior to commencing independent practice as a qualified professional. According to the CED's Manual of Dental Practice, graduates from Belgium, Croatia and Slovenia must complete 1 year of vocational training regardless of the healthcare system, whilst graduates from Germany, Switzerland and the United Kingdom must complete 1 year of vocational training to work in the National Health Service.[8]

4.2 | Postgraduate programmes

It was not within the scope of the data collection to focus on the finer details of postgraduate programmes across Europe. It can be acknowledged that many institutions across Europe offer postgraduate programmes in languages different from the national language and this is predominantly English. As for PDDPs, this likely stems from a desire to increase international student numbers and associated benefits to the institution.

Postgraduate tuition fees vary across Europe with a general sense that postgraduate fees are higher than those for undergraduate programmes. In comparison to undergraduate programmes (PDDP and DH), postgraduate fees are generally more expensive, with greater saturation from the more than €15 000 per year options. This is likely to result from greater costs in hiring staff to deliver these courses and additional equipment that may be required.

OHP schools across Europe offer a wide range of postgraduate programmes across numerous levels – from postgraduate diplomas to research, clinical and education doctorates. Only one school within the dataset did not offer postgraduate programmes at the time of submission. It appears that institutions do not prioritise postgraduate research programmes in education with only one school offering a Doctor of Education (EdD) programme.

It can be concluded from the dataset that OHP institutions are also offering a wide range of programmes, with 551 programmes offered from the discipline list in the questionnaire, making a mean of 8.6 postgraduate programmes per OHP institution ($n = 64$). The number, definition and acceptance of individual disciplines within dentistry vary hugely across Europe.[42] In the EU, the most recent directive only recognises two specialties: Oral Surgery and Orthodontics.[3] However, this document only recognises formal qualifications that lead to speciality recognition within member countries, it does not regulate the education or acceptance of specialties – this is managed by individual countries. This has led to wide disparity with some countries recognising no specialties (e.g. Spain) and others recognising many (e.g. United Kingdom – 13 specialties). It is also likely, due to this variance, that understanding of the terminology will lead to confusion, with some countries heavily regulating the specialist title whilst others adopt the title "specialist" after completing any form of postgraduate study. According to the EU directive 2013/55/EU, postgraduate programmes that lead to specialty status must be a minimum of three years duration and approved by competent authorities or bodies in each country.[5]

As expected, the two EU-recognised specialties of Oral Surgery and Orthodontics are the most prevalent programmes across Europe, with Periodontics, Endodontics, Prosthodontics and Paediatric Dentistry also very popular. To further add to the confusion, specialty training is delivered by hospitals in some countries rather than universities and this may have also impacted responses. Due to the large disparities in regulation of specialities across Europe it is impossible to analyse the dataset further.

4.3 | Limitations of the research

This was an ambitious project that aimed to establish a viewpoint on the current state of OHP education in Europe and in many respects, this has been achieved. As the data hub remains live, this series of papers will hopefully provide a foundation, with the hope of gaining more data in the future. There are some limitations within this dataset that should be highlighted. It is challenging to generalise the findings of this research to OHP education across the whole of Europe. The reasons for this are: (i) the exact number of OHP schools across Europe is not known, (ii) the dataset does not cover all regions of Europe. It is not the aim of this manuscript to provide generalisable statements on European OHP education, but rather it is to provide insight into existing structures from a large group of institutions across many European countries and to draw comparisons of different practices and approaches.

It is feasible that there could be an element of sampling bias within this survey as ADEE member OHP schools were invited to provide data. The researchers were aware of this from the outset of the project, and it was impossible to resolve due to challenges in communicating and finding non-ADEE members in Europe. Additionally, it could be hypothesised that ADEE members schools are more engaged in educational processes and perhaps are quicker to adopt new practices, again which impacts the generalisability of this data. As with any data from surveys there is risk of response bias whereby respondents provide inaccurate data that adopt to perceived standards or desirable options.

A final consideration is the questionnaire being written in English exclusively. This was intentional as translation of the consensus-agreed terminology from the Articulate glossary would likely have resulted in unidentifiable changes in meaning which would have impacted the accuracy of the responses. It is acknowledged that using English for a survey that spans a continent of multiple languages may have provided challenges in answering some questions and misunderstandings may be present in the data. As the project team members are based in a large area of the European continent and speak multiple languages, attempts were made to limit this by offering support when needed.

5 | CONCLUSION

This series of papers, as far as the authors are aware, are the first attempts to build a comprehensive picture of the current state of OHP education in Europe. This education is unique – with multiple different interpretations and contexts demonstrated in this dataset. Within this paper, important trends and variances have been identified for Primary Dental Degree, Dental Hygiene and Postgraduate programmes across Europe. Most importantly, questions have been raised to support key changes to OHP education in the future.

A comprehensive view of the state of OHP education in Europe is not yet *available* but the O-Health-Edu data hub provides a means for all education providers in Europe to contribute data to reach this goal. In the future, as the O-Health-Edu project *concludes*, ADEE will oversee the functionality and branding of the data hub. It is anticipated that the data hub will be updated and *built* upon over time to continually establish a clearer picture of the state of OHP education in Europe. This is call for collaboration across all institutions and education stakeholders to develop OHP education for the future.

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CONFLICT OF INTEREST STATEMENT

No conflict of interest has been declared by the authors.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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