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Oral Health Policy and Research Capacity: Perspectives From Dental Schools in Africa



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ABSTRACT

Introduction and Aims: The prioritisation of oral health in all health policies in the WHO African region is gaining momentum. Dental schools in this region are key stakeholders in informing the development and subsequent downstream implementation and monitoring of these policies. The objectives of our study are to determine how dental schools contribute to oral health policies (OHPs) in this region, to identify the barriers to and facilitators for engaging with other local stakeholders, and to understand their capacity to respond to population and public health needs.

Methods: We developed a needs assessment survey, including quantitative and qualitative questions. The survey was developed electronically in Qualtrics and distributed by email in February 2023 to the deans or other designees at dental schools in the WHO African region. Data were analysed in SAS version 9.4 and ATLAS.ti.

Results: The capacity for dental schools to respond to population and public health needs varied. Most schools have postgraduate programs to train the next generation of researchers. However, these programs have limitations that may hinder the students from achieving the necessary skills and training. A majority (75%) of respondents were aware of the

Abbreviations: MoH, Ministry of Health; OHP, oral health policy; OHPs, oral health policies; WHO, World Health Organization

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existence of national OHPs and encountered a myriad of challenges when engaging with them, including a lack of coordination with other stakeholders, resources, and oral health professionals, and the low priority given to oral health. Their strengths as technical experts and researchers was a common facilitator for engaging with OHPs.

Conclusion: Dental schools in the region face common challenges and facilitators in engaging in the OHP process. There were several school-specific research and training capacities that enabled them to respond to population and public health needs. Overall, shared challenges and facilitators can inform stakeholder dialogues at a national and subnational level and help develop tailored solutions for enhancing the oral health policy pipeline.

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Introduction

Oral diseases pose a tremendous global burden on patients, providers, and healthcare systems. The burden is particularly troubling in the WHO African region (Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Togo, Uganda, United Republic of Tanzania, Zambia, and Zimbabwe), with approximately 44% of the population across all age ranges having oral diseases.¹ In the last 3 decades, and compared to other regions globally, the WHO African region has also experienced the fastest rise in oral diseases.¹ Although global health stakeholders such as the WHO² and FDI³ recognise oral health as an integral component of general health and well-being, it is still not prioritized or even included in general health policies.⁴ Many countries, including almost half of those in the WHO African region, lack national OHPs.¹

Oral diseases share common risk factors⁵ with many other noncommunicable diseases (NCDs).⁶ However, oral health is still not fully integrated into NCD frameworks and programs.⁷ The WHO Regional Office for Africa (WHO AFRO) used the “global and international momentum on noncommunicable diseases towards universal health coverage (UHC) for oral health for all” as a springboard to prioritise oral health in the region by developing a regional strategy.⁸ Addressing oral health in all policies and public health programs is a key feature of its objectives. Another objective is to “improve integrated surveillance of oral diseases, monitoring, and evaluation of programmes and research”⁸ by “building partnerships with research institutes, universities and other relevant institutions to develop and implement operational research for improving the generation of evidence-based decision-making, policies and advocacy on oral health.”⁸ Based on the mid-term assessment of the implementation of the strategy with oral health focal points in the MoH, less than half (17) of the 47 member states in the region had OHPs or integrated oral health in general health policies, and 9 of them established monitoring systems to track their progress.⁹ The prioritisation of oral health at the global level through the

global strategy on oral health² and its action plan¹⁰ is an opportunity to strengthen the commitment to implementing the regional strategy in the WHO African region.

The WHO African region progress report allows thoughtful reflection regarding the barriers to and facilitators for implementing the regional strategy.⁹ Dental schools are 1 key stakeholder in this implementation. The schools in the region are uniquely positioned to partner with other stakeholders to achieve the strategy's goals and meet the objectives as they possess the expertise, resources, and mission to collaborate in OHP activities. They can also produce the evidence base to inform OHPs. Faculty and students can ensure the research and policies are relevant and appropriately tailored to the local context, build and maintain relationships with local partners, and increase the research availability within the continent.¹¹

It is essential to gain a thorough and current understanding of dental schools' views, specifically, their role in OHP activities and their capacity to conduct research to inform OHPs. Our study aims to understand the barriers to and facilitators for creating, disseminating, implementing, monitoring, and evaluating national and subnational OHPs in the WHO African Region from the perspective of dental schools and explore the research and training capacity of these schools to respond to public health and population oral health needs.

Material and methods

Identification of dental educational institutions in the WHO Africa Region

We compiled the first comprehensive directory of dental educational institutions and their respective deans or equivalent in the WHO Africa region countries. Leaders from the International Association for Dental Research (IADR) East & Southern Africa Division, the Nigerian Division, and the South African Division were contacted to configure a network of African investigators interested in contributing to its compilation. The WHO AFRO also contacted the network of chief dental officers at Ministries of Health (MoH) in the WHO African countries and NCD focal points at the WHO Country Offices to identify regional oral health academic experts. When contact information (names and/or emails) were elusive, we searched the institution's websites and publications listing these institutions' affiliations.

Survey development

We developed a draft of the survey questionnaire in English (Supplementary Table 1) with input from a multi-disciplinary and multi-cultural (African and non-African) team of researchers with extensive expertise in public health, population health, oral health education, survey methodology, social sciences, and the oral health context in Africa. The survey had 3 sections: Section 1) Demographics and dental school/educational institution information, Section 2) Involvement in the creation, dissemination, implementation, monitoring, and evaluation of national and subnational governmental OHPs, and Section 3) Capacity to respond to public health, population health, and oral health information systems' needs (Supplementary Table 1). The WHO AFRO translated the English draft into French and Portuguese. We programmed it in the electronic survey software Qualtrics. The study protocol was approved by the WHO AFRO Ethics Review Committee (AFR/ERC/2023/1.2) and received a notice of exemption from the University of Pennsylvania Institutional Review Board (IRB protocol #: 852500).

Survey deployment and follow-up

The survey was deployed electronically on February 20, 2023, by email in Qualtrics to the educational institutions. The email, available in the 3 aforementioned languages, informed the recipients about the reasons for the contact (identified as a dean, or the equivalent, or an appointed designee of the dean of an oral health educational institution in the WHO African region), the study objective, and request of consent to participate in the survey.¹² Participants were notified that an invitation to a sponsored trip to a conference in Nairobi, Kenya, would accompany survey completion. Two automatic reminders (1 and 2 weeks post deployment) were sent to nonrespondents. If a school still did not respond, the WHO AFRO and the research team reached out to their network (eg, chief dental officers) to identify alternative contacts. The survey closed on July 7, 2023.

Data analysis

We exported the data from Qualtrics and conducted data cleaning and exploratory analysis in SAS version 9.4. Descriptive statistics (means/standard deviations and medians/interquartile ranges for continuous data and frequencies and percentages for discrete data) were derived for quantitative data. We analysed qualitative statements (Section 2) from the questionnaire using thematic analysis and coded and classified participants' responses using ATLAS.ti.¹³ We used descriptive content analysis to create a taxonomy for the barriers and facilitators.

Results

Identification of dental educational institutions in the WHO Africa Region

We identified 84 educational institutions (65 dental schools (ie, offering a degree to become a dentist) and 19 schools

offering other dental training) across 26 WHO African region Member States. We did not identify any dental schools in 21 countries and could not identify contact information for 7 out of the 84 educational institutions, leaving 77 potential respondents.

Respondent demographics and educational institution characteristics

Forty-two out of the 77 potential respondents (54.5%) responded to the survey. Thirty-seven of these 42 respondents were affiliated with a dental school, and their responses were included in this analysis (Appendix A). A majority identify as males (81.1%), and 64.9% are the current dean at their institution and have been for a median of 2.0 years (IQR: 2.3). The remaining (35.1%) are designees of the dean who held a variety of leadership positions at their schools and have been in their position for a median of 4.0 years (IQR: 8.0) (Table 1).

Over a quarter (29.7%) of the respondents were from dental schools in Nigeria. Country representation from the remaining institutions ranged from 1 to 2 respondents per country. Most institutions (91.9%) are publicly funded, with a median annual tuition per student of USD 700.00 (IQR: USD 1935.0). Over three-quarters (78.4%) of the schools have some form of financial aid, with private loans (32.4%) and federal governmental/loans (29.7%) being offered most often (Table 2).

A majority of the institutions offer a bachelor of dental surgery (BDS) degree (62.2%), followed by a doctor of dental surgery (DDS) degree (27.0%). Few (10.8%) offer a doctor of dental medicine (DMD) degree. Predoctoral education and training (matriculation process to obtain a BDS, DDS, or DMD degree) takes 6 years to complete in 59.5% of the schools, and the median number of students who complete the training each year is 23.5 (IQR: 20.0). English is the preferred language during this training in 64.9% of the schools. In almost all schools (91.9%), predoctoral students treat patients (Table 2).

Table 1 – Demographic characteristics of respondents from dental schools in the WHO African region (n = 37).

Characteristic	n	%	Median (IQR)
Gender			
Female	6	16.2	
Male	30	81.1	
Prefer not to answer	1	2.7	
Administrative and/or educational title			
Dean	24	64.9	
Years in current position			2.0 (2.3)
Other*	13	35.1	
Years in current position			4.0 (8.0)
Total years worked in dental school or educational institution			18.2 (6.8)

* Other titles include: Acting Head of Department of Oral Health Sciences, Chairman; Coordinator - Community Dentistry Programme; Dental Sector Coordinator; Department Chair; Director; University hospital researcher teacher - Professor; Head of Dental Studies; Head of Department of Dental Clinical Sciences; Head of the Division in charge of the Development of "UGANC" Capacities, Department Chair, National Oral-Dental Coordinator; Professor; SubDean; consultant oral public health specialist.

Table 2 – Characteristics of the dental schools in the WHO African region for which respondents represent (n=37).

Characteristic	n	%	Median (IQR)
Country			
Nigeria	11	29.7	
Democratic Republic of the Congo	2	5.4	
Ethiopia	2	5.4	
Kenya	2	5.4	
Uganda	2	5.4	
Zambia	2	5.4	
Algeria	1	2.7	
Burkina Faso	1	2.7	
Cameroon	1	2.7	
Ghana	1	2.7	
Guinea	1	2.7	
Madagascar	1	2.7	
Malawi	1	2.7	
Mali	1	2.7	
Mozambique	1	2.7	
Namibia	1	2.7	
Rwanda	1	2.7	
Senegal	1	2.7	
South Africa	1	2.7	
Togo	1	2.7	
United Republic of Tanzania	1	2.7	
Zimbabwe	1	2.7	
Region			
Southern African	8	21.6	
West Africa	18	48.7	
East Africa	8	21.6	
Central Africa	3	8.1	
Type of institution			
Publicly funded	34	91.9	
Privately funded	2	5.4	
Combination of publicly and privately funded	1	2.7	
Annual tuition (U.S. Dollars) (n=27)*			\$700.0 (\$1935.0)
Financial aid			
No	8	29.6	
Yes†	29	78.4	
Private loans	12	32.4	
Federal/Governmental loans	11	29.7	
Grants	7	18.9	
Scholarships	17	45.6	
Work-study programs	3	8.1	
Tuition is waived (ie, education is free)	3	8.1	
Other‡	3	8.1	
Degrees offered			
BDS (Bachelor of Dental Surgery)	23	62.2	
DDS (Doctor of Dental Surgery)	10	27.0	
DMD (Doctor of Dental Medicine)	4	10.8	
Minimum education requirement for acceptance into program			
High school degree or equivalent	33	89.2	
Associates degree or equivalent	0	0.0	
Bachelors degree or equivalent	2	5.4	
Masters degree or equivalent	0	0.0	
Doctoral degree or equivalent	0	0.0	
Other§	2	5.4	
Length of education and training to receive a dental degree* (n=37)			
5 years	11	29.7	
6 years	22	59.5	
7 years	4	10.8	
Preferred languages# during predoctoral training**			
English	24	64.9	
English and French	3	8.1	
English and local languages††	2	5.4	
Portuguese and Other‡‡	1	2.7	
French	7	18.9	

23.5 (20.0)

(continued)

Table 2. (Continued)

Characteristic	n	%	Median (IQR)
Students completing pre-doctoral[¶] degree each educational year (n=30)^{§§}			
Students pursuing post-doctoral graduate training (n=20)^{¶¶}			8.5 (22.5)
Location of post-graduate training (n=19)^{##}			
Within country of dental school/educational institution			60% (89.0%)
Abroad			10.0% (25.0%)
Unsure			0.0% (80.0%)
Pre-doctoral students treat patients within training period			
Yes	34	91.9	
Total patients seen per year (n=20)[¶]			1515 (3825)
Total patient visits per year (n=24)[¶]			5000 (8095)
No	1	2.7	
Unsure	2	5.4	

* Denominator for this question includes respondents who knew this information for their institution.

† Percentages do not sum up to 100% because respondents could select more than 1 option.

‡ Other financial aid listed included partly or highly subsidized by the government and a reduced fee for indigenous of owner state.

§ Other educational requirements include: A levels Preliminary, High School certificate or relevant Diploma, Dental therapist or Assistant Dental officer certification.

¶ Defined as a degree to become a dentist, DDS, BDS, DMD.

Preferred languages of lectures, textbooks and seminars.

** Defined as training to obtain a degree to become a dentist.

†† Local languages include Afrikaans and Swahili.

‡‡ Other language listed was Spanish.

§§ Seven people did not respond to this question.

¶¶ Defined as a diploma, Masters degree, doctoral degree, or clinical specialty. The denominator for this question includes those that know this information for their school.

The denominator for this question includes respondents who indicated that on average at least 1 person from their school pursue post-doctoral graduate training (eg, a diploma, Masters degree, doctoral degree, clinical specialty).

Engagement with, barriers to, and facilitators for oral health policy creation, implementation, dissemination, monitoring, and evaluation

Three-quarters (75.7%) of respondents are aware of the existence of national OHPs, and among them, 3 (10.7%) are also aware of subnational (eg, municipality, province) OHPs. One-quarter of the respondents (24.3%) are unaware of national or subnational OHPs.

Engagement

Engagement in OHP activities varied for different policy activities. Providing technical support to their MoH is a way a few dental schools engage in creating national OHPs. Conducting research (eg, conducting epidemiological studies, surveys, pilot studies) informs policy creation and implementation while conducting regular workshops and providing outreach to communities about oral health is used to disseminate and implement OHPs (Appendix B). They engage in monitoring and evaluation of national OHPs by conducting research, national oral health surveys, collecting data, and performing monitoring and evaluation themselves, to name a few

(Appendix C). Few respondents are aware of subnational OHPs ($n=3$) and the ways in which they engage in OHPs is similar to national OHPs (Appendix D and E).

Barriers

Limited resources and a lack of qualified oral health professionals are common barriers among respondents who engage in the creation, dissemination, and implementation of national OHPs. Other common barriers that pervaded multiple policy levels includes a lack of coordination among dental schools and the MoH, no communication between decision-makers and researchers, and a lack of prioritisation for oral health (Appendix F).

Among the respondents who are aware but do not engage in national OHP activities encounter similar barriers that prevent them from doing so to those that do engage (Appendix F and Appendix G). Additionally, the institution's being new, not being involved with the MoH, and a lack of prioritisation of national policy development are common themes across policy activities (Appendix G).

Very few reported knowing any subnational OHPs ($n=3$), so reported barriers (Appendix H) and perceived barriers (Appendix I) were few but similar to those identified for national OHPs.

Facilitators

Some facilitators for national and subnational OHPs are complements to the reported barriers, such as the effective integration of the MoH and dental institutions and the availability of trained oral health professionals. The willingness of communities to learn and adapt emerged as a persistent theme across multiple policy activities for national and subnational policies (Appendix Figure J and K). Facilitators for national policies across all policy activities includes the enthusiasm among oral health professionals, having trained oral health professionals, and the endorsement of OHPs by politicians (Appendix Figure J). For subnational policies, community partnership and cooperation arose as important facilitators across policy activities (Appendix K).

Capacity to respond to public health and population oral health needs

Graduate programs

More than half (56.8%) of institutions offer a graduate dental public health program. The most common program offered is a residency program (27.0%), followed by a PhD (16.2%), and a master's (13.5%) program in dental public health. Across all 3 programs, respondents' top needs are resource and infrastructure-related, and more support for students (eg, financial, research), and faculty (eg, training, equipment to teach). Twelve institutions (32.4%) are considering starting a program, with a master's degree being considered by 91.7% of them. They anticipate barriers in creating the programs that are similar to the needs of the currently running programs. Potential facilitators for creating their program include the availability of resources, institutional support, motivated oral health professionals to enroll in the program, having trained professionals and utilizing existing programs to facilitate planning. Four institutions do not plan on creating a program

due to the absence of accreditation from the government, lack of teaching staff and financial resources, and it not being a priority (Table 3).

Research Capacity

The median number of full-time, part-time with greater than 50% and less than 100% effort, and part-time with less than 50% effort faculty at the institutions is 20 (IQR: 26), 6.0 (IQR:8.0), and 3.5 (IQR: 9.0) respectively (Table 4). Except for 1 institution, all the remaining ones have the capacity to collect patient data for research using paper charts (51.4%), electronic charts (5.6%), or both (41.0%). Of those who provided information regarding the research output for their schools ($n=20$) and, more specifically, knew the population and public health research output ($n=17$), their institutions produced a median of 10 (IQR: 15.5) and 5.0 (IQR: 8.0) publications per year respectively (Table 5). The most urgent dental public health research topics are oral health care system related (ie, oral health access, care, and services), oral health assessment (ie, oral health status and quality of life), and dental caries (ie, epidemiology and management) (Appendix L and Supplementary Table 2).

Discussion

OHP Activities

Many respondents are aware of national OHPs, very few are aware of subnational policies, and a quarter are not aware of either. Lack of awareness of subnational policies could be due to the absence of these policies which is corroborated by a scoping review of OHPs in the WHO African region, in which only 4% of the identified OHPs were subnational (Verdugo 2023, personal correspondence). Dental schools leveraged their strengths to provide technical advice to their MoH and local government, conduct research (eg, data collection, national surveys), organise workshops and seminars, and incorporate OHPs in their curriculums. Common barriers to achieving effective engagement in policy activities were resource limitations and a lack of coordination with the MoH, oral health professionals, and prioritisation of OHPs. Many of the barriers for some institutions serve as facilitators for others.

Capacity to respond to public health and population oral health needs

The capacity to respond to public health and population oral health needs among dental schools varied. Most institutions offer graduate dental public health programs but need more support for students. Resource-related barriers are anticipated in institutions planning on creating graduate programs. These findings are in alignment with a recent study examining barriers related to the oral health workforce in Africa, which also cited a lack of financial support for workforce training as a challenge and providing financial support for dental personnel education as a solution to workforce issues.¹⁴ Our study also elucidated a need for better trained and engaged faculty and students in the graduate programs and more oral health professionals to develop future programs. The workforce study cited a lack of continuing

Table 3 – Description of graduate dental public health programs in the dental schools in the WHO African region (n=37).

Graduate dental public health programmes	Currently Offered Programs (n=21)					Programs Under Consideration (n=12)				Program not under consideration (n=4)	
	Program offered		Length of program (years) Median (IQR)	Total number of individuals enrolled per dental school Median (IQR)	Total percentage of individuals completing program per dental school Median (IQR)§	Program needs	Program under consideration		Barriers	Facilitators	Barriers
	n	%				n	%				
Master in dental public health	5	13.51	3.00 (2.00)	7.00 (12.00)	90.00% (29.00%)	<ol style="list-style-type: none"> 1. Creation of a virtual platform for conferring degrees 2. Equipment needs for laboratories and clinics 3. Need financial support for students 4. Providing technological resources for teaching 5. Require more support for students 6. Trainers need continuing education 	11	91.67	<ol style="list-style-type: none"> 1. Absence of specialized oral health professionals 2. Delay in approval of the programs 3. Inadequate human resource management 4. Lack of administrative personnel 5. Lack of financial resources 6. Lack of infrastructure 	<ol style="list-style-type: none"> 1. Availability of financial resources for research 2. Motivation of oral health professionals to study in the programs 3. Presence of trained professionals to assist create the programs 4. Support from the institution for program creation 5. Utilization of existing programs for strategic planning of new programs 	<ol style="list-style-type: none"> 1. Absence of accreditation from the government 2. Creating dental public health programs is not a priority 3. Inadequate teaching staff 4. Lack of financial resources
PhD in dental public health	6	16.22	3.50 (1.00)	1.00 (1.00)‡	83.50% (50.00%)	<ol style="list-style-type: none"> 1. Curriculum integration with the residency training 2. Equipment needs for laboratories and clinics 3. Infrastructural needs 4. Need financial support for students 5. Need for qualified lecturers 6. Need for scholarships for students to study abroad 7. Providing technological resources for teaching 8. Require more support for students 9. Research funding is required 	3	25.00			
Residency (i.e., advanced training) program in dental public health (e.g., dental public health as a specialty)	10	27.03	6.00 (2.00)†	3.50 (7.00)	65.00% (48.00%)	<ol style="list-style-type: none"> 1. Equipment needs for laboratories and clinics 2. Increase the number of trainees 3. Infrastructural needs 4. Making available mobile dental clinics to increase accessibility 5. More support for research 6. Need financial support for students 7. Need for accessible exchange programs 8. Need highly motivated residents 9. Providing technological resources for teaching 	4	33.33			
Other*	3	8.11	N/A	N/A	N/A	<ol style="list-style-type: none"> 1. Need for specialty programs 2. Require research training for students 3. Research funding is required 	0†	N/A			

*One implausible value (25 years) removed from this calculation.

†Other programs include: Master of Science in Odontology, Master of Dentistry in Community Dentistry, and Doctorate in Medical Science (Option for Dental Medicine). Respondents reported 11 "other" programs, but they were not related to dental public health and were removed from the analysis.

‡One implausible value (900) removed from this calculation.

§Removed response of 0 from calculation because on average 0 people enroll in the program and therefore respondent said 0% of people complete the program.

¶One respondent reported "oral and maxillofacial surgery", but this response was removed from the analysis because it is not related to dental public health.

Table 4 – Faculty conducting public health and/or population health research in dental schools in the WHO African region (n=37).

Characteristic	Median (IQR)
Full-time faculty	
Average number of full-time faculty per institution (n=31)	20.0 (26.0)
Part-time faculty	
Average number of part-time faculty members per institution (ie, greater than 50% and less than 100% effort working at the dental school/educational institution) (n=23)	6.0 (8.0)
Average number of part-time faculty members per institution (ie, less than 50% effort) at the dental school/educational institution) (n=14)	3.5 (9.0)
Faculty conducting research in public and/or population health	
Percentage of full-time faculty (n=26)*	42.5% (65.0%)
Percentage of part-time faculty (n=18)*	22.5% (45.0%)

* Five respondents were not aware of the percentage of full-time faculty and 13 respondents were not aware of the percentage of part-time faculty that conduct population or public health research.

professional development opportunities as a hindrance to developing the oral health workforce.¹⁴ This could be a bottleneck for attracting adequately trained faculty to teach and develop these graduate dental public health programs.

In a review of the current status of oral health research in Africa, 55% of the oral health publications from 2012 to 2022 were produced by Nigeria and South Africa (Labarca 2023, Personal communication). This finding is consistent with the large variability in peer-review publications and the number of faculty to produce this research in the current study. Although almost all institutions are able to collect patient

Table 5 – WHO African region dental school's capacity to collect patient data for research purposes and research output (publications and funding) (n=37).

Question	n	%	Mean (SD)/median (IQR)
Capacity to collect patient data			
Yes (n=36)			
Paper system	19	51.4	
Electronic system	2	5.6	
Paper and electronic systems	15	41.0	
No (n=0)			
Unsure (n=1)	1	2.7	
Annual peer-review publications per dental school - any topic (n=20)*			10.0 (15.5)
Annual peer-review publications per dental school - population and public health (n=17) [†]			5.0 (8.0) [‡]
Funding (USD) [‡] (n=10)			\$0.0 (\$20,000.0)

* Denominator includes those who entered a number for this question and did not select "unsure"

[†] Denominator includes those whose institutions publish more than 0 publications in population and public health per year and who did not select "unsure"

[‡] One respondent said their institution publishes 0 articles, because they "do not have dental public health dentist in the faculty yet."

data for research, a lack of resources and funding to use this data emerged from our study, which is consistent with a decrease in government funding for African universities.¹¹

Implications for oral health stakeholders in the WHO African region

The results of this assessment will be disseminated to stakeholders with an interest in population and public oral health in the WHO Africa region, including oral health academia, chief dental officers at the MoH, and the WHO NCDs focal points. In particular, dental school leadership in the region can learn from the facilitators of others and consider implementing them in their settings.

These findings can serve as a tool to implement the global oral health action plan¹⁰ – in particular developing national OHPs and research agendas. Academia is a key stakeholder as the research and evidence-based policy development pipeline are synergistic.^{15,16} While some dental schools provide technical advice to their MoH and conduct research, coordination between the schools and the MoH and other governmental agencies was lacking for others, which can result in research to policy gaps. These findings can serve as a platform for fostering dialogues and collaboration between and among oral health stakeholders for OHP activities. They can also provide insights into the capacity of dental schools to conduct public health and population oral health research and train the next generation of researchers. Additionally, the survey elucidated the dental school's top urgent population and public health research needs, which can inform the development of national research agendas.

Study's strengths and limitations

Our directory of dental educational institutions in the WHO African region can facilitate collaborations across dental schools and other research centres. It is possible that we did not identify all of the regional dental schools, and this directory will be updated when new schools are identified. This is the first project utilizing this directory, with a response rate of 48%. Translating the survey and email invitations into the 3 most common languages used in the region may have facilitated responses, as did the personalized outreach from the WHO AFRO. Although we encountered challenges in identifying a contact person at some institutions, we were encouraged by the geographic breadth of responses covering 22/25 countries in the region with a dental school. Additionally, over a quarter of the responses were from Nigerian institutions, which is in alignment with Nigerian representation in the directory (20%). The data, to a large extent, reflects the situation in this country. The stratification of the data at a country level, specifically for the barriers and facilitators could be more informative for countries that are culturally, politically, and socio-economically different than Nigeria. Since our survey did not include questions addressing educational organisation engagements in OHPs produced by nongovernmental organisations, future research should determine the scope and extent of these efforts.

Conclusions

The capacity for dental schools in the WHO African region to respond to public and population oral health needs is limited by resources, and the needs of the students and faculty are not adequately met. Leaders who are aware of OHPs reported their institutions' strengths lie in providing technical advice and conducting research to inform OHPs. However, more coordination among them and other stakeholders is needed to reach their full potential as a key player in OHP activities.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Authors and contributions

CNMZ, ASB, OB, TC, ATE, AG, BTO, MR, OS, OOT, Outi, YM, MG, and ACL identified academic institutions in the WHO African region; OUrqhart, CNMZ, RK, EAP, IVK, MR, YM, MG, HA and ACL, drafted and refined the survey questionnaire; Ourquhart, ASB, JB, CCMP, YM, MG, and ACL conducted data analysis and drafted figures and tables; Ourquhart, RK, ACL, MG, and ABS drafted the manuscript. All authors critically reviewed and approved the submission of the manuscript.

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Supplementary materials

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REFERENCES

1. World Health Organization; Global oral health status report: towards universal health coverage for oral health by 2030: World Health Organization; 2023 Available from: <https://www.who.int/publications/i/item/9789240061484>. Accessed 29 September 2024.
2. World Health Organization; Draft global strategy on oral health: World Health Organization; 2022 Available from: <https://www.who.int/news-room/feature-stories/detail/landmark-global-strategy-on-oral-health-adopted-at-world-health-assembly-75>. Accessed 29 September 2024.
3. Glick M, Williams DM, Ben Yahya I, et al. Vision 2030: delivering optimal oral health for all; 2021 Available from: <https://www.fdiworlddental.org/vision2030>. Accessed 29 September 2024.
4. Benzian H, Hobdell M, Holmgren C, et al. Political priority of global oral health: an analysis of reasons for international neglect. *Int Dent J* 2011;61(3):124–30.
5. Watt RG, Sheiham A. Integrating the common risk factor approach into a social determinants framework. *Community Dent Oral Epidemiol* 2012;40(4):289–96.
6. Peres MA, Macpherson LMD, Weyant RJ, et al. Oral diseases: a global public health challenge. *Lancet* 2019;394(10194):249–60.
7. Benzian H, Daar A, Naidoo S. Redefining the non-communicable disease framework to a 6 x 6 approach: incorporating oral diseases and sugars. *Lancet Public Health* 2023;8(11):E899–904.
8. WHO Regional oral health strategy 2016–2025: Addressing oral diseases as part of noncommunicable diseases: Report of the Secretariat: WHO Regional Office for Africa; 2016 Available from: <https://apps.who.int/iris/handle/10665/250994>. Accessed 29 September 2024.
9. WHO Mid-term progress report on the implementation of the Regional oral health strategy 2016 –2025: addressing oral diseases as part of noncommunicable diseases in the WHO African Region: WHO Regional Office for Africa; 2022 Available from: <https://www.afro.who.int/publications/mid-term-progress-report-implementation-regional-oral-health-strategy-2016-2025>. Accessed 29 September 2024.
10. WHO Draft global oral health action plan (2023-2030); 2023 Available from: [https://www.who.int/publications/m/item/draft-global-oral-health-action-plan-\(2023-2030\)](https://www.who.int/publications/m/item/draft-global-oral-health-action-plan-(2023-2030)). Accessed 29 September 2024.
11. Lakati AS, Masibo PK. A call for African universities to define their research priorities. *Lancet Global Health* 2023;11(10):e1505–e6.
12. A Stakeholder Dialogue – Accelerating Oral Health Research and Evidence-informed Policies in the WHO African Region; 2023 Available from: <https://www.dental.upenn.edu/research/center-for-integrative-global-oral-health/exploring-global-strategies-to-promote-oral-health-in-the-who-african-region/>. Accessed 19 February 2024.
13. ATLAS.ti Scientific software development GmbH. ATLAS.ti Mac. V.5.17.3-2023-10.24 ed 2023.
14. Gallagher JE, Mattos Savage GC, Crummey SC, Sabbah W, Varenne B, Makino Y. Oral health workforce in Africa: a scarce resource. *Int J Environ Res Public Health* 2023;20(3):2328.
15. Ezeh AC, Izugbara CO, Kabiru CW, et al. Building capacity for public and population health research in Africa: the consortium for advanced research training in Africa (CARTA) model. *Glob Health Action* 2010;3. doi: 10.3402/gha.v3i0.5693.
16. McMaster Health Forum, Global commission on evidence to address societal challenges. The Evidence Commission report: a wake-up call and path forward for decision-makers, evidence intermediaries, and impact-oriented evidence producers Hamilton, ON, Canada: McMaster Health Forum; 2022 Available from: <https://www.mcmasterforum.org/networks/evidence-commission/report/english>. Accessed 29 September 2024.