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Dental public health post-graduate trainees in the US: Experiences, challenges, and opportunities—A qualitative study

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Abstract

Objectives: The goal of this study was to explore challenges and opportunities that dental public health (DPH) residents and recent graduates experienced during and after their residency training programs in the US.

Methods: In this qualitative study, to recruit participants, study invitations were distributed to 93 DPH postgraduate trainees via social media, email, and an online DPH nationwide course in 2019. Semi-structured in-depth interviews were conducted through Zoom audioconference. The interviews were conducted until thematic saturation was achieved. The audio-recorded interviews were transcribed and crosschecked to ensure accuracy. The interviews were coded using grounded theory. A qualitative analysis software (ATLAS.ti 8.0) was used to facilitate coding and organizing data extraction from transcripts.

Results: Eighteen DPH postgraduate trainees from 12 DPH residency programs participated and completed the interview. DPH trainees had experienced educational and financial challenges, difficulty finding DPH-related jobs after graduation, and a complex board examination preparation process.

Conclusion: DPH postgraduate trainees and especially foreign-trained dentists experienced serious challenges during and after their postgraduate residency programs. Opportunities exist to enhance the strength of DPH programs to build a competent DPH workforce.

Keywords

education; public health; workforce

INTRODUCTION

Dental public health (DPH) is defined as “the science and art of preventing and controlling dental diseases and promoting dental health through organized community efforts” [1,2]. DPH is one of the twelve specialties recognized by the American Dental Association (ADA)

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supporting ADA's vision and mission in improving oral health of the public [2]. Since the 1950s, health organizations and policymakers have relied on DPH professionals to design and execute local and national oral health strategic plans, and implement community-based programs to overcome barriers and disparities [1]. The 2000 "*Surgeon General's Report on Oral Health*" underscored the importance of oral health on overall health and initiated a movement in oral health field which then various stakeholders strategized their oral health plans [3].

In the United States, DPH specialty programs are responsible for training competent DPH professionals to increase the available workforce that is capable of leading both local and national endeavors improving the community's oral health through engagement in various government and private sectors [3]. In 2019–2020, 55 candidates admitted in DPH residency programs across the country comprising less than 1% of all admitted candidates in various advanced dental education programs [4,5]. In 2019–2020, there were about 850 DPH specialists, including 190 active diplomates, comprising only a small fraction (0.4%) of about 200,000 active dentists working in the US [6]. Nevertheless being a small size specialty does not underestimate the DPH professionals' roles in advancing oral health in the country and fulfilling national oral health strategic plans (e.g., Healthy People 2030 [HP 2030]) as researchers, faculty, clinicians, consultants, directors, policymakers, and leaders.

In 2016, the American Association of Public Health Dentistry (AAPHD) published the "New competencies for the 21st century dental public health specialist", which introduced a revised set of core DPH competencies that better align with the expected roles in the DPH workforce comprising 10 core objectives and 74 sub-objectives [1]. The new competencies, evolved from the previous version developed in 1998, providing a roadmap for redesigning the DPH residency programs curricula [1,7,8]. As of 2020, the Commission on Dental Accreditation (CODA) has accredited 15 US-based programs DPH residency programs, all directed by DPH diplomates, admitting US- and foreign-trained dentists for DPH specialty training [4]. The programs differ regarding the program curriculum and duration, prerequisite exams and degrees, offered degrees, number of admitting candidates per year, and financial support [9]. Most of the programs require having a Master of Public Health (MPH) degree or its equivalent, however, there are a few dual-degree DPH programs that offer MPH degrees as part of their DPH programs [9]. All programs proclaim the adherence of their curriculum to the new DPH competencies, and preparing their trainees to be eligible to take the American Board of Dental Public Health (ABDPH) examination after graduation [9].

There are limited studies depicting DPH residency programs characteristics and postgraduate trainees' challenges and opportunities; one 2014 unpublished study, evaluated the demographic trends and profiles of the US DPH workforce and found that "recent Harvard DPH residents have been mostly female and foreign-trained, and they expect to see similar trends from the other US programs." One study specifically assessed challenges that foreign-trained dentists (FTD) might encounter in pursuing their career in US and found that admission process difficulties, finances, immigration, and cultural barriers comprise some of the challenges [10]. Additionally, challenges in conducting research projects, engaging in field experiences, communicating with school staff and their peers, finances and living

conditions, and career opportunities have been mentioned in studies on dental and medical postgraduate programs [11–17].

This qualitative study aimed to explore the US DPH postgraduate trainees' challenges and opportunities during their residency programs. The results of this study provides valuable information about DPH trainees' experiences, and assists DPH program directors, faculty, and DPH-related organizations (e.g., AAPHD, ABDPH), to use this information to enhance DPH residency programs, and build a competent DPH workforce prepare to confront oral health problems locally and nationally.

METHODS

Study design

We conducted a qualitative research study using semi-structured interviews of a convenience sample of the US DPH residents and recent graduates. The study was approved by the Institutional Review Board (IRB) at the University of California San Francisco (UCSF) (IRB # 18–25,627). The inclusion criteria were being a current resident of an accredited US DPH program, or a graduate within 2 years of program completion. Invitations to participate in the study were sent to 93 DPH residents and recent graduates (whose contact information was available) via email from January to April 2019 to registrants in an online nation-wide DPH course, a WhatsApp Messenger DPH group, and in-person invitations at the DPH residents' oral session at the National Oral Health Conference (NOHC) in Memphis, Tennessee, in April 2019. The interviews were scheduled from February to July 2019 upon receiving an expression of interest in the study and meeting the inclusion criteria.

Interview questions

Interview questions were designed based on prior studies evaluating the challenges and opportunities of other dental or medical postgraduate programs. An interview guide was prepared to focus on the main goal of the study to obtain rich information about challenges and opportunities of DPH trainees. Study questions were carefully designed and pilot-tested and modified to be comprehensible. Fourteen open-ended questions were finalized to be asked from participants through semi-structured interviews (Table 1). Semi-structured interview is the most frequent technique used in qualitative studies which the researcher asks designed open-ended questions from interviewees to record their opinions and viewpoints about the study topic. The advantage of this method is being flexible, and eliciting rich information by asking interviewees to elaborate on their responses to a question [17].

An online audioconference platform (Zoom), was used to conduct 30-min semi-structured interviews. Prior to each interview, the consent form and a questionnaire comprising demographic and baseline information (e.g., age, sex, race/ethnicity, degrees, licenses, type of DPH program) were sent to participants via email. Verbal consent was obtained at the beginning of each interview, then the study questions were asked from interviewees to elicit their responses about various aspects of their training experiences including educational programs, financial support, board exam preparation, field experiences, and career opportunities. Recruitment was continued until thematic saturation was achieved

meaning that when new participants repeat the same comments and opinion, the recruitment will be stopped.

Data analysis

The interviews were transcribed, crosschecked, and reviewed by the authors (SB and EM) to ensure accuracy and completeness. The interviews were coded using grounded theory [18,19]. A qualitative analysis software (ATLAS.ti 8.0, Scientific Software Development, Berlin, Germany) was used to facilitate coding and data organization. Developing themes were classified and refined or expanded from existing codes, and finalized to create an inclusive code structure that captured all of the data concepts culminated in the final results. Descriptive statistics were used to summarize the characteristics of the DPH postgraduate trainees.

RESULTS

Tables 2–4 show study results. Table 2 displays participants' demographics, educational background, and their DPH program characteristics. Eighteen DPH postgraduate trainees from 12 of 15 US DPH residency programs participated in this study. Participants' age ranged from 30 to 45 years (mean 32.5 years); 61% were female and 39% were men. Six participants were current residents and 12 were DPH recent graduates. Nine (50%) DPH trainees were in on-campus programs, five (28%) in hybrid programs (online/on-campus), and four (22%) in online residency programs. Ten DPH trainees (56%) were in a university-based program (i.e., DPH program offered by a dental school or non-dental school university); eight trainees (44%) were in non-university-based programs (i.e., DPH programs offered by government agencies or hospitals). Five (28%) of the participants were US-trained dentists and 13 (72%) were FTD.

Responding to one of the interview questions, DPH trainees provided their suggestions for residency programs improvement (Table 3). All DPH trainees emphasized that they chose DPH residency program to receive required training and skills to be part of the community-based oral health workforce to improve oral health in the community.

Table 4 shows a comparison between the study participants' characteristics and the ADA Survey of Advanced Dental Education (SADE) (2018–2019 and 2019–2020) [4,20] (Table 4); as it can be seen in the table, female candidates constitute the majority of the DPH trainees in our study and both years of ADA SADE. Additionally, the number of foreign-trained dentists who enrolled in DPH residency programs were higher compared to US-trained dentists in our study as well as ADA SADE 2018–2019 and 2019–2020, with about the same percentage.

Five main themes emerged from the interviews

Theme 1: Variability in the structure of DPH residency programs—DPH residency programs differ significantly by host institution, program format, educational content, program length, and offered degree. One of the main differences was the program format being offered as online, hybrid, or on-campus programs. Trainees in online programs expressed the following experiences:

> …We had different topics for seminars and a lot of those topics were comprehensive and covered throughout the seminars that we had; seminars were ranged from, caries rates and trends, periodontal disease, professionalism, ethics. And so those core competencies were woven through all of those seminars that we completed. We did register for classes, but most of those classes, just covered the seminars that were in there, I don't even know those courses I was registered for.

Online DPH program trainees stated that even though being in an online program provides them with more flexibility, freedom, and ability to stay in their home state while studying, not having a face-to-face communication made networking difficult and considered this aspect as a weakness (Table 5).

Another differentiating aspect between the DPH residency programs was the specification of the host institution; being hosted by dental school, non-dental school, or nonacademic entities (such as government agencies and hospitals) induced educational program differences (Figure 1). Each of these program designs has its strengths and weaknesses presenting unique challenges and opportunities for residents as following sections.

Dental school-based DPH residency programs: These residency programs are offered by dental schools. Some of the strengths described by on-campus full-time dental school-based DPH postgraduate trainees, included the structured curriculum, regular face-to-face communication with program directors and peers, and opportunities to network with faculty members and other experts in the field. For example, a postgraduate trainee in an on-campus program stated that

> …there was an open-door policy which gave us opportunity to engage with the program director and network.

Another trainee noted that

> …we got a lot of communication skills through our journal club sessions, literature review, and through the discussion so it was [a] very enriching experience.

However, a part-time trainee mentioned occasional communication with program director and faculty as the program weakness.

DPH trainees in one-year full-time programs noted their educational challenges with covering a broad range of topics in such a short period and suggested extending the program by 6 months to 1 year in order to cover the necessary topics required to become a competent DPH specialist and successfully attempt the ABDPH certification examinations. Also, noted by a dental school-based program trainee:

> …the modules that are done as part of our core curriculum should definitely be updated. I think because you go through them on your own, it can be easy just to go through them and not really kind of remember, just to do them because you want to get them done. …It was really valuable to have content experts teach our courses and be able to ask them questions and read their articles and discuss them. So maybe doing everything in that platform and doing it just more often, maybe every day in a week instead of three days a week would probably be valuable.

Another trainee in dental school-based program suggested

> …make sure the residents have access to meet community health partners and get experienced at the local public health department and to get experience advocating for policies maybe locally or on the state level.

Non-dental school-based DPH residency programs: These DPH programs are offered by academic institutions that are not dental schools such as Health Sciences Schools. A DPH postgraduate trainee in one of these programs stated that

> … I suggest to really consider some of the possibilities of the courses that are accessible at the linked university and utilize the partnership with a dental school a little bit more.

Also, there was a suggestion to inform residents about their weaknesses in a field from the beginning, so they can plan to take courses to expand their knowledge and skillset;

> … even though it's not part of the day to day plan, but if a resident comes in and maybe isn't strong in biostatistics and now they have to do this research program, maybe instead of having it be optional or unavailable, let the resident know you're identifying this as a weakness from the beginning, so the faculty require the resident to go through the course to address that weakness because your research will suffer.

Nonacademic DPH residency programs: DPH residents in nonacademic institutions such as, governmental agencies and hospitals defined their experiences as being more practice-oriented with very limited didactic coursework. One of the trainees from a government agency DPH programs mentioned that

> …the program is real-life experience… we had seminars every week, not courses per se, comprehensive training, everything, but no classes with others; however, we could take other classes at other places.

Another government agency program trainee said:

> …we did not have core DPH courses. There was nothing that you were taught exclusively. It was like a job you were just doing, and part of it was that you analyze this, or if you want to learn about budgeting, we have a budget happening, you can learn. So there were no courses happening…you can learn from others like program coordinators, your director, and other people who are working in that organization. I would suggest being more structured …however, being part of the projects, which are actually day to day was a great experience.

The real-life practice and policy experience, and quality improvements opportunities were considered as strengths of DPH programs at nonacademic institutions.

One hospital-based DPH trainee stated that

> …I received the training in hospital-based settings to manage the problems in very unique population; not just underserved itself, it was urban settings not in the rural; immigrants, low incomes, and culturally diverse population, and I had

> the opportunity to do basic public research, quality improvement, performance improvement; it was very intense, yet quite fulfilling experience. But there was not a distinction between the courses.

Another hospital-based trainee noted the following:

> I wouldn't call it weakness, but unlike university-based settings, we do not have set scheduled or organized didactic program. At the same time, as one of the strengths it gives the opportunity to incoming residents to plan and tailor their program based on their interest.

Theme 2: Absence of clinical training—The absence of a clinical component was challenging for most residents and was considered a major weakness of the DPH residency programs. Only 2 of 18 (11%) interviewees at two university-based programs had received a supervised, limited clinical training:

> …we have clinical component because we have a limited resident license, so we work outside [the university]. Our director lets us go quite a few times to do dentistry, and we were working under the supervision of the dental director of the clinic, so we were continuously being monitored. Scaling, diagnosing, treatment, many extractions, everything was included.

One recent graduate from a university-based DPH program stated that:

> …one strength of my program that kind of changed over time that I had applied was that the program allowed me to practice one day clinically. But that has changed, and it is not there anymore. I would probably consider it a weakness; that was once a strength of theirs. They gave you the opportunity to be placed either at a community health center or at a dental school. Another DPH trainee said that

> …After all, we are dentists, even though we are in public health, we still will have contact with patients.

Noted by another interviewee:

> …so all of the residents like endo residents, perio residents, we take classes sometimes with them, and we are the one who just stays quiet because we don't know what to say. We don't have much meaningful clinical exposure.

Having a clinical component during the DPH residency program was considered very important in future career plans and experiences in the field.

Theme 3: Limited DPH job opportunities for DPH graduates and specifically Non-US licensed dentists—Unfortunately, there are limited job opportunities for DPH graduates in oral health workforce; the experience was different among US licensed graduates and FTDs. Five of 18 interviewees were US licensed dentists; one US-trained dentist stated that

> … the position that I was interested in applying after graduation was an oral health program director position which currently is directed by a registered hygienist, and

> when I inquired about the position, the response was that we have to pay more to a dentist for this position.

Another US licensed dentist mentioned that

> … I am hired by the program that I spent my fieldwork on; I am responsible for administrative work which unfortunately I cannot apply my DPH knowledge and expertise in this position.

The remaining 13 of 18 interviewees (72%) were foreign-trained dentists (FTD) only one of them had a US dental license before getting admitted to the DPH residency program, 10 FTDs had no US dental license, and only two had taken required regional exams through various State Dental Boards to get their US dental licenses after their DPH residency programs. Interviewees who were FTDs, were unanimous in stating that the absence of a US dental license made finding DPH-related jobs arduous. Although US States have various requirements permitting dentists to practice dentistry, but a US dental license was required for most prestigious DPH-related jobs such as faculty positions, and county or State Dental Director even though these positions are not clinical positions. One of the trainees stated that:

> … I have to be honest that after receiving my postdoctoral DPH certificate, the job options in Dentistry or Dental Public Health have not increased even after 20 months of my graduation. Despite my “overqualified” background, the main request has been to have a clinical license to design, manage or evaluate several oral health projects, hence, it has been the principal barrier to continue working in Public Health Dentistry. I continue applying my newly DPH skills in pro bono activities, but my current and potential job opportunities are not related or increased because of my postgraduate training in DPH.

Another trainee mentioned that:

> …even though we want to be a public health professional, we need a [dental] license.

Theme 4: Broadly-defined syllabus for the ABDPH certification examinations —All DPH trainees were interested in taking the ABDPH certification examinations to become diplomates. In 2018 and 2019, 11 of the interviewees took the ABDPH written examination. Only 6 (33%) had received any board preparation coursework during their residency programs. One of the interviewees noted:

> …we didn’t have any board preparation course, that is also one of the weaknesses. The problem is that the board doesn’t have any set guidelines or syllabus for the board exam. …So, it’s very diverse. I have taken so many exams in my life (WREB, NBDE part 1 and 2), and every exam has guidelines or syllabus. But for some reason, the DPH board exam doesn’t have that and I think someone has to come forward and ask the board to provide us with something. Or the school has to ask for some kind of boundaries in which we can study.

Another interviewee stated:

> …Unfortunately the difference between DPH residency program and the other residency programs is that we don't have any specific reference book. We only have one outdated reference (Burt & Eklund-2005), but the other residents have, for example, three, four, five, six, I don't know, 10 reference books, but they know that everything would be from those books. But we have this problem in DPH that they say you have to know everything. Even though those who are diplomate, or directors, I think they don't know everything, but they know many things but not everything. So, it's an unreasonable expectation for us.

Theme 5: Partial financial support for most DPH programs—In this study, 11 of 18 (61%) DPH trainees received some type of financial support for their programs, with or without the tuition fees. Financial support was one major factor that influenced the decision to apply to certain DPH programs. The absence of financial support was a source of stress for residents, creating struggles with living expenses, and the need to find jobs during their residency programs just to survive, especially for out-of-state trainees. One trainee noted:

> …Obviously, a challenge was not having a stipend… that was unrealistic to have to support myself financially for a year in a completely different state than I was living in. Moving to another state, as well as, figuring out how I was going to exist without a full-time job or without income, that was definitely a real challenge… added extra elements of stress too.

Another trainee noted that:

> …Making sure that the residents get the funding support to go to more than one conference because that was something that I did, but I did it with my own resources. I think it's valuable for all the residents to go to NOHC but also maybe to other conferences that they may be interested in like local conferences that may happen in their city or state. I thought that could have been a valuable part of my residency.

Table 3 summarizes the recommendations of DPH postgraduate trainees of this study to decrease challenges during DPH residency programs.

DISCUSSION

This qualitative research study is the first to explore experiences, challenges, and opportunities that US DPH postgraduate trainees have encountered during and after their residency programs (after the updated competencies). We recruited a diverse group of DPH trainees from 12 of the 15 US DPH residency programs based on the inclusion criteria; at least one resident from 12 US DPH programs willingly participated in the study. Majority of study participants (61%) were female similar to the ADA's SADE in 2018–2019 (68%) and 2019–2020 (74%) (Table 4).

In addition to some challenging experiences similar to other dental or medical postgraduate trainees such as educational and financial difficulties [10–17], we identified pervasive and unique challenges for DPH postgraduate trainees and graduates. Variations between DPH residency programs revealed in this study show that DPH trainees often received varying

degrees of training despite having the same goal—fulfilling 10 core DPH competency areas. As such, unstructured, partially-structured, and self-directed programs have exposed DPH trainees to more challenges such as struggling to learn a broad array of topics in a short period of time. This coupled with the broadly-defined criteria for the four-part ABDPH certification examination often created a perceived difficulty with preparing for the board certification examinations. Almost all interviewees expressed their interest in attempting the board certification examinations, and becoming ABDPH diplomates for the prestigious social and professional recognition it symbolizes. However, the challenges identified in this study within the respective DPH programs and the seeming irrelevance of the DPH board certification/diplomate status on the job market make pursuing ABDPH certification examination unattractive; for example, the lack of board preparation courses and sample questions, broad study topic areas along with enormous online DPH resources, and an outdated reference book (at the time of this study) were considered as main challenges pursuing DPH board exam. Fortunately, the release of the seventh edition of the Burt and Eklund's Dentistry, Dental Practice, and the Community in 2020 provided a useful guide for new DPH trainees, however, the board exam evaluates DPH trainees knowledge beyond the textbook which is challenging. Considering about 190 active diplomates in 2020 from about 850 DPH specialists, more DPH graduates need to be encouraged to obtain board certification, hence, this issue is closely related to future job opportunities for ABDPH diplomates.

Despite DPH graduates and trainees enthusiasm in pursuing DPH-related careers, the paucity of DPH-related jobs often led trainees to pursue entry-level or postdoctoral research positions (often non-dental), enroll in other dental specialty programs to improve their clinical skillset and employability, or accept jobs that they could have performed without having the DPH specialty training and spending their time and resources. Both US-licensed and FTD DPH graduates and trainees experienced challenges with finding DPH-related jobs, however, the burden was more significant for the FTDs. FTDs represented a high percentage of interviewees (72%), which aligns with the average enrollment in DPH programs for 2018–2019 (74%) [20] and 2019–2020 [4] (62%). For most FTD DPH graduates, there are usually two main career options upon graduation: (1) Find a public health job such as an (oral) epidemiologist, a program coordinator, or a research assistant that does not require a US dental license; in which case just having an MPH or doctoral degree in any public health field would suffice, without the need for additional DPH training; or (2) Devote the time and resources to obtain a US dental license, which often involves extensive personal preparation, and practice for the regional dental examinations, and application to the limited number of State Dental Boards that are willing to accept FTD DPH graduates. Unfortunately, these two options often lead to a deviation from their original DPH career path in search of the more readily available clinical jobs. This is an unfortunate situation to meet local and national needs for a competent and diverse DPH workforce. DPH residency program is one of the five postgraduate programs (oral medicine, orofacial pain, oral and maxillofacial radiology, and oral and maxillofacial pathology) which have lower percentage of admitted applicants compared with other postgraduate programs. Considering the role that DPH specialists have in leadership, policy development, oral health strategic planning, surveillance systems to improve community's oral health, this small size of graduates will expose various

entities with challenges. There are reports emphasizing on the shortage of DPH workforce since 1998 [21–23] proposing training, financing, and workforce development strategies while recommending all stakeholders work together to overcome the shortages [23]. In 2002, Health Resources and Services Administration (HRSA) requested a proposal to suggest strategies to improve DPH workforce supply [23] however, since then HRSA still encourages grant applications of DPH programs offered by dental schools to improve the Postdoctoral Training in General, Pediatric, and Public Health Dentistry to improve access to, and the delivery of, oral health care services for all individuals, particularly vulnerable populations and individuals located in rural and/or underserved areas by preparing general, pediatric, and public health dentists to practice in, and lead, new models of oral health care delivery [24].

Unfortunately, there are no established strategies to position DPH trainees in DPH-related jobs after graduation to reinforce DPH workforce supply.

Two Healthy People 2020 (HP 2020) Public Health Infrastructure objectives (17–1, 17–2) to “increase the proportion of States (including the District of Columbia) and local health agencies that serve jurisdictions of 250,000 or more persons, and Indian Health Service Areas and Tribal health programs that serve jurisdictions of 30,000 or more persons, with a dental public health program directed by a dental professional with public health training” [25] have been removed from HP 2030 Public Health Infrastructure objectives. According to the 2017–2018 report of the Association of State and Territorial Dental Directors (ASTDD) 30 states are directed by a dental professional with public health training [26]. Although, this met the HP 2020 objective but there is no indication that these states are directed by DPH specialists, ABDPH diplomates, or dental professionals with public health training. In addition, it is not clear if the remaining states have addressed the problem and there was no need to include this objective in HP 2030.

In addition to two career paths mentioned for DPH graduates, there is a third path: taking the long route by enrolling and graduating from CODA-accredited predoctoral dental programs, and completing the required regional examinations to obtain US dental license from their respective State Dental Boards of registration again dissipating time and resources which then more resources need to be devoted to improve postdoctoral DPH residency programs, and then attract and retain DPH graduates in the DPH workforce. It seems that a DPH workforce needs assessment would be beneficial to determine the DPH workforce in local and national DPH programs, and provide DPH trainees with a clear landscape of the DPH job market [27,28]. DPH specialists can also serve as the leaders of the dental community during disease outbreaks and pandemics, responsible for developing evidence-based practice guidelines about the oral manifestations of the new infectious diseases, infection control protocols, and patient safety. Providing their expertise and points of view, DPH specialists play executive roles in their workplace in mobilizing partnerships and collaborations among educational, governmental, and private sectors, and health organizations to plan and implement community-based oral health programs [1].

Furthermore, periodic surveys of recent DPH graduates regarding their confidence in the ten DPH competencies, job opportunities, and career needs could provide valuable

information for DPH programs on ways to optimize this specialty for the greatest impact in the society. A recent study on assessing the DPH trainees self-efficacy to fulfill core competencies showed that trainees had some challenges in achieving some required skills such as leadership, policy, and advocacy; more work is needed to evaluate the degree of implementation of the new core DPH competencies in the DPH programs, and their residents' self-efficacy to fulfill these roles upon graduation [29].

One limitation of this study was inability to recruit participants from three non-dental school based US DPH residency programs. However, since participation was voluntary, we had at least one participant from 80% of the US DPH programs.

CONCLUSION

This qualitative study has explored challenges and opportunities that recent US DPH postgraduate trainees experienced during and after their residency programs. DPH postgraduate trainees had various educational programs, coursework, and board preparation challenges and opportunities. Both US-trained and FTD DPH postgraduates experienced difficulties in finding DPH-related jobs to apply their DPH training and skills. All DPH stakeholders need to come together to begin systematically addressing these challenges and create a future to move the DPH specialty into the 21st century and build a pipeline of competent trainees who are ready for future public health challenges.

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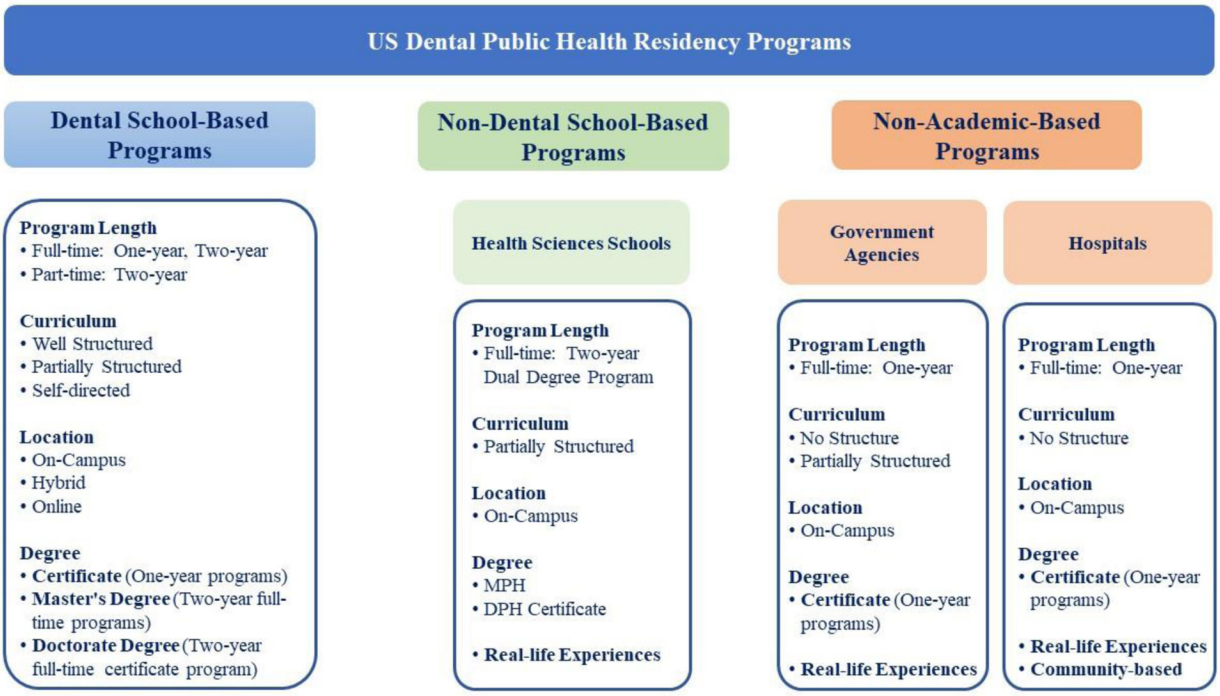

FIGURE 1-
The United States Dental Public Health Residency Programs

TABLE 1-

Interview questions

• Tell me about your experiences in your DPH residency program.
• Can you provide me with your core DPH courses?
• What are your career plans?
• What is your current position?
• Are you satisfied with your position? (For recent graduates)
• Were/Are you supported by your school/program financially?
• What is/are strength (s) of your program?
• What is/are weakness (es) of your program?
• Have you planned to take the board exam? If yes/no, why?
• Did you have any board preparation program?
• Do you have any suggestions for improvement of your DPH program?
• Did you have any clinical practice in your DPH program?
• What changes would you like to see in your educational program?
• Do you have any comments/suggestions to make the DPH program better?

TABLE 2-

Demographic distribution of the study participants (n = 18)

Variables	Number (%)
Gender	
Female	11 (61)
Male	7 (39)
Ethnicity	
Hispanic	3 (17)
Non-Hispanic	15 (83)
Race	
White (including European)	7 (39)
Asian (including Middle-Eastern (Arabian), Indian/Pakistani)	10 (55.5)
Black African/American	1 (5.5)
Duration of the Program	
One-year Full-time	11 (61)
Dual Degree Program	5 (28)
Two-year Part-time	2 (11)
Educational Background	
BDS	8 (44)
DDS	10 (56)
MPH *	16 (88)
Dental License Status	
US-trained dentist before residency	5 (28)
Foreign-trained dentist	13 (72)
Current Job Position	
Resident	6 (33.5)
Postdoctoral Scholar	1 (5.5)
Director	1 (5.5)
Clinical Dental Practice - (not DPH)	1 (5.5)
Academia	4 (22)
Assistant Director	3 (17)
Doctoral Student	1 (5.5)
None	1 (5.5)

* Two of the trainees were in MPH-DPH dual program.

TABLE 3-

DPH trainees recommendations for residency program improvement

Recommendations	Description
Structured Curriculum	To offer scheduled courses and classes to organize the DPH trainees learning and enable them to use their learnings in the real life dental public health experiences.
Networking	To facilitate frequent in-person communication opportunities with the program director and other faculty assisting the DPH trainees to expand their immediate network in DPH field as well as the interprofessional collaborations.
Clinical Component	To provide clinical component, even if limited. This is a strongly desired and missing part of the DPH residency programs as it is often required in DPH related jobs.
Financial Support	To reduce stresses regarding life expenses especially in full-time programs.
Board Exam Preparation Courses	To plan board exam preparation courses during the residency program, to provide a guideline about board references like other residency programs, and to set reasonable expectations from trainees who take the board exam.
Career Plan Consultation Services	To provide required information about applying to various job positions in the field without having a US dental license.
Outreach to the Local Community and Hiring Organizations	To educate related organizations about the DPH profession and its role in improving community's oral health to provide more job opportunities for graduates even without having a US dental license.

TABLE 4-

Comparison of demographics and characteristics of study participants and the ADA survey of advanced dental education (SADE)* (%)

	Study Results	SADE 2018–2019	SADE 2019–2020
Total number of DPH Trainees/Candidates	18	62	55
Dental License Status			
US-Trained Dentists	5 (28)	16 (26)	21 (38)
Foreign-Trained Dentists	13 (72)	46 (74)	34 (62)
Gender			
Female	11 (61)	42 (68)	41 (74.5)
Male	7 (39)	20 (32)	14 (25.5)
Race			
White (including European)	7 (39)	18 (29)	16 (29)
Black African/American	1 (5.5)	11 (18)	11 (20)
Asian (including Middle-Eastern (Arabic), Indian/Pakistani)	10 (55.5)	13 (21)	15 (27)
Other/Missing**	-	20 (32)	13 (24)
Ethnicity			
Hispanic/Latino	3 (17)	1 (2)	2 (4)
Non- Hispanic/Latino	15 (83)	61 (98)	53 (96)

*SADE: Survey of Advanced Dental Education, American Dental Association, Health Policy Institute. Source:https://www.ada.org/en/science-research/health-policy-institute/data-center/dental-education.

**Other/Missing race category refers to race of enrollees whose race were missing in SADE.

TABLE 5-

Five main themes emerged from the study interviews

Themes
Theme 1 *: Variability in the Structure of DPH Residency Programs*
Theme 2 *: Absence of Clinical Training*
Theme 3 *: Limited DPH Job Opportunities for DPH Graduates and specifically Non-US Licensed Dentists*
Theme 4 *: Broadly-defined Syllabus for the ABDPH Certification Examinations*
Theme 5 *: Partial Financial Support for Most DPH Programs*