

Critical Issues in Dental Hygiene Education

Exploration of the Scholarship of Doctoral Prepared Dental Hygienists

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Abstract

Purpose: The purpose of this study was to explore the scholarship of doctoral prepared dental hygienists as it relates to advancing the dental hygiene discipline.

Methods: A qualitative descriptive research design was used to determine patterns regarding dental hygienists' experiences with their doctoral education and resulting scholarly activities. Purposive and network sampling were used to identify potential participants. Interviews were audio recorded and transcribed. Data generated from the interviews were analyzed simultaneously with data collection. Open coding and axial coding were used to analyze data in a continuous comparative method to determine themes. Validity was insured through triangulation, member checks, and respondent validation.

Results: Ten participants were interviewed, and data analysis revealed several themes for each research question. Themes that influenced the decision to enroll in the program included *personal*, *professional*, *influencers*, and *situational*. Experiences the PhD program provided were *scholarship socialization*, *program requirements*, and *PhD program faculty*. Relative to career advancement, themes included *credibility* and *career opportunities*. Scholarship activities contributing to the dental hygiene discipline revealed two themes: *scholarly activities* and *dental hygiene is an evolving discipline*.

Conclusions: Although each participant's journey to a doctoral degree was unique, there were similar themes for motivation to obtain this advanced degree in addition to the preparation for engagement in scholarly activities and career advancement. While many participants had not pursued building theoretical or conceptual models, most agreed on their importance and the concept that dental hygiene is a developing discipline.

Keywords: dental hygiene, doctoral education, dental hygiene education, scholarship, scholarly activities, dental hygiene discipline, career advancement

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Introduction

Dental hygiene education began in 1906 when Alfred C. Fones, a dentist who valued prevention, trained his assistant to scale and polish teeth.¹ By 1913, Dr. Fones had established a nine-month program in his carriage house to educate these new oral health professionals, named dental hygienists.¹ After graduating three classes from the carriage house, dental hygienists began to receive their education through institutions of higher education. By 1916 formal programs were established at Hunter College, Rochester Dental Dispensary, and the Forsyth School of Dental Hygiene.¹ Over the next 40 years, dental hygiene education expanded from university settings to community colleges. The American Dental Association (ADA) Council on Dental

Education worked to establish curriculum and standards for all dental hygiene programs and it was decided that after 1947 all accredited programs would have a two-year minimum duration.² Later, the Truman administration supported this concept with the Report on Higher Education for American Democracy. This report endorsed community colleges as a cost-effective means to complete the first two years of college and receive occupational training to meet the needs of the workforce following World War II.³

Currently, the entry-level for dental hygiene remains at a two-year professional curriculum, with 329 entry-level programs in the United States.⁴ The majority of the entry-level programs award an associate degree, however there are

70 various types of baccalaureate degree programs in dental hygiene with an additional 57 programs offering baccalaureate degree completion options.⁴ The first master's degree program in dental hygiene was established at Columbia University in 1953 with the goal of preparing future dental hygiene educators and program administrators.² According to data from the American Dental Hygienists' Association (ADHA), there are currently 14 master degree programs with a dental hygiene major, Master of Science degree in Dental Hygiene (MSDH), and six programs granting related disciplines such as health sciences and allied health. Presently, the MSDH degree is the terminal advanced degree in dental hygiene.⁶

Despite the number of doctoral programs for health professions including nursing, physical therapy, pharmacology, and audiology professional programs, no doctoral program for dental hygiene exists in the United States (US). A number of health professions, such as physical therapy, are moving toward a doctorate as the entry-level degree. While doctoral education has been considered an essential factor in leadership, scholarship, research, policy and education in dental hygiene,⁷ currently dental hygienists must pursue doctoral degrees outside of the dental hygiene discipline.⁸ As a result, these scholars focus their research towards the discipline of their doctorate rather than within the dental hygiene discipline.⁹

Doctoral preparation of dental hygienists is essential for building the dental hygiene knowledge base and, ultimately, for advancing the profession.¹⁰ In the 2005 report, *Dental Hygiene: Focus on Advancing the Profession* published by the ADHA, a primary aim was to create a doctoral degree program in dental hygiene. Recommendations included developing curricular models for professional and academic doctoral programs in dental hygiene; conducting educators' workshops at professional meetings to promote the development of dental hygiene doctoral programs; and publishing curricular models for doctoral programs.¹⁰ While there are still no doctoral programs in dental hygiene in the US, advancing education in dental hygiene remains vital to the ADHA's vision to incorporate dental hygienists into the healthcare delivery system as primary healthcare providers and expand access to care.¹¹

Scholarship in the dental hygiene discipline is underdeveloped as compared to other disciplines because research is limited and not framed within the context of theoretical models or conceptual frameworks.¹² These frameworks are vital to the establishment of a scientific body of knowledge unique to dental hygiene rather than theories that are borrowed from other disciplines.¹³ Presently, there are seven theoretical models that support the dental hygiene discipline¹⁴⁻²¹ with little to no research establishing validity for these models.²²⁻²⁶

Dental hygienists with doctoral degrees are needed to support the dental hygiene discipline. Specifically, a doctoral curriculum prepares graduates to participate in research. Conducting original research through the application of scientific methods results in scholarly activities to grow the knowledge base. Although there are doctoral prepared dental hygienists, it is unknown whether they have previously or are currently engaging in scholarly activities, and whether these experiences have impacted the dental hygiene discipline. The purpose of this qualitative study was to explore the scholarship of doctoral prepared dental hygienists as it relates to advancing the dental hygiene discipline.

Methods

This study received approval from the Idaho State University Institutional Review Board (IRB-FY2019-272). A qualitative descriptive research design was used to determine patterns or themes regarding dental hygienists' experiences with their doctoral education and resulting scholarly activities.

The following research questions guided the study: 1) What factors influence the decision of dental hygienists to enroll in a doctoral program? 2) What experiences in the doctoral program prepared individuals to engage in scholarship? 3) How has a doctorate degree helped dental hygienists advance in their careers? 4) How have their scholarship activities contributed to advancing the dental hygiene discipline?

Purposive sampling identified potential participants who were knowledgeable about the phenomena of interest.²⁷ Network sampling was also used to identify additional participants. Inclusion criteria involved dental hygienists who had earned a doctorate degree and participated in scholarly activities. The required scholarly activities included the completion of at least three peer reviewed publications, including the dissertation and a minimum of two research studies conducted or grants written during and after the award of the doctorate degree. Exclusion criteria eliminated dental hygienists who did not have a doctorate degree or had not participated in scholarly activities. A screening questionnaire was administered to identify dental hygienists who met the inclusion criteria. Additionally, the information collected assisted researchers in selecting participants with diverse disciplines from which the degrees were received: education, community health and science.

An interview guide was created with open-ended and probing questions to gain more in-depth responses.²⁸ Two research team members evaluated the questions to ensure the reliability and the consistency of data collection during the semi-structured interview sessions. A copy of the interview

guide was sent to the participants prior to the interview to help prepare their responses. To establish the validity of data collection, one bracketing interview was conducted prior to the interviewing of subjects. Bracketing is a method used to decrease the potential effects of preconceptions of the interviewer and increase the researcher's clarity with participants' experiences.²⁹ Following the bracketing interview, one pilot interview was conducted with a dental hygienist who met the inclusion criteria for the study to evaluate the ability of the interview questions to gather relevant data and address any improvements needed in the research design.

A written consent form was sent to potential participants and verbal consent was obtained. Interviews were conducted by the primary investigator (PI) through an audio-recorded phone conversation (WS-300M Digital Recorder Voice Recorder; Olympus, Tokyo, JP). Word-for-word transcription of the audio-recording was completed by a professional transcriptionist. Pseudonyms were utilized during the interview and on the transcript to maintain confidentiality and anonymity. The PI listened to the audio-recorded interview to verify if the transcripts were correct.

Data generated from the interviews were analyzed simultaneously with data collection. This method allowed each previous interview to guide the next, as themes and/or categories become apparent. Open coding was used, in which data were divided into manageable words or phrases that were relevant to the research questions. During the next phase of coding, open codes were combined to form larger segments of data called categories or themes; referred to as axial coding. The goal of axial coding is for the themes to emerge and provide the PI direction and assist in answering the research questions.²⁸ During the data analysis process, the PI went back and forth between axial coding and open coding in a continuous comparative method to compare data and determine similarities and differences.²⁸

Internal validity was insured through triangulation.²⁸ Member checks or respondent validation were also used to ensure validity.²⁸ The tentative findings were sent to each participant to review and provide feedback on the data analysis. Participants were encouraged to inform the PI of clarifications needing to be made to the findings.

Results

Demographic data were analyzed for frequencies and are presented in Table I. Ten dental hygienists with doctorate degrees participated in the study. The majority of participants were between the ages of 51 and 60, female, and possessed a doctorate from an education, community health, or science discipline. Most participants were employed in a university setting and a majority of participants' dissertation topics were dental hygiene related. The following results present the themes answering the four research questions.

Table I. Demographics (n=10)

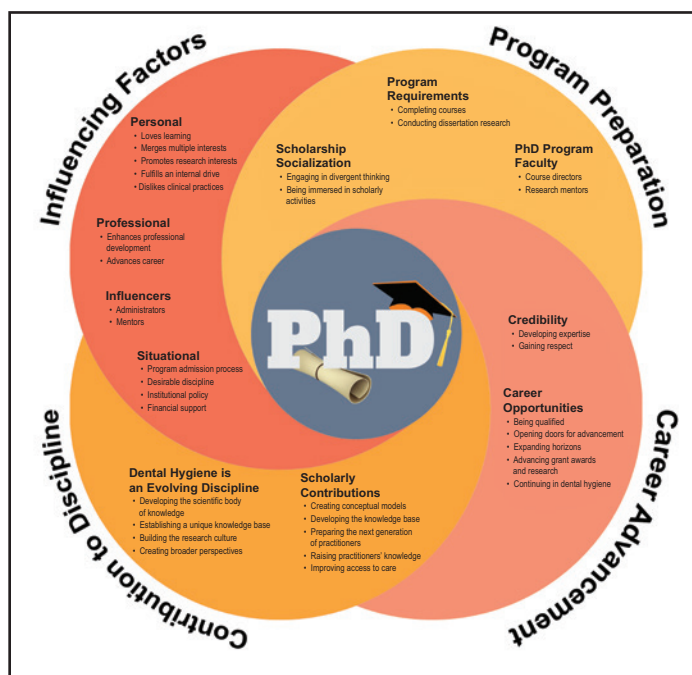
	n	(%)
Age Range		
41-50	1	(10)
51-60	5	(50)
61-70	1	(10)
71-80	3	(30)
Gender		
Male	1	(10)
Female	9	(90)
Entry-level degree		
Certificate	3	(30)
Diploma	3	(30)
Associate	3	(30)
Bachelor	1	(10)
Year of entry level degree		
1966-1970	3	(30)
1971-1980	1	(10)
1981-1990	3	(30)
1991-2000	3	(30)
Type of master's degree		
Dental Hygiene	4	(40)
Education	2	(20)
Science	4	(40)
Year of master's degree		
1961-1970	1	(10)
1971-1980	2	(20)
1981-1990	1	(10)
1991-2000	2	(20)
2001-2010	4	(40)
Doctorate degree discipline		
Education	4	(40)
Community Health	2	(20)
Science	4	(40)
Year of doctorate degree		
1976-1985	1	(10)
1986-1995	1	(10)
1996-2005	1	(10)
2006-2015	7	(70)
Dissertation topic		
Dental hygiene related	8	(80)
Oral biology	1	(10)
Physiology focus	1	(10)
Employment setting		
University setting	8	(80)
Retired educators	2	(20)

Influencing Factor Themes

Four themes emerged related to factors influencing the participants' decisions to pursue a doctorate degree: *Personal*, *Professional*, *Influencers* and *Situational* (Figure 1). Personal interests reflected sub-themes: loves learning, merges multiple interests, promotes research interests, fulfills an internal drive, and dislikes clinical practices. As Ivy stated, "I was more interested in education but more specifically the intersection between education, anthropology and sociology." Another participant discussed her science interest:

"I chose oral biology, that was a conscious decision. I liked biology, but I liked the fact that I have spent two years in dental hygiene where I knew about teeth. And I thought this program would be ideal from the standpoint of merging my two interests." (Jean)

Figure 1. Personal, Professional, Influencers and Situational



Professional factors included the sub-themes: enhances professional development and advances career. Judy and Alex revealed their perspectives on professional development. Judy noted "I knew that I wanted to be able to do more than continue to be just in the technical college system where I had been for 11 years." While Alex indicated, "If you don't continue to be intellectually challenged in the work that you're doing, you burn out and, and you get bored and you start looking for something else." Career advancement was represented another participant who stated:

I wanted to move up the ladder, at the university where I was, and I needed the Doctoral degree. I knew that having a Doctoral degree was a prerequisite to get into an administrative position." (AJ)

Influencers who were administrators and mentors who had encouraged participants to pursue their doctoral degree were another professional factor. An example was described by Lucy, "the director of [the bachelor completion] program was very visionary, and she was the one who planted that seed." The last factor identified was situational. Four related sub-themes emerged: *program admission process*, *desirable discipline*, *institutional policy*, and *financial support*. Elizabeth reported, "one of the deciding factors [of taking the new employment position] actually was that there was a PhD program available in the university that had offered me the position." Others reflected the financial benefits available to them including, "There also was a tuition reimbursement, a type of scholarship," (Ivy) and "A faculty benefit was that we could take two, three-hour courses at no charge." (Joni)

Preparation to Engage in Scholarship Themes

Three themes related to preparation to engage in scholarship were identified, *Scholarship Socialization*, *Program Requirements*, and *PhD Program Faculty* (Figure 1). Scholarship Socialization was organized into two sub-themes including engaging in divergent thinking and being immersed in scholarly activities. This theme was epitomized by Jean who said, "Socialization takes time. I had five years of being ingrained with scholarship." Other key quotes include:

"A critical part of the PhD program is learning how to write, learning how to analyze, develop scholarship and thinking in a very critical scholarly way." (Ivy)

"[The PhD program] taught me to be a lot more skeptical about what you see out there in the literature, to be able to more thoroughly assess studies that are published and, to be able to just make better decisions." (Elizabeth)

"Looking at certain problems or challenges from a different perspective, that's what the PhD has done for me. I now see things in different shades of gray, I can see and I understand from different perspectives...a doctoral degree makes you find other ways of looking at things and it may not be within the box; it may be a little bit unconventional." (AJ)

Analysis of the theme, *Program Requirements*, revealed two sub-themes, including *completing courses* and *conducting dissertation research*. Representative quotes reflecting this theme included:

"The PhD program required us to take not only quantitative research but qualitative research." (Judy)

"My program taught me more about statistics, study design, and overall project management." (Alex)

"I had a range of research courses, theory courses, and practice-based courses. I was pleasantly surprised how much

my doctoral program helped me develop the skills for my scholarship.” (Ivy).

“I don’t think you can really do substantial research without a PhD because you just don’t have the experience in research.” (Marie)

The final theme of this section relates to *PhD Program Faculty*. Sub-themes identified included course directors and research mentors as noted by Karen and Lucy.

“My PhD, I didn’t have many courses at all. The mentorship I got from my supervisor was where I learned a lot, not so much from the actual content of the course, but the supervisor and the mentor and the instructor that’s involved in coursework.” (Karen)

“One of my committee members was a very strong feminist and helped me develop my feminist approach to my research. I also had an advisor who was very pivotal, as far as me developing as a scholar because of what he required of me in developing my research proposal.” (Lucy)

Career Advancement

Two themes were identified related to career advancements *Credibility* and *Career Opportunities* (Figure 1). Credibility was analyzed as two sub-themes including *developing expertise* and *gaining respect*. Key quotes reflecting these sub-themes are represented by two of the participants.

“[The PhD] gave me credibility because no matter how smart and talented dental hygienists may be you’re on a very different playing field. It gives me a very strong credibility with dentists and with other scientists who recognize my degree as comparable, if not harder.” (Alex)

“You need dental hygienists at that table and you need them to be respected and listened to. The different tables that are making decisions creating policy in health care, creating research agendas or making decisions about where the dental hygiene discipline goes. Even if they’re sitting at the table without a PhD then they might be there, but they might not be respected and listened to.” (Lucy)

Multiple sub-themes were identified related to Career Opportunities: *being qualified*, *opening doors for advancement*, *expanding horizons*, *advancing grant awards and research*, and *continuing in dental hygiene* were identified as significant to the participants. Key quotes representing these sub-themes are shown in Table II.

Contributions to Advancing the Discipline

Two themes emerged from the interviews related to how scholarship activities contributed to advancing the dental hygiene discipline, *Dental Hygiene is an Evolving Discipline* and *Scholarly Contributions*. Four sub-themes were identified

Table II. Key quotes: Career Opportunities

<p><i>Being qualified</i></p> <p>“I would not have my position that I have today. I wouldn’t have got the promotions that I have gotten without the PhD.” (Ivy)</p> <p>“I have tenure at a major university and there’s no way I would be hired in the faculty I am without a doctorate.” (Marie)</p>
<p><i>Opening door for professional advancement</i></p> <p>“A PhD is essential. I would have not advanced in my career without it.” (Ivy)</p> <p>“Every degree is another window of opportunity.” (AJ)</p> <p>“Having a PhD is a key, a magic little key. A [PhD] advances you in real tangible ways and also in less tangible ways as far as, just having a PhD as a label that you attached to your name, where people make assumptions about your abilities and your knowledge and what you can offer that you don’t have when you have a masters. Its specialty unlocks a lot of doors.” (Lucy)</p>
<p><i>Expanding horizons</i></p> <p>“My PhD discipline is a broader and different lens than just dental hygiene. And that widening of my lens and widening of perception allowed me to leapfrog into other areas.” (Judy)</p>
<p><i>Advancing grant awards and research</i></p> <p>“We’ve done research with other universities and had major funding and that would not have come through without having a doctorate.” (Marie)</p>
<p><i>Continuing in dental hygiene</i></p> <p>“I really wanted to stay involved in the profession. Dental hygiene has been my passion since I was 19 years old. So, I feel like I still have a lot to contribute.” (Elizabeth)</p>

relative to the evolving discipline: *developing the scientific body of knowledge*, *establishing a unique knowledge base*, *building the research culture*, and *creating broader perspectives*. Regarding building a body of knowledge, one participant stated,

“My question would be can we overlap our body of knowledge with other bodies of knowledge or to be a true body of knowledge, Is it just ours? It has to be better defined through consensus and research. Then you have to provide the outlets through masters and PhDs to build and grow it. And that’s when we’ll truly have a dental hygiene discipline. Cause right now we’re a pseudo discipline.” (Lucy)

On building a research culture, another commented,

“We need to really establish a PhD as our end discipline, to become a true discipline. You really have to have an end point. And that’s the doctoral degree. We need to somehow

try to encourage more dental hygienists to pursue doctoral education to build a critical mass of doctoral prepared hygienists.” (Elizabeth)

In terms of creating broader perspectives, Alex observed, “I don’t think the scientific literature and theoretical base is unique because in dental hygiene education we beat everybody into submission. We teach everybody with the same textbooks, with the same philosophies, the same models. Everybody looks the same, they act the same, they think the same. Creative thinking or deviation from the norm is not encouraged. All you have to do is look at characteristics of the profession and that’s the only evidence you need to support that. If you have degrees in outside disciplines, you can bring novel and interesting things back to dental hygiene that nobody’s had exposure to before. Our current educational system has us stuck and it’s reflective in our literature too.” (Alex)

Additional quotes substantiating the theme of contri-butions to advancing the dental hygiene discipline are shown in Table III.

Six sub-themes were associated with the theme, *Scholarly Contributions* including creating *conceptual frameworks*, *developing the knowledge base*, *preparing the next generation of practitioners*, *preparing the next generation of researchers*, *raising practitioners’ knowledge*, and *improving access to care*. Key quotes illustrating these sub-themes are shown in Table IV.

Discussion

This qualitative study was the first to explore the scholarship activities of dental hygienists with doctoral degrees relative to advancing the discipline. The findings provided new evidence that dissertation topics in the study population were related to dental

Table III. Key quotes: Dental hygiene is an evolving discipline

<p><i>Developing the scientific body of knowledge</i></p> <p>“The dental hygiene, scientific body of knowledge could be improved by being broader based. That was the purpose of the dental hygiene research agenda. The majority of research that comes in is all about the minute and very narrowly focused about a certain disease or about a technique instead of being more about public health or interprofessional work.” (Judy)</p> <p>“For a very long time we depended on organized dentistry, medicine, and on other disciplines. We’ve borrowed very heavily from nursing. We’re still borrowing heavily for nursing, but it’s all interprofessional at this point.” (Joni)</p>
<p><i>Establishing a unique knowledge base</i></p> <p>“I think [dental hygiene’s knowledge base] is unique because a lot of what we do focuses on prevention.” (Mary)</p> <p>“Dental hygiene has a much more holistic and prevention and health promotion focus. And I think that does make us somewhat unique.” (Karen)</p> <p>“The other very unique part that we need to look at is prevention and care rather than cure or repair.” (Ivy)</p> <p>“We have to really start creating the data to show the outcomes of what dental hygienists delivered, models of care produce, how does the care that we deliver change patient outcomes, how does it affect the cost of care. We have basic fundamental questions about what we do and how it drives patient health that are unanswered. We think that we know the answer because it’s anecdotal, it’s what we observe, but we don’t have good numbers to show that.” (Alex)</p> <p>“The first step [in developing the dental hygiene body of knowledge] is making sure we have a definition and that definition is current and also visionary. Then making sure that education supports it and if you don’t have higher education in dental hygiene, then you can’t grow it. So the argument is always that if you don’t have PhDs and masters trained dental hygienists, you don’t have anyone developing that body of knowledge.” (Lucy)</p>
<p><i>Building a research culture</i></p> <p>“If we are able to establish a doctoral degree that could be one of our pathways on creating more theoretical or conceptual models for the profession.” (AJ)</p> <p>“We see sort of a ‘dumbing down’ of our profession where our graduate programs aren’t encouraging original research. If you don’t have original research you can’t grow a unique body of knowledge. So we’re stuck a little bit and we need to be doing creating more theoretical frameworks. But more importantly, we can’t just create them. We have to test them to see if they actually work.” (Alex)</p> <p>“We need to have more people who are knowledgeable about doing qualitative research and maybe mixed methods studies because that’s how you’re going to get some of the more social science types of theoretical information into dental hygiene and, applicable to dental hygiene. I think those are the kinds of studies we need more of because that’s how we’re going to improve our understanding of other paradigms.” (Elizabeth)</p> <p>“If we graduated more doctoral level hygienists to push the boundaries of the profession that could help advance us.” (AJ)</p>
<p><i>Creating broader perspectives</i></p> <p>“The dental hygiene scientific body of knowledge could be improved by being broader based. That was the purpose of the dental hygiene research agenda... Individuals we see in our profession are looking at wanting to make positive changes for the future. Those are all really good things, but the actual construction of it and making it happen, that’s a whole different layer of challenge.” (Judy)</p> <p>“I see more responsibilities coming to dental hygiene, to dental therapy, to dental assisting, and less responsibilities for the clinical services to the dentist. I see the dentist is more of an administrator or even a ring master.” (Joni)</p>

Table IV. Key quotes: Scholarly contributions

<p><i>Creating conceptual models</i></p> <p>“I value and understand how important conceptual models are. I support and really encourage and think that we need a lot of fine minds and active energy and scholars in dental hygiene to develop more theoretical or conceptual models.” (Ivy)</p>
<p><i>Developing the knowledge base</i></p> <p>“One of the reasons why we want a PhD is to have a better knowledge base and to produce new knowledge.” (Jean)</p> <p>“My scholarship and involvement has been able to help forward those things for the profession and looking at things through a broader lens instead of a narrower one. Help us advance the profession by having less boundaries with supervision and knowing that we’re just as clinically capable.” (Judy)</p> <p>“I’m still publishing..... And I will continue to do research and publish as long as I can because I love it.” (Elizabeth)</p>
<p><i>Preparing the next generation of practitioners</i></p> <p>“Understanding why people need a bachelor degree minimum, and even within our profession, I think that’s super, very important.” (Marie)</p> <p>“I wish more young dental hygienists could understand how advancing their education will help them to become master clinicians.” (Alex)</p>
<p><i>Preparing the next generation of researchers</i></p> <p>“The people who are directing and educating the dental hygiene master’s program should have a doctorate. You have to live research, you have to do more than one project. That’s why there needs to be more hygienists with PhDs to teach the master’s people. The joy of scholarship is producing other scholars for dental hygiene. I have advanced the dental hygiene discipline through my publications with students.” (Jean)</p> <p>“Few graduate programs in dental hygiene are left where students do original search. They used to all do original research but they don’t anymore. We have a tremendous responsibility, those of us who work in research to try to actively create the next generations of people who are going to take over the kind of roles that, you know, I’m in because it’s slim pickings right now to be honest with you and it’s a bit scary.” (Alex)</p>
<p><i>Raising the practitioners’ knowledge</i></p> <p>“The professional development courses or the clinical education courses that I present keep them current. The theories have changed over time and I want the evidence to be sound. Sometimes we practice the way we were taught and as clinicians we need to make sure we change with the times. We need to accept information and integrate it into clinical practice.” (AJ)</p> <p>“I’m very passionate about hygienists becoming more advanced clinicians. So I hope that some of my scholarly endeavors will eventually translate into raising that bar for that.” (Alex)</p>
<p><i>Improving Access to Care</i></p> <p>“My scholarship is a contribution to be able to first contribute to the community so that our community members can get the education and access to care that they need. Every dental student and faculty knows how competent and strong dental hygienists are in community settings because we are here and we’re doing the work.” (Ivy)</p> <p>“One of the things that I do, even though a lot of people look at access to care and marginalized and vulnerable populations, I focused specifically on prison population now, which was easy moving from institutionalized elders to institutionalized adults, For the most part it’s the institutionalization and the culture change models that are in place, or the organizational culture. That’s where my contribution is, not only from being a dental hygienist but from just a dental perspective, I work with an interprofessional team here and I’m the only dental professional involved.” (Karen)</p>

hygiene, rather than other disciplines. Although each participants’ journey was unique, interesting, themes emerged from the data.

Multiple factors influenced participants’ decision to pursue doctorate degrees. Previous research supports personal and professional factors previously identified such as increasing knowledge, gaining respect, gaining a deeper understanding of oral diseases, and merging of multiple interests.³⁰ However, the participants in the previous study also included individuals with dental degrees and a range of doctoral degrees.³⁰ In another study by Tumath and Walsh on the perceptions regarding dental hygiene doctoral programs from students in a master’s degree program, interests in earning a doctorate included career advancement (becoming a better teacher and/or researcher), and increased salary.⁸ Regarding influencers, Carpenter et al. identified similar Influencers to the participants in this study, including educators, dental professionals, researchers and family members.³⁰ These influencers provide encouragement and support for individuals as they consider and pursue doctoral education.

Doctoral education provides a socialization experience through immersion in scholarly activities and divergent ways of thinking; practices that are not usually a part of the undergraduate or master’s degree education experience. Weidman, et al. attributed socialization as processes for gaining knowledge, values and skills that are vital for entry into a career, requiring an advanced level of comprehension and attributes.³¹ Socialization within the context of a doctoral program requires individuals to internalize the values, roles, and attitudes that are accepted as part of the culture of scholars and to commit to portraying “the persona of the scholar.”³² Cunningham-Williams et al. described a conceptual model of socialization of doctoral students consisting of four

major components: research focused interdisciplinary curriculum, individualized mentoring, leadership development, and formal and informal supports, leading to academic and careers with a research concentration.³³ Doctoral coursework in a selected minor area, (e.g., anthropology, economics, physiology) can provide additional experiences to expand one's perspectives through developing a broad understanding of another discipline.³⁰ Coursework completed in other disciplines increases the individual's ability to engage in divergent thinking, the method or process of exploring creative ideas for problem solving. With divergent thinking, ideas are generated spontaneously in a non-linear manner. Participants in this study noted that more divergent thinking is needed within the dental hygiene profession, a skill that can be acquired when exposed to doctoral coursework.

In considering doctoral education for dental hygiene, Ortega and Walsh analyzed doctoral education in nursing and proposed two types of doctoral degrees for dental hygiene; one for professional practice and another as a PhD.³⁴ Gurenlian et al., outlined curricula for the two dental hygiene doctoral programs.³² While the professional practice doctorate would be focused on clinical practice, the proposed PhD program would educate and prepare researchers and academicians for advancing the discipline's scientific knowledge base.³⁵ Researchers educated within the discipline would be socialized to engage in quantitative and qualitative investigations leading to the development and testing of theoretical and conceptual models as well as establishing priorities for future research.³⁵

While participants in this study had not earned a doctorate in dental hygiene, they indicated that obtaining a doctoral degree contributed to their professional advantages. Participants noted that credibility was established by earning a doctorate which led to a recognition of a developed expertise and brought respect. Davis et al. reported similar findings credibility and respect in their study of dental hygiene educators. Additionally, Davis et al. found that a majority of dental hygiene educators in their study agreed that the greatest need for establishing doctoral programs in dental hygiene was for the ability to relate equitably with doctoral graduates of other health disciplines.³⁶ Participants in the current study perceived that career opportunities increased, and salary compensation options became available due to their advanced degree. Likewise, Davis et al. found similar agreement; dental hygiene educator participants were motivated to pursue a doctoral degree to become better researchers, educators, and program administrators.³⁶

Advancing the dental hygiene discipline through increasing the scientific knowledge base is an important consideration;

however, many of the participants lacked experience in contributing to the development or testing of theoretical models or conceptual frameworks. Cobban et al. examined whether dental hygiene practice would benefit from pursuit of development as a discipline.¹² While dental hygiene has developed some characteristics of a discipline, research production by dental hygienists had been limited and often not situated within theoretical or conceptual frameworks,¹² thus supporting the need for further development in this area.

A research infrastructure is needed to promote research and advance the scientific basis for dental hygiene practice.³⁷ An key component of an infrastructure is the presence of professionals who are educated in research, particularly those who are prepared through doctoral education in dental hygiene.³⁷ Participants in this study suggested that the dental hygiene research infrastructure was weak, and expressed concern that graduate students no longer experience significant study in research design or thesis. Unfortunately, this observation impacts the interest in research, which participants may have previously developed during their master's degree education. Another challenge to a research infrastructure was the need for broader consensus on defining the unique body of knowledge for dental hygiene. However, doctoral programs offer experiences in both quantitative and qualitative research which help to foster the development of conceptual models and theoretical frameworks. To date, there are only seven theoretical frameworks for the dental hygiene profession with limited testing of these constructs.^{14-21, 22-26}

Transitioning dental hygiene to the level of recognition as a research-based discipline, requires the building of research capacity. The foundation is fostering a strong research culture among practitioners, academicians and researchers that begins during the entry-level curriculum and continues through graduate and doctoral education. A research culture has been defined as "an organization constructing an environment that enables and supports creative work to generate new knowledge and that provides researchers with opportunities to interact and grow."³⁸ Research needs to be integrated into all aspects of education, to create a critical mass of practitioners who use science-based evidence to guide patient care, and researchers to create new knowledge.

This study has several limitations. Although purposive sampling is widely used in qualitative research, this sampling method limits the generalization of the results. However, the intent purposive sampling is to provide in-depth insights about the study questions.³⁹ Participants were recruited through professional networking, with many of the participants in educational settings, recommending potential participants who were also in education. Unfortunately, potential participants working outside of education did not volunteer to participate.

Also, this study did not include dental hygienists with all types of doctoral degrees and participants were located only in the US and Canada.

Further research is indicated to support the development of an understanding of doctoral education in dental hygiene and the development of the discipline. Each theme addressed within this qualitative study could be examined in greater detail using maximum variation with dental hygienists who have different types of doctoral degrees allowing for additional expression and experiences to emerge. A new Delphi study could be conducted allowing for examination and consensus pertaining to dental hygiene's research infrastructure. Lastly, a study examining the current levels of dental hygiene research being conducted and determining how the current research relates to existing conceptual models and theoretical frameworks. A perspective is needed on the contributions dental hygiene researchers are making to the discipline and the existing gaps in the literature to chart a course that makes significant contributions to the advancement of the profession.

Conclusion

The participants of this study provided valuable insight regarding their experiences in doctoral programs and scholarship activities. Although each participant's journey to a doctorate degree was unique, there were similar themes for motivation to obtain this advanced degree as well as the preparation for engagement in scholarly activities and for career advancement. While many participants lacked personal experience in building theoretical or conceptual models, most agreed on the importance of these models and that the dental hygiene discipline is continuing to evolve and develop.

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