

RESEARCH

Factors Influencing Dental Hygienists' Decisions to Pursue Doctoral Degrees

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Abstract

Purpose: To identify the factors that have influenced dental hygienists to pursue post-graduate education opportunities, specifically dental (DDS, DMD) as compared to academic doctoral degrees, such as doctor of philosophy (PhD) or doctor of education (EdD).

Methods: A convenience sample of dental hygienists with doctoral degrees were identified from multiple sources (n=140) and sent a 27-item web-based survey. Univariate logistic regression analysis was used to explore the influence of independent variables (respondents' demographic and personal characteristics, influential persons and experiences, encouraging and motivating factors) on the respondents' decision to pursue either a dental or an academic doctoral degree.

Results: Of the 140 potential participants, 69 (n=69) responded (49% response rate): 17 dental degree respondents, 46 academic degree respondents. In contrast to academic degree respondents, those with dental degrees graduated from dental hygiene programs more recently (p=0.03), spent less time working as a dental hygienist (p=0.01), considered themselves mechanically inclined (p=0.03), and preferred to learn a new skill rather than read about a current research study (p=0.002). Both groups agreed that working one-on-one with people was important to career satisfaction. Dental degree respondents were more likely to have been influenced or encouraged to pursue dentistry by dentists (p=0.01) and family (p=0.004). Academic degree respondents were more likely to have had experiences with a researcher/scientist (p=0.004) or had been influenced by an educator (p=0.01). Only 40% of all respondents reported that dental hygiene instructors were instrumental in encouraging their advanced education.

Conclusion: Dental hygienists possessing characteristics similar to the academic degree respondents in this study should be encouraged to pursue academic doctoral education, providing the necessary skills to advance the dental hygiene profession.

Keywords: dental hygiene education, faculty development, professional development, postgraduate education

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Introduction

Increasing numbers of dental hygienists have been advancing their education to the doctoral level in recent years with the majority pursuing doctoral degrees in dentistry as a Doctor of Dental Surgery (DDS)/Doctor of Medicine in Dentistry (DMD), or in education/research as a Doctor of Education (EdD) or Doctor of Philosophy (PhD). Multiple factors appear to have led dental hygienists to pursue doctoral education in their respective specialty areas and the subsequent career pathways.

Previous studies of students choosing to pursue dentistry have reported a desire to help others, regular hours and flexible work schedules, independence/autonomy, financial benefits, job security, and the

desire to use one's practical/artistic skills as motivations for this career choice.¹⁻⁵ Students seeking research-oriented doctoral degrees were reportedly motivated by learning and discovering new things, thinking and acting independently, and helping others, albeit indirectly, through research. They also identified the greater career mobility that a doctorate degree can provide, as a factor.^{6,7} In a study of women's career choices conducted by Edmunds et al., female faculty members reported a greater interest in teaching over research, expressing that teaching enabled greater flexibility and enhanced their work-life balance.⁸ These personal preferences and interests may parallel those that have attracted dental hygienists to pursue their specific doctoral degree and career pathway.

Both dental and academically based education/research doctoral career pathways address oral health-related issues and play critical roles in maintaining the oral health of the public. However, the education/research pathway may potentially offer greater benefits towards the overall advancement of the dental hygiene profession. Dental hygienists educated at the doctoral level may be better able to relate more equitably with others holding doctorates in health-related disciplines, facilitating interprofessional collaboration among health care professions.⁹ Additionally, dental hygienists with academically based doctorate degrees may be more focused on conducting the discipline-specific research to expand the dental hygiene body of knowledge, and be better able to attract the necessary funding to support large-scale studies for oral health promotion and disease prevention.⁹ Matriculation through doctoral educational programs prepares students with the skills and resources to conduct hypothesis-driven research; it is less likely that dental hygienists holding dental degrees would have the same focus.

A retrospective analysis of the motivational factors influencing dental hygienists who have pursued doctoral degrees, both dental and academic, may help identify distinguishing personal characteristics and interests as well as the types of experiences that have played key roles in their career pathways. Counselors and mentors might be able to use these characteristics to identify dental hygiene students and practitioners and actively encourage them to consider postgraduate degrees in research and academia. Personal contact with established educators and scientists could exemplify the advantages of an education or research-focused career, as well as providing teaching and research opportunities particularly for individuals who had not previously considered this pathway. Increasing the numbers of dental hygienists in research and academia at the doctoral level has the potential to significantly impact the advancement of the profession. The purpose of this study was to identify the factors influencing dental hygienists to pursue post-graduate education opportunities, specifically dental (DDS, DMD) degrees as compared to academic doctoral degrees, such as doctor of philosophy (PhD) or doctor of education (EdD).

Methods

This cross-sectional study, using a quantitative web-based survey, was approved by the Institutional Review Board of the University of California, San Francisco (IRB# 15-18028), as exempt. Dental hygienists who had earned doctoral degrees (dental and academic) were identified as the target study population. Names and email addresses of the convenience sample of 140 (n=140) were compiled from a variety of resources including scholarly journal editorial review boards, authors of professional publications, and professional contacts.

The survey instrument consisted of 26 quantitative, close-ended questions and one qualitative, open-ended question regarding personal characteristics, interests, influences and life experiences. Survey items were developed following extensive reviews of previous research and discussions with dental hygienists holding doctoral degrees. The relevant experts included 3 dental hygienists with EdD, PhD, or DDS degrees, 2 dentists, one of whom also held a PhD. Items were modified according to their feedback. The survey was then pre-tested for clarity and comprehension by 5 dental hygiene master's degree candidates.

One hundred forty email addresses were entered into Qualtrics™ survey research software program, which also hosted the survey instrument. An email message containing a letter of informed consent and a link to the survey was sent to potential participants. Respondents selecting the survey link indicated their informed consent. After the initial invitation, three reminders were sent to non-responders over a course of three months. The survey remained active for a four-month period during the spring and summer of 2016. Qualtrics tabulated the responses and calculated the response frequency (percentage) for each survey item.

Respondents were separated into two categories depending upon whether the respondents had pursued a doctoral degree (PhD, EdD, or other), termed academic degree or whether they had pursued a DDS or DMD, termed dental degree. Univariate logistic regression analysis was used to explore the influence of the independent variables (respondents' demographic characteristics, interests and characteristics, influential people and observation/work experiences, encouraging and motivating factors for advanced education, and satisfaction with working as a clinical dental hygienist) on the primary outcome (respondents' choice of either an academic or dental degree). The magnitude of the association between the primary outcome and independent variables were reported as unadjusted odds ratios with corresponding 95% confidence interval. Statistical analyses used SAS version 9.4 (SAS Institute, Cary, NC). All statistical tests provided two-sided p-values, and p-values equal to or less than 0.05 were considered statistically significant.

Responses to the one open-ended item regarding the participant's motivation to earn a doctoral degree and to the "other" options in the close-ended questions were reviewed to identify patterns of responses and categorized into themes.

Results

Of the 140 potential participants, 69 (n=69) responded for a 49% response rate. Sixty-three respondents specified the type of doctoral degree they earned: 17 had earned a dental degree (22%) and

46 (67%) had a non-dental academic degree. Of the non-dental degreed, 22 had a PhD in various subjects (35%), 16 an EdD (25%), and 8 respondents had earned other types of doctoral degrees (13%). Of the eight who specified "other", their degrees included Doctor of Health Education, Doctor of Public Health, and Doctor of Health Sciences. The non-dental degree respondents totaled 46 or 67% of the 63 respondents specifying their doctoral degree. Ninety-one percent of the respondents were female. Respondents selected as many current employment positions as applicable, with no distinction between full-or part-time status. Sixty-five percent of the dental degree respondents were employed in private practice, 21% at community clinics, and 43% at an educational program. Ninety-six percent of respondents with an academic degree were currently working at education institutions as either faculty (47%) or as administrators (49%).

Results displayed in Table I show that a significantly higher percentage of the respondents who had graduated from their entry-level dental hygiene programs during the years 2006 and 2010 had earned dental degrees versus academic degrees ($p=0.03$). Approximately half of the respondents reported that their parents' terminal degrees were a high school diploma or less. The fathers of nearly 30% of the dental degree respondents had earned a doctoral degree. Time spent working as a dental hygiene clinician before earning a doctoral degree was statistically greater ($p=0.01$) for those that earned academic degrees than for those with dental degrees (Table I).

Dental degree respondents were more likely to consider themselves mechanically inclined than those with academic degrees ($p=0.03$) (Table II). More of the academic degree respondents preferred to read current research studies than to learn a new skill ($p=0.002$). Respondents with dental and academic degrees both agreed that working one-on-one with people was important to career satisfaction.

All dental degree respondents agreed they wanted to help people by providing treatment on an individual

Table I. Demographic characteristics of respondents

Characteristics/Experience	Respondent's Degree Type	
	Dental % (n)	Academic % (n)
Entry level Dental Hygiene Program Graduation Year		
1955-1975	6% (1)	29% (13)
1976-1985	31% (5)	40% (18)
1986-1995	19% (3)	20% (9)
1996-2005	19% (3)	4% (2)
2006-2010*	25% (4)	6% (3)
Father's Terminal Degree		
none/high school diploma	24% (4)	49% (22)
associate's degree	12% (2)	9% (4)
bachelor's degree	18% (3)	18% (8)
master's degree	18% (3)	16% (7)
doctoral degree	29% (5)	9% (4)
Mother's Terminal Degree		
none/high school diploma	65% (11)	54% (24)
associate's degree	6% (1)	20% (9)
bachelor's degree	24% (4)	11% (5)
master's degree	6% (1)	11% (5)
doctoral degree	0	4% (2)
Time spent working in clinical dental hygiene before entering doctoral degree program		
0 years	18% (3)	2% (1)
1-4 years	29% (5)	25% (11)
5-9 years	24% (4)	18% (8)
10-14 years	24% (4)	16% (7)
15-30 years*	6% (1)	39% (17)
Time spent in non-clinical roles before entering doctoral degree program		
0 years	76%(13)	24% (11)
1-3 years	24% (4)	9% (4)
4-14 years**	0	38% (17)
15-25 years**	0	29% (13)

*Statistically different responses between degree types ($p<0.05$) based on logistic regression analysis, corresponding odds ratio presented in Table VI

**Statistically different responses between degree types could not be determined by logistic regression due to the presence of zeroes

basis, which differed significantly ($p=0.007$) from the academic group (Table II). Respondents with academic degrees were more likely than those with dental degrees to envision employment at an educational institution ($p<0.0001$) and to prefer helping people by being involved in policy changes that affect society as a whole ($p=0.002$) and by becoming involved in educating future generation of dental professionals ($p=0.03$). Dental, more than

academic, degree respondents reported desiring regular work hours ($p=0.0003$).

Most respondents reported receiving encouragement to pursue a doctorate in the type of degree they had ultimately selected (Table III). Respondents with dental degrees had been encouraged to earn degrees in dentistry ($p<0.0001$), while those with academic degrees had been encouraged to earn a doctorate an area outside of dentistry ($p=0.0003$). Only

Table II. Interests and characteristics of respondents

Interest/Characteristic	Degree	Agree % (n)	Neutral % (n)	Disagree % (n)	Total (n)
I consider myself mechanically inclined*	Dental	82% (14)	18% (3)	0	17
	Academic	57% (26)	22% (10)	22% (10)	46
I prefer doing hands on projects rather than reading books	Dental	32% (6)	41% (7)	24% (4)	17
	Academic	31% (14)	43% (20)	26% (12)	46
I prefer to read about a current research study rather than learn a new skill*	Dental	0	24% (4)	77% (13)	17
	Academic	17% (8)	61% (28)	22% (10)	46
Working one-on-one with people is important to career satisfaction	Dental	94% (16)	6% (1)	0	17
	Academic	83% (37)	16% (7)	2% (1)	45
I want to help people by providing treatment on an individual basis*	Dental	100% (17)	0	0	17
	Academic	52% (24)	28% (13)	20% (9)	46
I want to help people by becoming involved in educating future generations of dental professionals*	Dental	71% (12)	24% (4)	5% (1)	17
	Academic	96% (44)	4% (2)	0	46
I want to help people by being involved in policy changes that affect society*	Dental	35% (6)	65% (11)	0	17
	Academic	74% (34)	24% (11)	2% (1)	46
Work environment or position envisioned when selecting field of study included:					
Regular hours*	Dental	67% (10)	13% (2)	20% (3)	15
	Academic	13% (7)	45% (21)	37% (17)	46
Control of my own work environment	Dental	100% (15)	0	0	15
	Academic	67% (31)	28% (13)	5% (2)	46
Employment at an educational institution*	Dental	27% (4)	33% (5)	20% (6)	15
	Academic	85% (39)	15% (7)	0	46
An affluent lifestyle	Dental	24% (4)	47% (8)	29% (5)	17
	Academic	15% (7)	46% (21)	39% (18)	46
The ability to work independently	Dental	88% (15)	12% (2)	0	17
	Academic	72% (33)	20% (9)	8% (4)	46
Collaboration with peers	Dental	65% (11)	29% (5)	6% (1)	17
	Academic	87% (40)	13% (6)	0	46

*Statistically different responses between degree types ($p<0.05$) based on logistic regression analysis, corresponding odds ratio presented in Table VI

40% of all respondents combined agreed that their dental hygiene instructors had been instrumental in motivating advanced education.

Motivation to pursue advanced education also varied according to degree type (Table III). All dental respondents agreed with being motivated to advance their clinical skills as a means to be involved in more challenging procedures. The dental respondents were also more likely than academic degree respondents to agree to statements of gaining a deeper understanding of the science supporting treatment of oral disease ($p=0.04$) and a greater knowledge base of treatment options/therapies used to combat oral diseases ($p=0.002$). In response to the "other" option, both groups of respondents provided the following additional reasons for advancing their education: increased knowledge, professional advancement, and financial motivation.

Influential persons and experiences leading to respondents' decisions to pursue doctoral degrees are described in Table IV. Compared to respondents with academic degrees, those with dental degrees were influenced to advance their education by a dentist/dental professional ($p=0.01$) or a family member ($p=0.04$). Academic respondents were influenced more by an educator ($p=0.01$) and had more experience observing or working with a researcher and/or scientist than dental respondents ($p=0.004$). Similar percentages of dental and academic degree

respondents indicated that their continued education was self-initiated (12.5% and 13.0%, respectively).

Seventy-one percent of dental degree respondents reported satisfaction working as a clinical dental hygienist compared to 42% of the academic respondents, although the difference was not statistically significant (Table V). Respondents from both groups who expressed a neutral opinion or dissatisfaction with clinical dental hygiene selected as many of the following reasons as were applicable to them: repetitive procedures, limited scope of practice, being treated subserviently, lack of promotional opportunities and other. The following themes were developed based on respondents (34%) who selected "other" reasons for dissatisfaction: perceived lack of respect, disappointment with the clinical environment, and lack of stimulation.

Due to the large number of survey items, Table VI lists only those items where the respondent group responses were significantly different. The highest odds ratio was for the survey item, "encouraged to earn degrees in dentistry," meaning that the dental respondents were 33 times more likely (95%, CI:8.3, 100.0, $p<0.0001$) than the academic respondents to have been encouraged to earn degrees in dentistry. Conversely, the academic respondents were 15 times more likely (95%, CI:3.4, 67.0, $p=0.0003$) to have selected the response, "encouraged to earn doctorate in a subject other than dentistry."

Table III. Encouraging and motivating factors for advancing education at the doctoral level

Factors	Degree	Agree % (n)	Neutral % (n)	Disagree % (n)	Total (n)
Encouraged to pursue a doctorate in a subject other than dentistry*	Dental	0	18% (3)	82% (14)	17
	Academic	71% (32)	20% (9)	8% (4)	45
Encouraged to pursue a doctorate in dentistry*	Dental	75% (12)	19% (3)	6% (1)	16
	Academic	14% (6)	29% (13)	57% (26)	45
Dental hygiene instructors were instrumental in motivating advanced education	Dental	52% (9)	24% (4)	24% (4)	17
	Academic	36% (16)	31% (14)	33% (15)	45
To advance clinical skill and be involved in more challenging procedures	Dental	100% (16)	0	0	16
	Academic	35% (16)	20% (9)	45% (20)	45
To gain deeper understanding of the science supporting treatment of oral diseases*	Dental	68% (11)	25% (4)	6% (1)	16
	Academic	40% (18)	38% (17)	22% (10)	45
To gain a greater knowledge base of treatment options/therapies used to combat oral diseases*	Dental	94% (15)	6% (1)	0	16
	Academic	42% (19)	36% (16)	22% (10)	45

*Statistically different responses between degree types ($p<0.05$) based on logistic regression analysis, corresponding odds ratio presented in Table VI

Table IV. Influential people and observation/work experiences of respondents

	Dental % (n)	Academic % (n)
The most influential person who encouraged respondents to continue their education:		
Educator*	12.5% (2)	43% (20)
Dentist/dental professional*	38% (6)	6% (3)
Researcher/scientist	0	9% (4)
Employer	6% (1)	2% (1)
Family member*	19% (3)	9% (4)
Spouse	6% (1)	9% (4)
Friend	6% (1)	9% (4)
Self-initiative	12.5% (2)	13% (6)
Experience observing or working with the following before selecting doctoral degree type		
Researcher*	50% (8)	82% (35)
Dentist	100% (17)	82% (35)
Educator	71% (12)	100%(46)

*Statistically different responses between degree types ($p < 0.05$) based on logistic regression analysis, corresponding odds ratio presented in Table VI

Themes were also developed based on the patterns of responses to the open-ended survey question regarding descriptions of experiences influencing respondents to pursue doctoral degrees. Forty-five out of the 63 respondents shared a motivating experience. Nearly half (49%) of those individuals described an experience focused on attaining personal professional advancement. Representative statements from academic degree respondents also included: "All full-time faculty at the university where I teach are required to hold a doctorate," "I wanted to earn one degree higher to be better qualified to teach graduate students, especially related to research," and "I was the only one without a doctoral degree. I was being overlooked for mid-level/senior administrative positions."

"Increased knowledge" was another theme exemplified by statements from 16% from both categories of respondents. Academic degree respondents expressed statements, such as "I wanted more education to hone research skills" and "Working in a laboratory conducting research was a great experience and convinced me that I wanted to spend my career constantly learning new things, rather than doing the same procedure over and over again." Dental degree respondents stated comments similar to: "Enjoyed clinical practice and wanted to help more people."

Table V. Satisfaction level of respondents with working as a clinical dental hygienist

	Degree	Satisfied % (n)	Neutral % (n)	Dissatisfied % (n)	Total (n)
Satisfaction with working as a clinical dental hygienist	Dental	71%(12)	12%(2)	18%(3)	17
	Academic	42%(19)	26%(12)	33%(15)	46
*Lack of satisfaction with clinical dental hygiene was due to:					
Repetitive procedures	Dental	80%(4)	20%(1)	0	5
	Academic	81%(22)	15%(4)	4% (1)	27
Limited scope of practice	Dental	100%(5)	0	0	5
	Academic	74%(20)	19%(5)	7% (1)	27
Being treated subserviently	Dental	80%(4)	0	20%(1)	5
	Academic	70%(19)	19%(5)	11%(3)	27
Lack of promotional opportunities	Dental	80%(4)	0	4% (1)	5
	Academic	78%(21)	19%(5)	4% (1)	27

*Questions only answered by respondents who reported being neutral or dissatisfied

Table VI. Univariate association of survey items with type of doctoral degree

Survey Items*	Reference Group	Odds Ratio, [95% Confidence Intervals]	P-VALUE
Time spent working in clinical dental hygiene	Academic	4.3, [2.6,11.16]	0.01
Mechanically inclined	Dental	4.3, [1.1,16.7]	0.03
Prefer to read current research studies than to learn a new skill	Academic	10.2, [3.0,34.0]	0.0002
Help people by involvement in policy changes	Academic	5.8, [1.9,17.9]	0.002
Help people by educating dental professionals	Academic	7.0, [1.2,40.0]	0.03
Envision employment at an educational institution	Academic	20.0, [5.4,77.0]	<0.0001
Desire regular hours	Dental	9.1, [2.8,33.3]	0.0003
Encouraged to earn degrees in dentistry	Dental	33.3, [8.3,100.0]	<0.0001
Encouraged to earn doctorate in a subject other than dentistry	Academic	15.0, [3.4,67.0]	0.0003
Motivated to gain a deeper understanding of science supporting treatment	Dental	3.2,[1.04,10.0]	0.042
Motivated to gain greater knowledge of treatment options/therapies	Dental	25, [3.3,100.0]	0.002
Influenced to advance education by a dentist/dental professional	Dental	9.9, [1.7,50.0]	0.01
Influenced to advance education by a family member	Dental	9.9, [1.1,50.0]	0.04
Influenced to advance education by an educator	Academic	9.9, [1.7,50.0]	0.01
Experience observing or working with a researcher and/or scientist	Academic	5.5, [1.7,17.7]	0.004

* Survey items presented represent those with significant differences between groups. All odds ratios were calculated to be above one, and the reference group was changed accordingly.

Quotes from four respondents, relating to the theme of the advancement of the dental hygiene profession included: "...desire to raise the level of dental hygiene to doctoral and have more educators at this level" and "I want to make a difference in dental hygiene and I felt I needed to have a doctorate outside of dentistry to do that." The specific numbers of responses for each of the remaining themes were prior academic experience (4), family influence (3), financial motivation (2), peer/mentor influence (1), gaining respect (1), and personal experiences with dentistry (1).

Discussion

Interests and Characteristics of the Respondents

This study identified factors influencing dental hygienists to pursue doctoral education by comparing the responses of dental hygienists who had earned

dental degrees (DDS and DMD) to those with academic degrees (PhD, EdD, and others). As both groups of respondents began careers as dental hygienists, they identified a number of shared interests and characteristics, ones that may have initially attracted them to the profession, such as working one-on-one with people as being important for their career satisfaction.

The survey questions also identified several parameters that distinguished respondents with dental degrees from those with academic degrees. First, dental respondents in this study were more likely than academic respondents to consider themselves mechanically inclined, defined as preferring to solve problems and work on projects that require building or repairing things with one's hands. This interest confirms results of previous studies.^{1,10} In the study of career motivators for dental students conducted by Du Toit et al., "I like working with my hands and

being artistic" was selected by respondents from 13 different countries.⁵ Job satisfaction has been shown to be related to the opportunity to use one's abilities,¹¹ and study respondents may have been piqued to pursue a dental degree by a desire to use their artistic abilities.

Another distinguishing characteristic between the groups was the academic degree respondents' preference to read about current research rather than to learn a new skill. It is likely that these respondents were actively involved with reading and evaluating current research studies throughout their doctoral educational programs. Furthermore, these activities and skills are fundamental to both teaching at institutions of higher education and conducting scientific research. In contrast, results of a recent systematic literature review of information-seeking behaviors of dentists indicated that dentists tended to adopt new materials and techniques after discussion with a colleague, a dental specialist, or a respected dental expert, rather than studying evidence-based resources,¹² which is in agreement with the findings of this study.

A desire to help people was a common interest of both groups in this study; however, there were remarkable differences to the approaches to this common goal. Respondents with dental degrees were in unanimous agreement about helping people by providing care on an individual basis, as supported by employment positions in private practice (65%) and in community clinics (21%). In a study conducted by Scarbecz and Ross, the third top reason for pursuing a career in dentistry for both males and females was a desire to treat or help people to improve their appearance,¹ and is reflected in other study findings regarding the employment settings of dentists and the provision of treatment on an individual basis.¹³

In contrast, academic respondents indicated a desire to help people by becoming involved in the education of future generations of dental professionals, as indicated by the academic institution employment settings of 96% of respondents of this study. Motivations for a faculty career for both groups of respondents may be similar. Research conducted by Gibbs and Griffin reported a desire to serve as a role model and facilitate the success of students as being a key motivator in biomedical science education.⁷ Although it was a smaller percentage when compared to the academic respondents, 43% of the dental respondents reported that they were also employed in academic positions. Intellectual challenge, research opportunities, and a desire to become a university administrator are factors identified in previous studies regarding dentists' career choices in academic dentistry.¹⁴ Additionally, female dental specialists reported positive career and personal life balance found in academic dentistry.¹⁵

Helping people through involvement in policy decisions affecting society as a whole, was reported more frequently by academic respondents than dental respondents. Doctoral education may have helped prepare academic respondents to collaborate with other healthcare professionals in bringing changes through public policy.⁹ Dental hygienists with academic doctoral degrees may be able to help create healthier communities by conducting research and developing policies related to oral disease prevention and health promotion, a proposed program goal for a doctoral degree in dental hygiene.⁹

Dental and academic respondents in this study envisioned certain aspects of their work environment in similar ways. Both groups anticipated an affluent lifestyle contrary to the expectations that a greater percentage of dental respondents would indicate income as being a motive for pursuing a dental career.^{1,3,4} Dental respondents in this study may have had more realistic expectations as compared to previous research.^{1,3,4,11,16} A major difference between the dental and academic respondents was that more dental respondents indicate regular work hours as a career preference mirroring previous studies.^{5,16} Regular working hours was ranked eighth out of the top 30 reasons for pursuing dentistry by both males and females.¹

Both groups in this study also agreed that they preferred an independent work environment; results which agree with previous studies of both dental and research-oriented students.^{1,6} Dental respondents in this study also envisioned control of their work environment, supporting the findings of Chambers' review of job satisfaction in dentistry.¹⁶ Chambers identified typical job satisfiers in dentistry as being factors under their control, such as what goes on in their office.¹⁶ Other studies have identified specific aspects of control, including greater freedom and flexibility in scheduling their work.¹ In this study two-thirds of the academic respondents also envisioned control of their work environment. These respondents may have considered control of the work environment differently than dentists, possibly contemplating freedom to pursue research topics of interest⁷ and being able to think or act independently with limited consultation or guidance from others,⁶ as suggested by previous studies.

Influential Persons and Experiences; Encouraging and Motivating Factors

Study respondents expressed receiving encouragement to pursue advanced education from various sources, only a small percentage reported internal motivation for earning their doctoral degree. Most had been encouraged to advance their education by a known individual. The importance of this key factor as a recruitment tool is evidenced by the statistically significant results that both the dental and academic

groups of respondents had been encouraged to pursue the doctoral degree that they subsequently earned. Dentists appeared to be very instrumental at guiding dental hygienists and pre-dental students⁴ toward dental degrees. Approximately one-third of dental respondents in this study reported that a dentist or dental professional had been the most influential person in encouraging them to pursue a dental degree and that they had observed or worked with a dentist. These findings were supported by a study of pre-dental students demonstrating that more than half of the respondents identified their family dentist as the professional who most influenced their decision to pursue dentistry.⁴ Another study of final-year British dental students indicated that work experiences and other encounters with dentists at work had been an important influence, particularly when the dentists appeared to find their work enjoyable or satisfying.³

While all of the respondents in this study had doctoral degrees, their parents had varying levels of education. This finding is of interest since parents have been shown to influence the level of education of their children,^{17,18} regardless of their own academic achievements. Previous research has also shown that parents with advanced education may have set high aspiration and achievement standards for their children and served as academic or occupational role models.¹⁷ Conversely, parents without college degrees may have impressed upon their child the importance of academic achievements and their relationship to upward mobility with respect to a career. Of the respondents with academic degrees in this study, fewer than 10% indicated that a family member played an influential role in encouraging their advanced education. These results are consistent McGee and Keller's research on doctoral students' opinions of individuals who played critical roles in guiding their interests and career directions; very spoke of parents or other family members, whereas many referred to teachers, research mentors, and other role models.⁶

Of the respondents with academic degrees in this study, 43% reported having been influenced by an educator. These respondents indicated their agreement utilizing a Likert scale with the following survey statements: an educator was the most influential person; they were encouraged to pursue a doctorate in a subject area other than dentistry; and they experienced working with or observing a researcher or scientist before starting a doctoral degree program. Taken together, these statements point to the underlying importance of mentoring potential candidates for academically based doctoral degrees.

Relationships with Dental Hygiene

Respondents who had most recently graduated from entry-level dental hygiene programs were more likely to pursue a dental degree than an academic

degree reflecting a classically held view that dental hygiene could serve as an introduction or foundation for dentistry.¹⁹ Dental degree respondents in this survey may have enjoyed the patient care aspect of dental hygiene, but felt dissatisfied or limited by the scope of practice or knowledge base. Data from this study indicate that the dental degree group may have been motivated to advance their clinical skills to gain a greater knowledge base of the options used to treat and prevent oral diseases.

A greater percentage of academic versus dental degree respondents expressed dissatisfaction while working clinically as a dental hygienist, prior to their doctoral education. Low satisfaction was reported to be due to the lack of promotional opportunities and being treated subserviently; findings similar to previous studies, reporting dissatisfaction in clinical practice due to the lack of financial and career growth opportunities, insufficient communication with the dentist, and long work hours.^{20,21}

Dental hygiene educators carry the responsibility for teaching students the foundational knowledge and requisite clinical skills, however to advance the profession they also need to recognize the importance of mentoring. A mentor is defined as someone willing to share career experiences; a supporter who offers encouragement, provides performance specific feedback, and assists students to obtain opportunities.^{22,23} Dental hygiene instructors as mentors could have a valuable influence on dental hygiene considering advanced degrees. Faculty role models have been shown to be pivotal in students career choices in research and academia.^{14,24} An important finding in this study was that only 40% of all respondents agreed and 29% expressed being neutral regarding the role that their dental hygiene instructors had played in motivating their advanced education. Considering that the majority of entry-level dental hygienists graduate from certificate or associate degree programs, dental hygiene educators need to be aware of the importance of encouraging advanced education options. Pipeline programs and early outreach efforts in regards to academic careers have been shown to be effective recruitment strategies.²⁵

Ongoing discussions on the value and benefits of advanced education during entry-level dental hygiene education may serve to encourage and motivate future graduate students.⁹ Duties and career choices within dentistry are well known, especially to those with family members in the field. Dental hygienists exploring options for advanced education may choose dentistry based on its familiarity. Integrating dental hygiene-based research into classroom experiences that can be linked to more detailed descriptions of the different types of doctoral degrees and their applications can inspire students to think of multiple opportunities beyond clinical practice. Research conducted by Boyd and Bailey demonstrated

that one-third of their respondents were unclear regarding the opportunities and value of obtaining a graduate degree in dental hygiene and therefore were reluctant to pursue graduate education.²⁶

Early exposures or encounters have been reported to influence thoughts on pursuing graduate education. Findings from Smith et al.'s research-doctorate pipeline initiative showed that students do not know where their interests lie unless they have been exposed to new opportunities.²⁷ Another study conducted with undergraduate nursing students identified as having no interest in research, showed that after engaging in meaningful research activities, students reported enhanced research interests, which subsequently influenced their future career plans.²⁷ Entry-level dental hygiene students could be introduced to the research process by teaching them skills in searching and evaluating the literature, requisite to adopting an evidence-based approach to patient care and graduate programs could create opportunities for dental hygiene master's degree students to participate in on-going studies, conducted by established researchers.²⁸ Increased numbers of dental hygienists with experience in the research process are needed to play this critical role in dental hygiene education and advancement of the profession. The development of a research-based doctoral degree program in dental hygiene would be advantageous to increase the number of dental hygienists with academic doctoral degrees to fulfill this role.⁹

Limitations

The unequal number of respondents in the academic and dental doctoral groups limited the findings of this study. While the number of potential participants were similar for both groups, more dental hygienists with academic degrees responded to the survey. Respondents from the academic group may be actively involved in dental hygiene education and recognize the importance of doctoral education for the advancement of the profession, resulting in a response bias. A second limitation was that the survey items relating to motivating factors were more descriptive of the practice of dentistry than academic interests. Items including increased knowledge, professional advancement, and intellectual challenge, which are more related to academic career choices, could have been included. Also, responses to survey items regarding the most influential person may have been dependent upon the respondent's interpretation of the term educator, that was assumed to include a dental hygienist/instructor. Qualifying terms to differentiate educators as dentists from dental hygienists were lacking, as well as distinctions between dentist/dental professionals who may or may not have been educators. Considering that 25% of the dental respondents were also recent dental hygiene graduates, the 71% who selected observing or working with an educator may have

been referring to instructors in their dental hygiene educational programs, which would have included both dentists and dental hygienists. If the term educator had specified non-dentist, the percentage of dental respondents selecting educators may have been lower.

Conclusions

Respondents with dental degrees reported differences from those with academic degrees in terms of the person(s) and experiences that were influential in encouraging and motivating them to pursue a doctoral degree. For dental degree respondents, other dentists and clinical experiences had been the most influential factors. Respondents with academic degrees reported experiences observing or working with a scientist/researcher and that an educator had been the most influential person in their career pathway. These specific types of career relationships emphasize the importance of influential persons and experiences in the career decision-making process. Opportunities exist for the dental hygiene community to actively assume an influential role for dental hygiene students, practitioners and faculty to consider academic doctoral education as a career path. Dental hygienists possessing characteristics similar to the academic degree respondents in this study should be encouraged to pursue academic doctoral education, providing the necessary skills to advance the dental hygiene profession.

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