

Scholarly Inquiry and Research: An assessment of graduate dental hygiene schools' requirements

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Abstract

Purpose: Scholarly inquiry and research are core competencies for graduate dental hygiene education as defined by American Dental Education Association (ADEA). The purpose of this study was to examine how graduate dental hygiene programs in the United States (US) are meeting these competencies.

Methods: The study sample consisted of the graduate programs in the US that award a terminal degree specific to dental hygiene (n=14). Graduate program directors were invited via email to participate in an electronic survey. The survey questions were developed based on the ADEA graduate dental hygiene education competency for scholarly inquiry and research. Descriptive statistics including frequencies and percentages were used to analyze the data. Exploration of relationships between variables were conducted using correlational analyses and t-tests.

Results: A response rate of 71% was achieved (n=10). There was a significant difference in the minimum number of scholarly activity requirements between programs with lower student enrollments (M=4.43, SD=1.61) versus those with higher enrollments (M=2.00, SD=0; $t(8)=2.51, p=.036$). A negative correlation was found between the submission of a manuscript to a peer reviewed journal and the number of students accepted per year in the graduate program ($r(10) = -.655, p < .05$), indicating that students graduating from programs with larger enrollments were less likely to submit their scholarly work for publication.

Conclusions: All program directors reported requiring students to participate in at least one scholarly activity as defined in the ADEA Core Competencies for Graduate Dental Hygiene Education. Program size was the biggest variable in relationship to the number of scholarly requirements. Schools with smaller enrollments required their students to participate in over twice the number of scholarly activities as compared to programs with larger enrollments. More research is needed to evaluate how graduate level dental hygiene programs are meeting the ADEA competencies.

Keywords: scholarship, scholarly activities, research, dental hygiene graduate education

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Introduction

The dental hygiene profession has the potential to grow exponentially in the near future. Multiple states are passing legislation supporting advanced practice acts and there has been renewed discussion regarding the possibility of a dental hygiene doctorate degree. As public understanding of the relationship between oral and systemic health grows, dental hygienists are positioned to fill greater roles of responsibility in the healthcare system, and a body of knowledge specific to the dental hygiene discipline will be crucial to this advancement.

The American Dental Hygienists' Association (ADHA) has long recognized the importance of original research in its strategic vision to advance the profession.¹ Graduate education provides the foundation for the development of scholars who are able to participate in the conduct and generation of research that ultimately validates the dental hygiene discipline. However, graduate dental hygiene programs are not required to go through an accreditation process with the Commission on Dental Accreditation (CODA) and this can result in large variances in program requirements and rigor.

In 2011, ADHA collaborated with the American Dental Education Association (ADEA) to develop the ADEA Core Competencies for Graduate Dental Hygiene Education.² The core competencies emphasize the importance of developing scholar researchers and preparing dental hygiene professionals to assume leadership roles in health care and education. Purposes outlined for the creation of the document include: 1) to concisely establish the competencies expected of graduates, 2) to offer direction to graduate dental hygiene programs in regards to curriculum development, enhancement, and establishment of a benchmark of educational quality, and 3) to assist new professionals by defining what it means to be a graduate of a master's degree program in dental hygiene and offer direction to those seeking a graduate degree in the profession.² Eight core competencies were defined, including scholarly inquiry and research.

National Dental Hygiene Research Agenda

The ADHA published its first National Dental Hygiene Research Agenda (NDHRA) in 1993.³ The agenda supported the organization's strategic vision for the advancement of the profession and was intended to serve as a framework to guide researchers in adding to the body of knowledge unique to dental hygiene.¹ The most recent version of the ADHA Research Agenda was released in June of 2016.¹ The revised agenda highlights the need to focus research efforts on questions that will support the growth of the profession. The authors of the 2016 agenda stated that the revisions were intended to promote research that will assist in the further transformation of dental hygiene as a profession, along with facilitating interprofessional collaboration and practice.

There is a gap in the literature regarding how scholarly inquiry and research is addressed in graduate dental hygiene education. It is unknown whether these programs are addressing this particular competency as one of the eight core competencies for graduate dental hygiene education, as set forth by the ADHA and ADEA. Research unique to the discipline of dental hygiene is fundamental for the advancement of the profession, however the role of graduate dental hygiene education requirements with regards to the publication of peer-reviewed graduate research is unknown. The purpose of this study was to examine how graduate dental hygiene degree programs in the US are meeting the ADEA/ADHA core competency for scholarly inquiry and research.

Methods

This descriptive research survey study design was deemed exempt by the University of Missouri, Kansas City Institutional Review Board (#18-363). Survey questions were

developed by the authors using ADEA Core Competencies for Graduate Dental Hygiene Education, Competency eight: *Scholarly Inquiry and Research*.² Since these guidelines were first published in 2011, it was determined that all programs would have had adequate time for implementation. Program directors of the schools in the US awarding graduate degrees specific to dental hygiene dental hygiene were invited to participate (n=14, Table I).⁴ Only programs awarding a Master of Science degree in Dental Hygiene were included in the study sample obtained from the ADHA website.

Survey instrument

Using the sub-competencies for *Scholarly Inquiry and Research*, an investigator designed survey was developed to include: 1) apply the research process to an identified problem, 2) demonstrate professional writing and presentation skills in the dissemination of research findings, 3) conduct a comprehensive systematic literature search relevant to a specific topic and critically evaluate the evidence gathered, 4) demonstrate skill in proposal development and writing, 5) analyze and interpret quantitative and qualitative data from the research literature to guide problem-solving and evidence-based decision making, 6) synthesize information from evidence-based literature to apply to a community health, education, clinical practice and/or research problem, 7) design and implement a scholarly project in an area of emphasis.

The survey consisted of three parts. Part one consisted of five demographic questions including average number of years it takes students to complete the program, number of credit hours required for graduation, type of academic units used, average number of credit hours taken by students per semester, and the number of students accepted each calendar year. The second part of the survey had four items addressing scholarly inquiry and research with two of those questions related specifically to the ADEA sub-competencies. Participants were asked to identify which of the sub-competencies were part of the required curriculum, as well as the percentage of time devoted to each sub-competency. The two remaining questions in this section examined minimum requirements for scholarly activities, and the resources available to graduate students at their respective institutions. Part three of the survey consisted of four retrospective questions regarding the number of graduates and scholarly activity over the past five years.

The survey was pilot tested for validity by three faculty members from the University of Missouri Kansas City, School of Dentistry (UMKC-SOD) with experience in survey and program development. Following minor changes, the survey, including cover letter and informed consent, was

Table I. US graduate programs with a Master of Science in Dental Hygiene degree*

University of California; San Francisco**	https://dentistry.ucsf.edu/programs/dental-hygiene
University of Bridgeport, Fones School of Dental Hygiene	https://online.bridgeport.edu/degrees/master-dental-hygiene
Idaho State University	http://coursecat.isu.edu/graduate/healthscience/dentalhygiene/#text
Massachusetts College of Pharmacy and Health Sciences (MCPHS, Forsyth School of Dental Hygiene)	https://www.mcphs.edu/academics/school-of-dental-hygiene/dental-hygiene
University of Michigan	http://www.dent.umich.edu/about-school/department/pom/dental-hygiene/dental-hygiene-masters-degree
University of Minnesota	https://www.dentistry.umn.edu/degrees-programs/dental-hygiene/master-science
University of Missouri-Kansas City	https://dentistry.umkc.edu/academics/dental-hygiene-education-master-of-science/
University of North Carolina	https://www.dentistry.unc.edu/academicprograms/dh/msdh/
University of New Mexico	http://online.unm.edu/online-programs/dental-hygiene-m.s..html
Ohio State University	https://dentistry.osu.edu/prospective-students/dental-hygiene-programs/graduate-program-dental-hygiene
University of Texas Health Science Center at San Antonio	http://www.uthscsa.edu/academics/dental/departments/periodontics/dental-hygiene/master-science
Old Dominion University	https://odu.edu/dental/dental-hygiene-overview#tab102=2
Eastern Washington University	https://www2.ewu.edu/chsph/programs/dental-hygiene/master-of-science-in-dental-hygiene
West Virginia University	https://dentistry.hsc.wvu.edu/education/programs/dental-hygiene-programs/master-of-science/

* Study sample, programs accepting students as of fall 2018

** Program on hiatus since 2019-20 academic year

sent to dental hygiene graduate program directors via an online survey platform (Qualtrics; Provo, UT). Participants were asked to reply within two weeks and informed that their answers would be anonymous. A follow up email was sent at the conclusion of the initial two-week period, inviting non-respondents to take the survey. Data were analyzed using the statistical software program SPSSv25 (IBM Corp., Armonk, NY). Descriptive statistics including frequencies and percentages were calculated. Exploration of relationships between variables were conducted using correlational analyses and t-tests.

Results

An overall response rate of 71% was achieved (n=10). Participants reported that students take an average of 1-4 years to complete the graduate programs, with 34 to 41 credit hours required for graduation. Students take an average of 3-9 credit hours per semester, and programs accept anywhere from of 4-20 students per year. All programs use semesters to define academic units. Program characteristics are shown in Table II.

In the second part of the survey, respondents were referred to a list of activities associated with the ADEA *Scholarly Inquiry and Research* sub-competencies² (Table III). The participants were asked to indicate which of those scholarly inquiry and research sub-competency activities were included in their required curriculum. Finally, they were asked to estimate the percentage of time devoted to each required activity identified in the previous step. The participants did not appear to understand the intent of the final step as results for this item totaled greater than 100%. Because the data were not interpretable, they were excluded from further analysis. Over half, 67% (n=8) of the scholarly inquiry and research activities included in the survey were identified as required curriculum by all respondents. Writing a research proposal (90%) and conducting a systematic literature review (80%) were required by the majority of programs. Grant proposal writing and conducting case reports or case series were indicated as required curriculum elements by fewer programs (50% and 30%, respectively).

The reported minimum requirements for scholarly inquiry and research are shown in Figure 1. Participation in a scholarly project (90%), and submission of an institutional review board application (80%) were the two most frequency reported requirements followed by submission of a written report (60%), submission of a manuscript to a peer review journal (50%) and a local presentation (50%). National and

Table II. General program characteristics:

	Minimum	Maximum	Mean
On average, how many years do students take to complete your program?	1	4	2.4
How many credit hours does your program require for graduation?	34	41	36.8
What is the average number of credit hours taken per semester?	3	9	7.3
How many students do you accept into the program in a calendar year?	4	20	8.5

regional presentations were identified as requirements by a much lower percentage of the respondents (20% and 10% respectively).

Program directors were asked about resources offered to students enrolled in the participating programs to assist with scholarly inquiry (Table IV). All programs (100%) reported having a faculty mentor to assist with the research process and most (70%) reported having a statistician and/or research director. A positive correlation was found between the availability of a research director and submission of a manuscript to a peer reviewed journal ($r=.655, n=10, p=.04$). In addition, a positive correlation was also found between availability of a statistician and the submission of a manuscript to a peer reviewed journal ($r=.655, n=10, p=.04$). Programs where students have access to a statistician and/or a research director were more likely to have students submit their manuscripts to a peer reviewed journal.

Figure 1. Minimum requirements reported for scholarly inquiry and research (n=10)

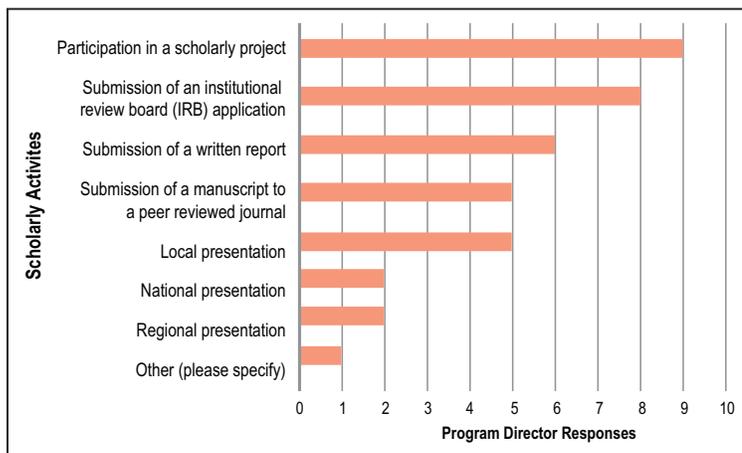


Table III. List of scholarly inquiry and research activities and activity percentage of the required curriculum (n=10)

Activity	n (%)
Conducting case reports or case series (with references).	3 (30%)
Writing a grant proposal.	5 (50%)
Conducting a systematic literature review.	8 (80%)
Writing a research proposal.	9 (90%)
Applying the research process to an identified problem.	10 (100%)
Applying professional skills in the dissemination of research findings.	10 (100%)
Applying professional presentation skills in the dissemination of research findings.	10 (100%)
Submitting a proposal to an IRB review board.	10 (100%)
Completing original research studies.	10 (100%)
Analyzing and interpreting qualitative and quantitative data.	10 (100%)
Synthesizing information from evidence-based literature to apply to a community health, education, clinical practice, and/or research problem.	10 (100%)
Designing and implementing a scholarly project.	10 (100%)

Due to the large variance in program enrollment and size, the variable of program was dichotomized for further analysis. Programs accepting 10-20 students a year formed one group, and those accepting 4-9 students a year formed the second group. In addition, scholarly activities marked as required by the program director, were summed to create a frequency scale reflecting the degree of scholarly activity characteristic of each program. A *t*-test was conducted to evaluate program scholarly activity as indicated in part two of the survey. The test was significant, ($t(8) = 2.51, p = .03$) with programs accepting 10-20 students a year reporting a significantly lower degree of scholarly activity ($M=2.00, SD=0$) as compared to schools with smaller enrollments of 4-9 students per year ($M=4.43, SD=1.61$). Further, a negative correlation was found between submission of a manuscript to a peer reviewed journal and the number of students accepted per year, ($r = -.655, n = 10, p = .04$). Programs with lower enrollments were significantly more likely to graduate students who submitted manuscripts to peer review journals.

The third part of the survey included a series of retrospective questions spanning over a period of five-years (Table V). Two hundred and forty-six students have

Table IV. Resources available for scholarly inquiry (n=10)

	Mean	SD	Frequency	Percent
Scholarship review committee	.40	.516	4	40.0
Research track within your program	.40	.516	4	40.0
Research Director	.70	.483	7	70.0
Statistician	.70	.483	7	70.0
Faculty Mentor	1.00	.000	10	100.0
Other (Focus Groups)	.10	.316	1	10.0

Table V. Number of graduates and scholarship activities in the past 5 years (n=10)

	Minimum	Maximum	Mean	Total (%)
How many students graduated from your program in the past 5 years?	12	65	24.6	246(NA)
In the past 5 years, how many students have presented their scholarly activity at a regional conference?	0	15	3.8	37(15%)
In the past 5 years, how many students have presented their scholarly activity at a national/international conference?	2	15	5.5	54(22%)
In the past 5 years, how many students have published their scholarly activity in a peer-reviewed journal?	2	10	6.5	64(26%)

graduated from the participating dental hygiene programs (n=10) over the past five years. Of those graduates, 15% presented at a regional conference (n=37), 22% had presented at a national or international conference (n=54), and 26% had manuscripts published in peer reviewed journals (n= 64). Exploration of the relationship between the reported requirement of submission of a manuscript to a peer-reviewed journal and subsequent publication in the past five years, identified that institutions that required submission of a manuscript to a peer-reviewed publication were also more likely to report graduates who had published in the past 5 years ($r(10)=-.683, p<.05$).

Discussion

The purpose of this study was to address how graduate dental hygiene programs in the US are meeting the scholarly inquiry and research competency as defined in the ADEA Core Competencies for Graduate Dental Hygiene Education. The initial investigation at comparing program requirements proved difficult to interpret for a variety of reasons. First, words such as thesis, non-thesis, special project, and capstone project are used interchangeably. Second, program lengths can vary anywhere from 12 months to 7 years. Third, some programs offering the same terminal degree allow students to pursue different “tracks” or areas of emphasis, meaning that while the degree awarded might be named the same (master of science) the requirements are quite different. For the purpose of this study, scholarship and research was defined according to the ADEA Core Competencies for Graduate Dental Hygiene Education, (Competency 8, *Scholarly Inquiry and Research*).² Using this document as a common parameter, the researchers were able to eliminate confusion ensuing from words such as thesis/non-thesis, and create a metric that would allow reasonable comparison across programs.

The magnitude of the significance of scholarship and research in graduate education and its contribution to the advancement of the profession, is supported by national organizations such as ADEA and ADHA, as well as within the educational institutions themselves. Universities generally define graduate education as the discovery, preservation and dissemination of knowledge. The importance of research is so ingrained in higher education that universities are found to address its significance in their mission and values statements.⁵ While the importance of scholarship and research is stressed, there are obvious barriers that have been noted in the literature. Studies examining graduate education

in nursing,⁶⁻⁷ emergency medicine,⁸ and obstetrics and gynecology⁹ have identified a variety of obstacles including a lack of time devoted to the process in the curriculum, lack of adequate staff to serve as mentors, and insufficient support from the administration. Results from this study of graduate dental hygiene education corroborates that when graduate students have access to research mentors/directors and statisticians (adequate staff), they are more likely to submit their manuscripts to a peer reviewed journal. The results also indicated that when submission of a research manuscript to a peer-reviewed journal is a program requirement, those students are significantly more likely to ultimately have their work published. While this study endeavored to quantify the amount of time devoted to scholarship and research, the resulting data were not interpretable. It would be interesting in future studies to try and determine more closely the amount of time allocated to these activities in the graduate dental hygiene program curriculum and conduct comparative analysis to determine optimal time commitments dedicated to the generation and dissemination of knowledge. This information would be helpful for addressing the lack of time devoted to the process of scholarship and research barriers identified in the curriculum.

Since the ADEA Core Competencies were approved and released by their ADEA House of Delegates in 2011, it seemed reasonable that programs would have had adequate time to adopt these national competencies. This study identified a great deal of variability still exists across programs' scholarly inquiry and research requirements. Variations in program size was found to be the biggest factor in determining the amount and level of requirement difficulty. Results show that schools with smaller enrollments require over twice the amount of scholarly activity as their larger counterparts. As noted in the research from nursing, emergency medicine, and obstetrics, administrative support is critical for fostering scholarship and research.⁶⁻⁹ Discussion between the graduate programs and their respective administrations is key in regards to determining the mission and goal of graduate education at their institutions. As a profession, it will be important to continually scan the environment of graduate dental hygiene education to ensure that an emphasis on scholarship and research continues to be a priority and ultimately results in the generation and dissemination of new knowledge.

The second research question guiding this study inquired whether the research requirements of graduate dental hygiene programs are contributing to the advancement of the profession through published peer-reviewed research. One-half (50%) of programs reported submission of a manuscript to a peer reviewed journal as a program requirement, with

one-fourth (26%) of all graduates (n=246) in the past 5 years publishing their research. This important finding needs further examination from both an institutional and a professional perspective. As discussions continue around doctoral level education in dental hygiene, preparing students at the graduate level will be critical for their success with doctoral education and research.¹⁰⁻¹²

This study had limitations. There is always the potential for responder bias with a self-reporting survey. Program directors may have overestimated their programs participation in scholarly inquiry and research. Data obtained from this survey was completely dependent on the participants own knowledge and recollection. Also, given the small number of graduate dental hygiene education programs (n=14), it would have been even more informative to have had a 100% response rate.

This is the first study to examine how graduate dental hygiene programs are meeting the ADEA competency of scholarly inquiry and research. Further refinement of the survey would be beneficial since there appeared to be a disconnect in reported responses, minimum requirements and percentage of time spent on each sub-competency. Future research should also examine how graduate dental hygiene programs are preparing students for possible doctoral level dental hygiene education as well as how programs are fulfilling the other seven core competencies. Perceptions of graduates, in regards to their preparedness in meeting all of the ADEA core competencies, would be informative from the both the educational and professional perspective.

Conclusion

All of the dental hygiene graduate program director respondents reported requiring students to participate in at least one scholarly activity as defined in the ADEA Core Competencies for Graduate Dental Hygiene Education. Program size was the biggest variable in relationship to the number of scholarly requirements. Schools with smaller enrollments required their students to participate in over twice the number of scholarly activities as compared to programs with larger enrollments. In order to advance the dental hygiene profession, programs awarding a graduate degree in dental hygiene need to prepare their students with the tools and knowledge to contribute scholarly work beyond the program requirement basics. Ongoing research is needed to evaluate how graduate level dental hygiene programs are meeting the ADEA competencies. More information and discussion among stakeholders will also better prepare the profession in moving towards a doctorate degree.

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