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ETSU Dental Hygiene Students' Interest in and Perceived Preparedness for Nontraditional or
Expanded Roles after Graduation

By

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Dr. Deborah Dotson, Thesis Mentor

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Introduction

With millions of Americans lacking access to dental care, the role of the dental hygienist within the dental team is of interest. Expanded or nontraditional roles for dental hygienists could increase access to dental care for underserved populations. The American Dental Hygienists' Association advocates both expanded roles for dental hygienists and the creation of mid-level dental practitioners; many states have passed or are considering proposed legislation to support such changes. As dental hygiene is changing and expanding, an increased need exists for educators and educational models that prepare dental hygienists for expanded roles, nontraditional roles, and a role that provides direct access to patients. The purpose of this study was to investigate East Tennessee State University (ETSU) dental hygiene students' awareness of underserved populations' lack of access to dental care, as well as students' interest in and perceived preparedness for expanded or nontraditional careers after graduation.

Background

Throughout the United States, Americans are unable to access dental care. In 2011, 49 million Americans lived in an area of the country that lacked "adequate dental care" (Rhea & Bettles, 2011, p. 5). According to a 2014 report, although 83% of children ages 2 to 17 had visited a dentist within the last year, only 61.7% of adults ages 18 to 64 and only 60.6% of adults ages 65 and older had access to dental care (CDC, 2014). This lack of access to dental care was not without effect, as 17.5% of children ages 5 to 19 and 27.4% of adults ages 20 to 44 had untreated dental caries (CDC, 2014). Ninety-one percent of Americans have had a cavity at some point in their lives (CDC, 2014). The dental care crisis will likely worsen, and it is estimated that by 2020 only one dentist will be in practice for every 1,800 Americans (Rhea & Bettles, 2011, p. 5).

Proposed solutions to the dental care crisis are related to the role of the dental hygienist within the dental team. For over a decade, the American Dental Hygienists' Association (ADHA) has supported increased utilization of dental hygienists. In 2004, the ADHA advocated the creation of a mid-level dental practitioner, often referred to as an Advanced Dental Hygiene Practitioner (Battrell et al., 2014, para. 18). Similar to a nurse practitioner, the Advanced Dental Hygiene Practitioner (ADHP) would be required to complete a master's degree; the ADHP would practice at a level between that of a dental hygienist and a dentist. Minnesota was the first state to pass legislation to create the ADHP position, and many other states have proposed similar legislation (ADHA, 2015, p.11).

In 2009, the ADHA publicly became a proponent for models under which currently registered dental hygienists could directly access patients without further education (Battrell et al., 2014, para. 20). Five years earlier, the ADHA defined direct access as the dental hygienist's "right to initiate treatment based on his or her assessment of a patient's needs without the specific authorization of a dentist, treat the patient without the presence of a dentist, and maintain a provider-patient relationship" (Naughton, 2014, para. 7). Currently, forty states allow some form of direct access by dental hygienists, but levels of access vary from state to state (ADHA, 2017, pp. 1-16).

The call for dental hygienists to practice to the full extent of their education and experience extends beyond the trend toward direct access by dental hygienists and the creation of the ADHP to support dental hygienists joining multidisciplinary teams. Based on increasing evidence that oral health is essential to overall health, proposed expanded roles for dental hygienists include practicing in nursing homes and in family, pediatric, and geriatric clinics (Duley, Fitzpatrick, Zornosa, & Barnes, 2011, para. 5, 22, 24). Dental hygienists' involvement in

these settings is hypothesized to reduce care costs, increase access to dental care, and raise care quality (Duley et al., 2011, para. 28).

The members of the dental hygiene workforce who have already expanded their practice by assuming nontraditional roles, taking advantage of mid-level practitioner opportunities, or reaching underserved populations through direct access agreements have yielded positive results. As early as the 1980s, dental hygienists in nontraditional roles enjoyed high levels of acceptance from their patients (Singer, Cohen, & Labelle, 1986, para. 1). In a more recent qualitative study, Kansas dental hygienists with Extended Care Permits, which allow various levels of direct access to underserved populations, were positively impacting children, special needs patients, and the elderly (Delinger, Gadbury-Amyot, Mitchell, & Williams, 2014, para. 1). The success of dental hygienists with expanded practices in Kansas is not a lone success story; studies of either mid-level dental practitioners or dental hygienists with direct access to patients in other states, such as Oregon, California, and Minnesota, have shown that by assuming these roles, dental hygienists can improve the oral health of specific populations, such as the elderly, children, individual communities, and special needs groups (ADHA, 2015, p. 14).

Literature Review

As opportunities for dental hygienists are increasing throughout the country and as state legislation has expanded dental hygienists' roles, the need for educational models that expose dental hygiene students to the possibility of nontraditional or expanded roles has become apparent. Dental hygienists who have completed graduate education have reported more autonomy (Catlett, 2016, p. 102). This finding demonstrates that additional education can prepare dental hygienists for expanded or nontraditional roles. However, as direct access policies make it possible for dental hygienists to practice independently or within multidisciplinary teams

without completing additional education and the need is great for dental hygienists to take advantage of these policies, entry level programs must also prepare graduates for nontraditional and expanded roles.

In Oregon, a baccalaureate program was specifically designed to prepare graduates for expanded practice (EPDH). An EPDH provides dental care for underserved populations with no direct supervision from a dentist. The dental hygiene program at Pacific University was designed around ten competencies, such as networking and marketing skills, communication with Spanish-speaking patients, and provision of care in nontraditional settings, that an EPDH should master to be an effective care provider for underserved populations. Graduates of the program reported plans to apply for expanded practice permits and work as EPDHs, both as employees of agencies and as owners of their own businesses (Rowley & Stein, 2016, para. 24). Graduates perceived themselves as being well-prepared for expanded practice (Rowley & Stein, 2016, para. 23). Other dental hygiene programs, though not necessarily designed specifically to prepare graduates for expanded practice, have incorporated clinical rotations and other opportunities with underserved populations into their curriculum, which serve as impactful exposure to the dental care crisis and possible areas of care provision once these graduates have entered the workforce (Duncan, 2007, pp. 6-8). The projected success of the educational model in Oregon and the demonstrated impact of exposure to underserved populations during dental hygiene educational programs serve as encouragement for other dental hygiene programs to intentionally recruit and prepare students for expanded, nontraditional roles after graduation.

Specific characteristics and professional skills of dental hygiene students must be developed for graduates of entry-level dental hygiene programs to be prepared for expanded and nontraditional roles. Dental hygienists must be prepared to implement the dental hygiene process

of care, which is “a comprehensive care tool” that includes “at a minimum, a patient history review and oral cancer screening, periodontal evaluation, caries risk assessment and self-care recommendations” (Jahn, 2015, para. 5). Mastering this process comes with the understanding that no patient receives “just a cleaning” when visiting a dental hygienist (Jahn, 2015, para. 5). Dental hygienists working in expanded or nontraditional roles must have confidence in their abilities to provide comprehensive oral care because they will be practicing in a new way in terms of the historical progression of the profession. Data from a study of Extended Care Permit dental hygienists in Kansas show that confidence, creative problem solving, and determination are imperative to the success of dental hygienists functioning in expanded roles (Delinger et al., 2014, para. 17). Being fully prepared to use a comprehensive care tool will enhance dental hygienists' confidence in their own abilities, as well as their confidence to confront barriers to new dental hygiene roles (Jahn, 2015, para. 7).

In addition to mastering the dental hygiene process of care, dental hygienists must have access to underserved populations. Marsh (2012) showed dental hygienists with a bachelor's degree or higher were more willing to voluntarily practice with underserved populations as their sensitivity to patient needs increased. Recommendations were made to “incorporate more volunteering and community service activities within the dental hygiene curriculum” (Marsh, 2012, para. 38). This incorporation will expose students to the dental hygiene crisis and the need for dental care within underserved populations. Studies of Extended Care Permit dental hygienists in Kansas showed that these dental hygienists who provide care to underserved populations are “driven by their need to feel some satisfaction for giving back and making a difference to the unserved and underserved populations” (Delinger et al., 2014, para. 14).

Lastly, dental hygienists must be prepared for collaboration with other professionals, both within and outside of the dental hygiene profession, to be catalysts for legal change within the field of dental hygiene and to be effective expanded role practitioners. Awareness regarding increased access to oral care through expanded role dental hygienists, nontraditional dental hygienists, or mid-level dental practitioners is increasing among legislatures and private groups (Naughton, 2014, para. 47). However, barriers still exist that dental hygienists must be prepared to overcome. Legal barriers exist (e.g., ten states do not allow direct access, levels of direct access vary in states that do allow it, and the mid-level dental practitioner is a topic of debate among many political bodies; ADHA, 2015, pp. 4-5). Dental hygiene graduates must be prepared to collaborate with professional organizations and policymakers to lobby for legal changes that will allow dental hygienists to practice to the full extent of their education (Jahn, 2015, para. 10). Additionally, dental hygienists must develop professional skills that will facilitate working relationships with dentists outside of dental offices so that expanded role dental hygienists can gain the support of dentists and collaborate with dentists to whom patients can be referred (Delinger et al., 2014, para. 42). With so much potential change and expansion and the significant need for dental hygiene graduates prepared to care for underserved populations in expanded and nontraditional roles, the ADHA has expressed the need for educators who possess “a vision of the profession functioning in higher-level clinical, administrative, and public health positions” (ADHA, 2015, p. 18).

Purpose

The purpose of this study was to determine attitudes of dental hygiene students at ETSU about their careers after graduation in relation to underserved populations. Specifically, the study's research questions were as follows: 1) To what extent are ETSU dental hygiene students

exposed to and knowledgeable about underserved populations and corresponding proposed solutions to the dental care crisis involving the role of the dental hygienist, 2) Do ETSU dental hygiene students favor expanded or nontraditional roles for dental hygienists, and if so, what is the level of favor, 3) Are ETSU dental hygiene students interested in expanded or nontraditional roles, and if so, to what extent, and 4) Do ETSU dental hygiene students feel prepared to work outside of a traditional dental office in nontraditional or expanded roles to provide care for underserved populations, and if so, to what degree? Results of this study could inform leaders of the ETSU Dental Hygiene Program regarding focus areas that may need to be incorporated into the program for graduates to be fully aware of the needs of underserved populations, to understand the changing state of the dental hygiene profession, and to be prepared for expanded or nontraditional roles as dental hygienists or for continued education to become a mid-level practitioner.

Methodology

This study's design was a voluntary cross sectional survey of ETSU dental hygiene students from both the class of 2017 and the class of 2019. The 25 members of the class of 2017 were given the survey during the last semester of their senior year in the Dental Hygiene Program. The 24 members of the class of 2019 were given an identical survey during the first semester of their junior year in the Dental Hygiene Program. The study's population was ETSU's 49 dental hygiene students; no sample was drawn from the population.

The survey's purpose was to obtain information about students' attitudes toward their careers after graduation, as well as their awareness about underserved populations' access to oral care. (See Appendix A.) The survey's 25 questions were divided into four major categories: 1) exposure to and knowledge of underserved populations and corresponding solutions to lack of

access to care, 2) opinions about expanded or nontraditional roles for dental hygienists, 3) interest in expanded or nontraditional roles after graduation, and 4) perceived preparedness for expanded or nontraditional roles after graduation. With the exception of one short-answer question, all survey questions utilized a modified Likert scale for response options. Additionally, for fifteen questions, respondents were given the option to select *insufficient knowledge* as their response if they believed they possessed insufficient information about the subject to have an opinion; for two questions, respondents were given the option to select *no clinical experience yet* as their response if they believed they did not possess the clinical experience necessary to answer the question.

After the study's approval by the ETSU Institutional Review Board (See Appendix B), a pilot survey was administered to 22 students in the class of 2018 during their first year of the dental hygiene program. In general, pilot survey participants showed a positive response to the survey. One misspelled word was identified and corrected. Additionally, the response options for Question 1 and Question 11 were changed to include "no clinical experience yet" instead of "insufficient knowledge" after pilot participants indicated confusion related to these questions' response options. This change was implemented to better address the questions and to provide participants an appropriate option to choose if they did not have the clinical experience necessary to answer these questions accurately.

Data collection occurred on April 25, 2017, for senior participants and on August 30, 2017, for junior participants during the beginning of the students' regularly scheduled classes. On both dates, participants were provided information about the informed consent to participate in the study, including that the survey was completely voluntary and that names would not be recorded or associated with the surveys. (See Appendix C.) Participants were given a paper copy

of the survey and were allowed as much time as required to complete the survey. After completing the surveys, the participants returned their surveys immediately to the primary investigator by placing the surveys within an envelope, which was sealed once all participants had returned the survey. As the surveys were administered to the two different classes on two different days, the completed surveys were kept in two different folders labeled by the students' class (junior/senior). This coding facilitated comparison of responses based upon student classification. After the surveys were returned, the responses were transcribed to a Microsoft Excel file, which was then transferred to an SPSS file and delivered to Dr. Randy Byington, a research methodologist for the Department of Allied Health Sciences, for assistance with data analysis.

The data was analyzed so that conclusions about students' attitudes toward their future careers could be drawn. The survey data was aggregated and analyzed within the general context of the Dental Hygiene Program at ETSU, and differences in responses based upon student classification were investigated using an independent samples *t* test. In addition to hypothesis testing using an independent samples *t* test, descriptive statistics including measures of central tendency were calculated.

Results

The survey was given to the 25 students in the class of 2017 and the 24 students in the class of 2019. Twenty-one of the 25 students in the class of 2017 submitted a completed survey, and 24 of the 24 students in the class of 2019 submitted a completed survey for an overall participation rate of 91.84%.

When examining responses for differences between classes, a significant difference was seen in the responses for seven questions, all of which were questions that addressed either

students' exposure to or knowledge about underserved populations and corresponding solutions to the lack of access to care or students' perceived preparedness for nontraditional or expanded roles after graduation. The differences in response means were considered statistically significant at a 95% confidence level ($\alpha=0.05$) if at least 5 students provided data. For example, the first question of the survey asked participants to rate the frequency with which they have provided care for underserved individuals while in the ETSU Dental Hygiene Program. While the seniors' response mean was 4.81 and the juniors' response mean was 2.50, 22 of 24 junior participants chose *no clinical experience* as their answer to this question, calling into question any statistical significance seen between the modified Likert responses of the two classes. Table 1 lists the five questions with statistically significant differences in responses between the junior and senior classes with the following response options: 1) no knowledge, 2) low level, 3) moderate level, 4) high level, and 5) very high level.

Table 1

Survey Question	Class	N	Mean	P Value
Q6. What is your knowledge about underserved populations, such as children, the elderly, or those with special needs?	Junior	24	3.00	.008
	Senior	21	3.81	
Q7. What is your knowledge about expanded or nontraditional roles for dental hygienists?	Junior	24	2.21	.001
	Senior	21	3.10	

Table 1 cont'd

Q8. What is your knowledge about dental hygiene direct access policies?	Junior	24	1.54	.000
	Senior	21	2.76	
Q9. What is your knowledge about the Advanced Level Dental Hygiene Practitioner?	Junior	24	1.54	.000
	Senior	21	2.90	
Q23. What is your knowledge about those lacking access to dental care due to either geographical location or socioeconomic status?	Junior	24	2.71	.001
	Senior	21	3.81	

Table 2 lists the two questions with statistically significant differences in responses between the junior and senior classes with the following response options: 1) completely unprepared, 2) unprepared, 3) neutral, 4) prepared, and 5) completely prepared. (Question 11 also had *no clinical experience yet* as a response option, while Question 22 had *insufficient knowledge* as a response option.) Question 18 was also designed to measure perceived preparedness of the participants, specifically their perceived preparedness to advance their education beyond a Bachelor of Science in Dental Hygiene. However, there was no statistically significant difference between the juniors' and seniors' responses. Seventy-five percent of junior respondents felt either prepared or completely prepared to pursue an advanced level degree, while 80.95% of senior respondents felt prepared or completely prepared to do so. Combined, 78.79% of respondents felt prepared or completely prepared to pursue an advanced level degree.

Table 2

Survey Question	Class	N	Mean	P Value
Q11. To what extent do you feel prepared to treat patients as a dental hygienist without a dentist present?	Junior	7	2.86	.023
	Senior	21	4.52	
Q22. As a dental hygienist, to what extent do you feel prepared to work outside of a traditional dental office in a nontraditional setting?	Junior	12	3.17	.006
	Senior	21	4.10	

While no statistically significant differences were seen between the juniors' and seniors' responses for questions other than the seven questions included in Table 1 and Table 2, the other survey questions can be analyzed within the general context of the ETSU Dental Hygiene Program. Table 3 lists the survey's questions that addressed students' interest in nontraditional or expanded roles as dental hygienists. These questions utilized one of the following response scales: 1) highly disinterested, 2) disinterested, 3) neutral, 4) interested, and 5) highly interested; 1) highly unlikely, 2) unlikely, 3) neutral, 4) likely, and 5) highly likely; or 1) strongly unobligated, 2) unobligated, 3) neutral, 4) obligated, and 5) strongly obligated. All of the questions listed in Table 3 included *insufficient knowledge* as a response option.

Table 3

Question	Class	N	Mean	% of Responses Above Neutral (4 or 5)
Q2. How interested are you in volunteering to provide dental care to underserved populations?	Junior	24	4.50	91.67%
	Senior	21	4.81	100%
	Combined	45	4.64	95.56%
Q3. How interested are you in working in a nontraditional setting, such as a nursing home, school, or nonprofit organization?	Junior	24	3.50	54.17%
	Senior	21	3.90	71.43%
	Combined	45	3.69	62.22%
Q10. How likely are you to pursue a career as an Advanced Level Dental Hygiene Practitioner?	Junior	9	3.11	33.33%
	Senior	21	3.29	47.62%
	Combined	30	3.23	43.33%
Q12. As a dental hygienist, how likely are you to take a job working with underserved populations if it lowers your income?	Junior	23	3.04	26.09%
	Senior	21	3.52	47.62%
	Combined	44	3.27	36.36%

Table 3 cont'd

Q13. How likely are you to advance your education beyond a Bachelor of Science in Dental Hygiene?	Junior	24	3.46	58.33%
	Senior	20	3.25	40.00%
	Combined	44	3.63	50.00%
Q14. How likely are you to advance your education beyond a Bachelor of Science in Dental Hygiene if doing so has no effect on your income?	Junior	22	3.00	40.91%
	Senior	21	2.52	19.05%
	Combined	43	2.77	30.23%
Q16. To what extent do you believe you have an obligation to provide dental care to underserved populations?	Junior	23	3.96	73.91%
	Senior	21	4.29	90.48%
	Combined	44	4.11	81.82%
Q17. How likely are you to choose private practice as your primary place of employment?	Junior	24	4.38	87.50%
	Senior	21	4.48	90.48%
	Combined	45	4.42	88.89%
Q24. If allowed by state legislation, to what extent would you be interested in owning your own practice as a dental hygienist?	Junior	22	4.05	77.27%
	Senior	21	3.52	52.38%
	Combined	43	3.79	65.12%

Table 3 cont'd

Q25. To what extent are you interested in working in rural areas as a dental hygienist?	Junior	23	3.52	65.22%
	Senior	21	3.90	80.95%
	Combined	44	3.70	72.73%

Table 4 lists the survey's questions that addressed students' position regarding nontraditional roles for dental hygienists. These questions utilized the following response scale: 1) completely opposed, 2) opposed, 3) neutral, 4) in favor, and 5) completely in favor. All three questions included *insufficient knowledge* as a response option. As no significant differences were seen between the juniors' and seniors' responses, the combined data from all participants is of more interest than is that of either individual class.

Table 4

Question	Class	N	Mean	% of Responses Above Neutral (4 or 5)
Q19. To what extent are you in favor of or in opposition to direct access policies for dental hygienists?	Junior	5	3.80	80.00%
	Senior	18	4.11	72.22%
	Combined	23	4.04	73.91%
Q20. To what extent are you in favor of or in opposition to the creation of the Advanced Level Dental Hygiene Practitioner?	Junior	7	4.29	85.71%
	Senior	21	4.14	66.67%
	Combined	28	4.18	71.43%

Table 4 cont'd

Q21. To what extent are you in favor of or in opposition to nontraditional roles for dental hygienists, such as practice within a nursing home, school, pediatric clinic, or geriatric clinic?	Junior	20	4.30	90.00%
	Senior	21	4.57	100.00%
	Combined	41	4.44	95.12%

Question 4 and Question 5 of the survey addressed participants' opinions about the importance of helping people through practicing dental hygiene and the importance of making good wages through practicing dental hygiene, respectively. There was no statistically significant difference between the responses of the two classes. The combined response mean for Question 4 was 4.82, while that of Question 5 was 4.36. One hundred percent of participants felt more strongly than neutral toward the importance of helping people through dental hygiene, while 95.56% of participants felt more strongly than neutral toward the importance of making good wages through dental hygiene.

The single short-answer question on the survey asked participants which state they plan to practice in as a dental hygienist. Exactly 75% of junior participants reported Tennessee as the single state in which they plan to practice. All but one junior participant (95.83%) listed Tennessee as either the single state or as one of two states in which they plan to practice. One participant out of 24 did not list Tennessee at all, reporting North Carolina as the only state in which he or she plans to practice. Out of the senior participants, 80.95% reported Tennessee as the single state in which they plan to practice. All but two senior participants (90.48%) listed

Tennessee as either the single state or as one of two states in which they plan to practice. Two participants out of 21 did not list Tennessee at all; one participant listed only North Carolina, while the other participant listed Florida, Virginia, and Washington, D.C. Combined, 77.78% of participants reported Tennessee as the lone state in which they plan to practice; 93.33% listed Tennessee as the single state or as one of two states in which they plan to practice.

Discussion

The purpose of this study was to assess ETSU dental hygiene students' interest in expanded or nontraditional roles after graduation, their opinions about such roles, their perceived preparedness for such roles, and their level of exposure to or knowledge about underserved populations. Additionally, the study was designed so that differences between juniors' responses and seniors' responses could be analyzed. Only seven questions yielded response differences that were statistically significant. Five of these questions addressed students' knowledge levels regarding underserved populations and expanded roles for dental hygienists that could address these populations' lack of access to care; two of these questions were designed to measure students' perceived preparedness for nontraditional or expanded roles after graduation. These results indicate that senior dental hygiene students are more knowledgeable about the changing state of dental hygiene and the lack of access to dental care in America, while simultaneously feeling more prepared than junior dental hygiene students to step into one of these expanded or nontraditional roles after graduation if they choose to do so.

None of the survey questions addressing students' opinions about expanded or nontraditional roles for dental hygienists or students' interest in nontraditional or expanded roles after graduation yielded statistically significant response differences. However, as a whole, ETSU dental hygiene students reported that they were in favor of differing expanded and

nontraditional roles for dental hygienists, and they showed interest in such roles by consistently averaging scores stronger than neutral (a score of 4 or 5 on the modified Likert scale) on questions addressing students' interest in or likelihood to pursue careers or participation in such roles. Combined, 95.56% of junior and senior participants were either interested or highly interested in volunteering to provide care to underserved populations, 62.22% were interested or highly interested in working in a nontraditional setting, 81.82% felt either obligated or strongly obligated to provide care to underserved populations, 65.12% would be either interested or highly interested in owning their own practice as a dental hygienist if allowed by state legislation, and 72.23% were either interested or highly interested in working in a rural area. However, 88.89% of participants also reported that they were either likely or highly likely to choose private practice as their primary place of employment, a result that could be in part due to the fact that the overwhelming majority of available dental hygiene jobs in the surrounding area are within private practices. This sense of practicality could also play a role in the result that only 36.63% of participants reported being likely or highly likely to take a job working with underserved populations if it lowered their income; 45.45% reported being neutral toward this topic.

In regards to opinions about nontraditional or expanded roles for dental hygienists, the majority of participants once again responded as feeling more strongly than neutral for each question in this category. Combined, 73.91% of participants were in favor of or completely in favor of direct access policies for dental hygienists. Additionally, 71.43% of participants were in favor of or completely in favor of the creation of the ADHP, and 95.12% were in favor of or completely in favor of nontraditional roles for dental hygienists, such as practice within a nursing home, school, or pediatric or geriatric clinic. The large number of participants in favor of

expanded roles for dental hygienists and interested in these roles in combination with the large number of participants who reported private practice as their likely primary place of employment may warrant the Dental Hygiene Program placing focus on practical ways to facilitate the transition of students into expanded dental hygiene roles as students enter the workforce. Though participants reported being in favor of these types of expanded roles and interested in these types of roles, participants' answers to Question 17 indicate that ETSU dental hygiene students are unlikely to work primarily in these types of roles after graduation, but in contrast, are likely or highly likely to work in private practice.

Additionally, though participants showed high interest in nontraditional or expanded career roles, they did not show as much of an interest in advancing their education after graduation from the Dental Hygiene Program. Combined, 50% of participants said they were either likely or highly likely to advance their education beyond a Bachelor of Science in Dental Hygiene; however, only 30.23% of participants reported being likely or highly likely to do so if it had no effect on their income. Interestingly, 43.33% of participants reported being likely or highly likely to pursue a career as an ADHP, which would currently require a master's degree and relocation to a different state, such as Minnesota, that has passed legislation to create such a position. Only 6.67% of students reported planning to practice dental hygiene in a state other than Tennessee.

Limitations and Implications

While the response rate for the study was 91.84%, this study was designed and implemented for a small population of 49 dental hygiene students who were all members of a single dental hygiene program. The results of this study should not be transferrable to dental hygiene students from other universities, colleges, or academic programs. Instead, the goal of

this study was to determine opinions, interest levels, and perceived levels of preparedness of ETSU dental hygiene students alone so as to provide the ETSU Dental Hygiene Program with data that can be used to assess potential focus areas that should be incorporated into the program or its curriculum related to underserved populations and expanded roles for dental hygienists. The possibility of repeated studies should be considered by the ETSU Dental Hygiene Program; either repeated cross-sectional surveys or a longitudinal study could increase knowledge about the program's students and their relationship to the changes occurring within the dental hygiene profession. Additionally, studies with a larger population (students from multiple dental hygiene programs) would be necessary to draw any conclusions about dental hygiene students outside of ETSU.

Conclusion

Millions of Americans currently lack access to dental care. The literature indicates that expanded or nontraditional roles for dental hygienists can increase access to care for underserved populations and positively influence these individuals' oral health. However, dental hygienists' awareness about these issues and interest in expanded roles are imperative in the successful implementation and execution of such evolving models of oral health care. Results of this study show that ETSU senior dental hygiene students possess higher levels of knowledge about and exposure to underserved populations and corresponding solutions to the dental care crisis involving the role of the dental hygienist than do junior dental hygiene students. Additionally, senior dental hygiene students reported higher levels of perceived preparedness to function in one of these roles if they choose to do so.

While there was no statistically significant difference between the juniors' and seniors' responses for questions addressing students' opinions about expanded roles or interest in

functioning in one of these roles, as a whole, the majority of ETSU dental hygiene students responded as being in favor or completely in favor of such roles, and with the exception of pursuing a career as an ADHP, the majority of ETSU dental hygiene students reported being interested or highly interested in functioning in such roles. (See Table 3 and Table 4.) In contrast, the majority of students did not report being likely or highly likely to advance their education beyond a Bachelor of Science in Dental Hygiene. (See Table 3.)

These results should serve as encouragement for the ETSU Dental Hygiene Program to continue to educate and train students in such a way that as by the time students are seniors, they are both knowledgeable about underserved populations and the state of dental hygiene and prepared to function in expanded roles if they choose to do so. At the same time, the Dental Hygiene Program could consider focus areas and additional questions, such as the following: the specific plans of those students who do wish to advance their education beyond a bachelor's degree, especially those desiring to practice as mid-level oral health providers; the reason for students' high interest in expanded roles and simultaneous high likelihood to work primarily in private practice; and ways to address the discrepancy in the previous point (e.g., providing students with more information about local nontraditional dental hygiene opportunities, facilitating networking between students and organizations serving populations with limited access to care or between students and dental hygienists practicing in expanded roles, etc.). In this way, the results of this study can serve as preliminary data for the ETSU Dental Hygiene Program to assess the attitudes and opinions of its students, as well as the ways in which its students may fit into the changing nature of the dental hygiene profession, with the ultimate goal of increasing Americans' access to quality oral health care.

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Appendix A

ETSU Dental Hygiene Survey

1. In your dental hygiene program, how often have you provided care for individuals who you believe lack access to dental care?

1	2	3	4	5	X
never	rarely	sometimes	often	very often	no clinical experience yet

2. How interested are you in volunteering to provide dental care to underserved populations?

1	2	3	4	5	X
highly disinterested	disinterested	neutral	interested	highly interested	insufficient knowledge

3. How interested are you in working in a nontraditional setting, such as a nursing home, school, or nonprofit organization?

1	2	3	4	5	X
highly disinterested	disinterested	neutral	interested	highly interested	insufficient knowledge

4. How important is it for you to help people as you perform the role of a dental hygienist?

1	2	3	4	5
highly unimportant	unimportant	neutral	important	highly important

5. How important is it for you to make good wages as a dental hygienist?

1	2	3	4	5
highly unimportant	unimportant	neutral	important	highly important

6. What is your knowledge about underserved populations, such as children, the elderly, or those with special needs?

1	2	3	4	5
no knowledge	low level	moderate level	high level	very high level

7. What is your knowledge about expanded and nontraditional roles for dental hygienists?

1	2	3	4	5
no knowledge	low level	moderate level	high level	very high level

8. What is your knowledge about dental hygiene direct access policies?

1	2	3	4	5
no knowledge	low level	moderate level	high level	very high level

9. What is your knowledge about the Advanced Level Dental Hygiene Practitioner?
- | | | | | | |
|-----------|-------|----------|-------|-----------|--|
| 1 | 2 | 3 | 4 | 5 | |
| no | low | moderate | high | very high | |
| knowledge | level | level | level | level | |
10. How likely are you to pursue a career as an Advanced Level Dental Hygiene Practitioner?
- | | | | | | |
|----------|----------|---------|--------|--------|--------------|
| 1 | 2 | 3 | 4 | 5 | X |
| highly | unlikely | neutral | likely | highly | insufficient |
| unlikely | | | | likely | knowledge |
11. To what extent do you feel prepared to treat patients as a dental hygienist without a dentist present?
- | | | | | | |
|------------|------------|---------|----------|------------|----------------|
| 1 | 2 | 3 | 4 | 5 | X |
| completely | unprepared | neutral | prepared | completely | no clinical |
| unprepared | | | | prepared | experience yet |
12. As a dental hygienist, how likely are you to take a job working with underserved populations if it lowers your income?
- | | | | | | |
|----------|----------|---------|--------|--------|--------------|
| 1 | 2 | 3 | 4 | 5 | X |
| highly | unlikely | neutral | likely | highly | insufficient |
| unlikely | | | | likely | knowledge |
13. How likely are you to advance your education beyond a Bachelor of Science in Dental Hygiene?
- | | | | | | |
|----------|----------|---------|--------|--------|--------------|
| 1 | 2 | 3 | 4 | 5 | X |
| highly | unlikely | neutral | likely | highly | insufficient |
| unlikely | | | | likely | knowledge |
14. How likely are you to advance your education beyond a Bachelor of Science in Dental Hygiene if doing so has no effect on your income?
- | | | | | | |
|----------|----------|---------|--------|--------|--------------|
| 1 | 2 | 3 | 4 | 5 | X |
| highly | unlikely | neutral | likely | highly | insufficient |
| unlikely | | | | likely | knowledge |
15. In which state do you plan to practice as a dental hygienist?
16. To what extent do you believe you have an obligation to provide dental care to underserved populations?
- | | | | | | |
|-------------|-------------|---------|-----------|-----------|--------------|
| 1 | 2 | 3 | 4 | 5 | X |
| strongly | unobligated | neutral | obligated | strongly | insufficient |
| unobligated | | | | obligated | knowledge |
17. How likely are you to choose private practice as your primary place of employment?
- | | | | | | |
|----------|----------|---------|--------|--------|--------------|
| 1 | 2 | 3 | 4 | 5 | X |
| highly | unlikely | neutral | likely | highly | insufficient |
| unlikely | | | | likely | knowledge |

18. To what extent do you feel prepared to advance your education after graduation with your Bachelor of Science in Dental Hygiene if you choose to do so?
- | | | | | | |
|--------------------------|------------|---------|----------|------------------------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | X |
| completely
unprepared | unprepared | neutral | prepared | completely
prepared | insufficient
knowledge |
19. To what extent are you in favor of or in opposition to direct access policies for dental hygienists?
- | | | | | | |
|-----------------------|---------|---------|----------|------------------------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | X |
| completely
opposed | opposed | neutral | in favor | completely
in favor | insufficient
knowledge |
20. To what extent are you in favor of or in opposition to the creation of the Advanced Level Dental Hygiene Practitioner?
- | | | | | | |
|-----------------------|---------|---------|----------|------------------------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | X |
| completely
opposed | opposed | neutral | in favor | completely
in favor | insufficient
knowledge |
21. To what extent are you in favor of or in opposition to nontraditional roles for dental hygienists, such as practice within a nursing home, school, pediatric clinic, or geriatric clinic?
- | | | | | | |
|-----------------------|---------|---------|----------|------------------------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | X |
| completely
opposed | opposed | neutral | in favor | completely
in favor | insufficient
knowledge |
22. As a dental hygienist, to what extent do you feel prepared to work outside of a traditional dental office in a nontraditional setting?
- | | | | | | |
|--------------------------|------------|---------|----------|------------------------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | X |
| completely
unprepared | unprepared | neutral | prepared | completely
prepared | insufficient
knowledge |
23. What is your knowledge about those lacking access to dental care due to either geographical location or socioeconomic status?
- | | | | | | |
|-----------------|--------------|-------------------|---------------|--------------------|--|
| 1 | 2 | 3 | 4 | 5 | |
| no
knowledge | low
level | moderate
level | high
level | very high
level | |
24. If allowed by state legislation, to what extent would you be interested in owning your own practice as a dental hygienist?
- | | | | | | |
|-------------------------|---------------|---------|------------|----------------------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | X |
| highly
disinterested | disinterested | neutral | interested | highly
interested | insufficient
knowledge |
25. To what extent are you interested in working in rural areas as a dental hygienist?
- | | | | | | |
|-------------------------|---------------|---------|------------|----------------------|---------------------------|
| 1 | 2 | 3 | 4 | 5 | X |
| highly
disinterested | disinterested | neutral | interested | highly
interested | insufficient
knowledge |

Appendix B

EAST TENNESSEE STATE
UNIVERSITY

Office for the Protection of Human Research Subjects • Box 70565 • Johnson City, Tennessee 37614-1707
Phone: (423) 439-6053 Fax: (423) 439-6060

IRB APPROVAL – Initial Exempt

January 5, 2017

Olivia Rowell

RE: ETSU Dental Hygiene Students' Interest in and Perceived Preparedness for Nontraditional or Expanded Roles after Graduation

IRB#: c1216.24e

ORSPA#:

On **January 5, 2017**, an exempt approval was granted in accordance with 45 CFR 46.101(b)(1). It is understood this project will be conducted in full accordance with all applicable sections of the IRB Policies. No continuing review is required. The exempt approval will be reported to the convened board on the next agenda.

- New Protocol Submission xForm; CV; Informed Consent Script; Survey; Pertinent Literature list

Projects involving Mountain States Health Alliance must also be approved by MSHA following IRB approval prior to initiating the study.

Unanticipated Problems Involving Risks to Subjects or Others must be reported to the IRB (and VA R&D if applicable) within 10 working days.

Proposed changes in approved research cannot be initiated without IRB review and approval. The only exception to this rule is that a change can be made prior to IRB approval when necessary to eliminate apparent immediate hazards to the research subjects [21 CFR 56.108 (a)(4)]. In such a case, the IRB must be promptly informed of the change following its implementation (within 10 working days) on Form 109 (www.etsu.edu/irb). The IRB will review the change to determine that it is consistent with ensuring the subject's continued welfare.

Sincerely,
Stacey Williams, Chair
ETSU Campus IRB

Cc:



Accredited since December 2005

Appendix C

Good morning/afternoon.

My name is Olivia Rowell. I am a member of both the Dental Hygiene Class of 2018 and the University Honors Scholars Class of 2018. As part of my honors requirements, I have to complete an undergraduate research thesis. The name of my research study is "ETSU Dental Hygiene Students' Interest in and Perceived Preparedness for Nontraditional or Expanded Roles after Graduation." Dr. Dotson is serving as my research mentor. In order to complete this research, I am surveying the ETSU Dental Hygiene Class of 2017 and the Class of 2019.

The survey questionnaire I am about to hand out to you contains questions about your opinions about nontraditional and expanded roles for dental hygienists, your interest in practicing in a nontraditional role after graduation, your feelings of preparedness to pursue these career paths, and your exposure to populations who do not have access to dental care. The survey should take approximately 10 to 15 minutes to complete. Results of this study should aid the Dental Hygiene Program in recognizing focus areas that should be addressed by the program to best prepare graduates for the workforce and the current state of the dental hygiene profession.

Participation in this research study is voluntary. You may refuse to participate. You may quit at any time. Any survey that is blank or is only partially completed will be discarded from the research study. If you do not want to fill out the survey, it will not affect you in any way. If you choose to participate, informed consent will be inferred from your submission of a completed survey.

We are aiming to maintain complete confidentiality throughout the research study. Please do not put your name on your survey. Additionally, please sit as you would for an exam with at least one empty chair between each of you. Once you are finished with the survey, whether you have decided to complete it, leave it blank, or only partially complete it, please put the survey inside this envelope. This

way the answers cannot be traced to an individual participant. Although your rights and privacy will be maintained, the ETSU IRB and personnel particular to this research within the Department of Allied Health Sciences have access to the study records.

Thank you in advance to those of you who will participate. If you have any questions, please feel free to ask me now or to ask me for the contact information of Dr. Dotson or the chairperson of the Institutional Review Board at ETSU.