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Brittany Elaine Tripp
Candidate

Dental Hygiene
Department

This thesis is approved, and it is acceptable in quality and form for publication:

Approved by the Thesis Committee:

Angela Cook, RDH, MS , Chairperson

Nicole Gonzales, RDH, MS

Christine Nathe, RDH, MS

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By

Brittany Elaine Tripp

B.S., Dental Hygiene, University of New Mexico, 2020

THESIS

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Abstract

This study investigated whether dental hygiene programs implement interdisciplinary care into their curriculum and assessed student preparedness for working in interdisciplinary settings. The study also aimed to identify student preferences for various interdisciplinary care settings. A survey was developed and distributed via email to program directors of accredited dental hygiene programs across the United States. Those programs directors were asked to forward the survey to currently enrolled final-year students. Out of eighty-two responses received, 16 were excluded because those respondents were not final-year dental hygiene students. Sixty-six participants were considered eligible for the survey (n=66). The results indicate that most dental hygiene programs provide education and experience in interdisciplinary care. Most students expressed the opinion that interdisciplinary care is an important component of their education and showed interest in furthering their education in this area. Some students were neutral about the importance of this and the idea of furthering their education in interdisciplinary care. The survey identified specific areas of interest among students such as dental therapy, special needs care, public health and more. The insights obtained

in this survey can ultimately help inform educators and curriculum developers about the needs and preferences of students. This information can help improve educational programs and better prepare dental hygienists for diverse work environments. Overall, the findings suggest that while the current curriculum provides a foundation in interdisciplinary care, there is room for improvement to meet student and professional needs.

Table of Contents

List of Figures .... **vii**

Chapter I: Introduction **1**

Introduction 1

Statement of the Problem 2

Significance of the Study 2

Operational Definitions 4

Chapter II: Literature Review **6**

Introduction 6

Persisting Challenges in Oral Health 6

Access to Care Issues 8

Dental Hygiene Delivery: Roles, Supervision and Shifting Trends 10

Dental Hygienists in Interdisciplinary Settings 11

Dental Hygiene Curriculum 16

The Commission on Dental Accreditation 18

Review 20

Chapter III: Methods and Materials **21**

Introduction 21

Research Question 21

Sample Defined 21

Research Design 21

Data Collection and Analysis 22

Chapter IV: Results, Discussion and Conclusion **24**

Results 24

Discussion of Results 32

Limitations ... 34
Conclusion & Recommendations ... 35
Chapter V: Article of Submission ... 37
Abstract ... 37
Introduction ... 38
Methods and Materials ... 46
Results ... 47
Discussion ... 55
Conclusion ... 57
Appendices ... 59
Appendix A: HRPO Approval Letter ... 59
Appendix B: Consent Form ... 61
Appendix C: Recruitment Email ... 62
Appendix D: Reminder Email ... 63
Appendix E: Survey ... 64
References ... 71

List of Figures

Figure 1. Participants' Academic Year 25

Figure 2. Type of Interdisciplinary Care Training 26

Figure 3. Student Interest for Interdisciplinary Care Settings 27

Figure 4. Student Knowledge about Interdisciplinary Care Models 28

Figure 5. Student Preferences for Interdisciplinary Settings 29

Figure 6. Curriculum Adequacy 31

Figure 7. Curriculum Improvement Word Cloud 32

Chapter I: Introduction

Introduction

Despite a decline in the prevalence of oral diseases and conditions such as dental caries, periodontal disease and tooth loss over the last decade, these conditions continue to persist. Social determinants of oral health contribute to challenges in accessing dental care resulting in delayed treatment, chronic oral health issues, and a diminished quality of life.[1] The data highlighted the ongoing need for improvements in the current approach in dentistry, particularly in providing preventive treatment modalities in a variety of settings. Dental hygiene was initially envisioned to be a public health profession, providing services in schools and within hospital settings.[2] Dental hygienists, with their specialized focus on preventive treatment modalities, are best suited to assume the change toward integrated care due to their training and educational background. While traditionally working in private practice dentistry, dental hygienists are now increasingly working in interdisciplinary settings such as hospitals, long-term care facilities, public health centers and more.[3]

Dental hygienists are typically trained and licensed at an entry level associate or baccalaureate degree with a focus on providing preventive care in a traditional clinical setting. Accreditation is standardized across the United States ensuring dental hygiene graduates are competent in all aspects of patient care such as scaling, polishing, patient education and therapeutic procedures.[4] Although this standardization exists, current educational standards have not kept pace with the evolving composition of the dental hygiene workforce. Outlined standards for integrated care are vague and are often interpreted differently depending upon the individual institution. Further education at a

bachelor's or master's degree level is often the main source of exposure to interdisciplinary settings. Improvements in educational requirements across the country will need to be implemented for upcoming dental hygiene professionals to be prepared to practice within interdisciplinary settings.

Statement of the Problem

Are current dental hygiene students adequately prepared to work in interdisciplinary care settings with the current dental hygiene curriculum standards and what are their perceptions about working in such environments?

Significance of the Study

Research demonstrates that oral diseases are among some of the most common undiagnosed chronic diseases in the United States today.[1] Current oral disease rates cause major concern for dental professionals and put a great strain on the healthcare system. Oral diseases have been linked to numerous chronic systemic health conditions, demonstrating that untreated oral disease affects more than just the mouth. The stressors relating to oral health conditions can place a tremendous burden on an individual's overall health as well as their quality of life.[1] Considerations regarding the current prevalence, severity and distribution of oral disease should be a primary focus when planning for the future of dental care delivery. Without significant and timely changes to the current oral health delivery system, those suffering will continue to live with poor quality of life and the increased risk for systemic disease due to preventable oral health conditions.

Currently, dental hygiene curriculum standards prepare upcoming professionals for traditional clinical settings without a significant focus on education in

interdisciplinary settings. The foundation for oral disease prevention starts with education. Dental hygienists who are educationally prepared to provide more diverse care in a variety of settings can help attain better oral health across the United States. Specific accreditation standards roughly outline the expectation of knowledge in interdisciplinary settings but have not put forth specific measures to assure application of this knowledge. The current curricula standards for dental hygiene education should be improved to expand preventive oral healthcare and better prepare students for employment in diverse integrated settings with the goal to reduce the incidence and prevalence of oral disease.

Improving dental hygiene curriculum is crucial because it directly influences the preparedness of dental hygiene students to navigate diverse settings post-graduation. The significance of this study lies in the potential improvement of education to align more effectively with the demands of the evolving oral healthcare landscape. This alignment ensures that future dental hygienists are well-prepared for the challenges posed by interdisciplinary care settings. By establishing a strong educational foundation and teaching upcoming dental hygiene professionals in various approaches, they will be better equipped to provide effective preventive care, patient education and early intervention on a larger scale. This, in turn, can result in improved oral health outcomes at both individual and community levels.

Operational Definitions

Interdisciplinary care: Interdisciplinary care (sometimes referred to interprofessional or integrated care) in dental hygiene refers to a collaborative approach involving professionals from different healthcare disciplines working together to address the oral health needs of patients. Interdisciplinary care promotes better communication, shared decision making, and improved outcomes for patients.

Scope of practice: refers to the range of the procedures that a licensed professional, such as a dental hygienist, is authorized to perform within the profession. It defines the specific duties, responsibilities, and services that an individual is trained, educated, and legally permitted to undertake based on their professional qualifications. The scope of practice may vary depending on location as each state has their own dental regulations outlining what a dental hygienist can do.

Curriculum: the set of courses educational experiences, and learning activities designed to achieve specific educational objectives. A curriculum is planned and structured to provide systematic and organized framework for students to acquire knowledge, skills, and competencies in a particular subject or field of study.

Didactic curriculum: the structured educational component of a program that involves classroom-based instruction. In the context of dental hygiene, the didactic curriculum includes lectures and other instructional activities where students acquire theoretical knowledge, principles, and foundational concepts relevant to the field of study.

Extramural experience: learning opportunities that take place outside of the traditional classroom or clinical setting, sometimes referred to as internships. These experiences are designed to provide students with practical, real-world exposure to the field of dental

hygiene and often involve interactions with the community or external healthcare facilities.

Commission on Dental Accreditation (CODA): develops and implements accreditation standards for dental education programs across the United States. CODA plays a crucial role in ensuring the quality and standardization of dental education.

Chapter II: Literature Review

Introduction

This literature review aims to explore current interdisciplinary settings for dental hygienists, focusing on the provision of preventive oral health services beyond traditional clinical settings. This review will include an examination of the existing education and accreditation standards related to interdisciplinary care. By comprehensively assessing the current state and potential challenges of dental hygiene curriculum, this review intends to contribute valuable insights to the discipline of dental hygiene.

Literature was reviewed using Google Scholar and National Library of Medicine/PubMed search engines. The terms in the search included keywords such as "dental hygiene curriculum," "integrated care," and "interdisciplinary care." National surveillance reports and related surveys were used for inquiries on oral disease rates. References from cited articles were also used to obtain relevant information.

Persisting Challenges in Oral Health

Despite a decline in the prevalence of oral diseases, ongoing challenges persist in effectively controlling ongoing oral health issues within the U.S. population. Suboptimal oral health has far-reaching implications, affecting not only the individual well-being but also broader public health outcomes. Beyond just the clinical presentation of disease, poor oral health can impede normal daily functions. Research has shown that inadequate oral health can also diminish one's overall quality of life, self-esteem, and employment prospects.[1] According to the 2016 Global Burden of Disease Study, which examined over 328 health conditions, four oral diseases ranked among the most prevalent. These include untreated dental caries in permanent teeth (ranking #1), severe periodontitis (ranking

#11), untreated dental caries in primary teeth (ranking #17), and severe or complete tooth loss (ranking #29).[5] The persistently high incidence of oral diseases over time presents a significant challenge in attaining and sustaining optimal overall health.

Periodontal disease affects over 40% of U.S. adults 30 years and older.[6] Periodontitis exhibits a higher prevalence among specific demographics and has been linked to multiple chronic health conditions.[1] Although difficult to evaluate, the most current data show there has not been a significant change in the clinical presentation of periodontal conditions over the last few decades.[7] Untreated dental caries affects 25% of Americans aged 6 and older. Despite preventive efforts, there has been little improvement in permanent dentition caries. While a downward trend is observed in the primary dentition caries, disproportionate socioeconomic disparities continue to exist.[1,7] As previously noted, dental caries continues to be one of the most common chronic health conditions globally and across the lifespan despite being almost entirely preventable. The multifactorial nature of oral diseases leads to disparities influenced by social, economic, and environmental factors. Marginalized subgroups have a disproportionate burden, leading to pronounced oral health inequities. Income disparities affect caries and periodontitis prevalence, with rural populations facing barriers due to isolation, transportation issues and a shortage of dental professionals. Ethnic and racial factors similarly contribute to higher rates of oral disease.[1,8] Despite strides in transitioning from a restorative to preventive approach in dental care, controlling and treating oral disease remains an ongoing issue. Understanding the root causes and environmental factors contributing to oral disease rates is necessary in addressing oral health disparities.

Access to Care Issues

Access to care refers to the ability of individuals to obtain timely, affordable, and appropriate healthcare services when they need them. Improving access to care stands as a pivotal factor in changing oral health outcomes and mitigating disparities in the future. In 2019, 85.9% of children 2-17 years of age had a dental visit in the past year. In the same year, only 65.5% of a adults aged 18-64 had a dental visit.[9] This data is indicative of disparities in the utilization of dental services that vary across factors such as age groups, family income levels, racial and ethnic backgrounds, access to dental insurance, employment status, and educational attainment. It should be noted that this staggering statistic spans across the entire U.S. population, not just those presenting with disparities.

One major factor in the access to care issue in the U.S. is a dental workforce shortage. A geographic region that lacks enough healthcare providers to serve its entire population is often termed a health professional shortage area (HPSA). Out of the 3,143 counties in the United States, 65% are classified as experiencing shortages in both primary care medical and dental professionals. An additional 55 counties possess an adequate number of physicians but face a deficiency of dental professionals.[1] As discussed previously, these shortages are often in rural areas and affect those with limited financial means. Similarly, individuals lacking dental insurance or those covered by Medicare and Medicaid health insurance face challenges when seeking dental care. For various reasons, many providers are reluctant to accept payments from federally funded programs, which, in turn, further diminishes the accessibility of dental care for such individuals.[1]

Ensuring that there are enough providers distributed effectively is vital to guaranteeing access to necessary care for the population in any healthcare system. With

oral healthcare, there is an ongoing discussion at both federal and state levels regarding the sufficiency of the dental workforce to meet present and future needs. As of 2022, the American Dental Association (ADA) reported a total of 202,536 dentists actively practicing in the United States.[10] According to estimates provided by the Health Resources and Services Administration (HRSA), the U.S. currently experiences a deficit of 10,877 dentists.[11] Although workforce model projections show a trend toward an increase in the per capita supply of dentists in the U.S. through 2040, the current dentist to population ratio rests at 60.7 dentists per 100,000 population as of 2020.[11] While an ideal one-size-fits-all dentist to patient ratio may not exist, many patients report difficulty finding a dentist accepting new patients, extended appointment waiting times and general access to care issues often due to geographic location.[12] The ratio as it currently stands may indicate an insufficiency in the number of dentists to manage population needs across the United States when accounting for the number of people who continue to have difficulty accessing care. This argument gains support when examining the current number of active oral health professionals alongside the high levels of oral disease rates. The high prevalence of oral diseases despite the preventable nature of these diseases demonstrates that oral health has not been prioritized in health systems and policy. Although assumptions can be made based on the general workforce formula, the issue of provider adequacy is quite complex. It involves examining the need for dentists and allied dental professionals, which, in turn, depends on the future demand for dental care, how efficiently dentists work, and potential changes in how dental care is provided.

A report published by the American Dental Association (ADA), *Dental Workforce Shortages: Data to Navigate Today's Labor Market*, outlines the current state

of workforce shortages for other allied dental professionals. There is an upward trend in the number of job vacancies for both dental assistants and dental hygienists. This increase in job vacancies has resulted in a decline in dental practice capacity nationwide, with an estimated 10% reduction as of 2022.[11] Not only is there an already existing dental workforce shortage, but it is also stated that roughly one-third of the dental assistant workforce (33.7%) and dental hygienist workforce (31.4%) anticipate retiring within the next five years or sooner.[9] Allied dental health professionals play crucial roles in delivering oral healthcare as part of the dental team. Inadequate staffing levels limit the capacity to provide oral healthcare, particularly as a substantial part of the workforce is expected to retire. The future may exacerbate the current challenges in accessing care.

Dental Hygiene Delivery: Roles, Supervision and Shifting Trends

Most dentists employ dental hygienists, who primarily focus on preventive oral care and patient education. According to the U.S. Bureau of Labor Statistics (BLS), there were an approximated 214,700 working dental hygienists as of 2022.[13] Dental hygienists can be independent contractors or employed by dentists, and in some areas may practice independently or as part of a medical team. Currently, a dental hygienist's specific role and supervision requirements vary greatly and are often defined by scope-of-practice laws dependent on which state the licensee is practicing. The level of supervision for dental hygienists whether direct, indirect, or general, determines the extent of oversight and collaboration required when providing care. Direct supervision involves the dentist's physical presence in the office or treatment area while the dental hygienist carries out certain procedures. The dentist must approve the treatment plan and must be available for "face-to-face" consultation and evaluation throughout the procedure. Indirect supervision

means the dentist authorizes the procedure, remains in the office but does not need to be present in the treatment room throughout. General supervision allows the dental hygienist to perform certain procedures based on the dentist's prior diagnosis without the need for the dentist to be physically present or on-site while the hygienist provides care.[14] Direct access and collaborative practice are two other forms of supervision where hygienists can provide services without supervision and provide these services as they determine appropriate without prior authorization from a licensed dentist. Collaborative practice dental hygiene requires the dental hygienist to have a collaborative agreement with a licensed dentist to ensure ongoing and comprehensive care.[14] Additionally, supervision can change within the same state for the same provider depending on if the hygienist works in a private or public setting.[14] Supervision levels influence the provision of care and can potentially cause barriers to treatment particularly in HPSA's. The composition of the dental workforce is strongly influenced by the demands and needs of the population and the U.S. is currently seeing a shift toward dental hygiene becoming the primary focus for improving the public's oral and overall health to further increase access to care.[1]

Dental Hygienists in Interdisciplinary Settings

Dental care can be provided in various settings to meet people's diverse needs. Although historically the predominant delivery system for oral healthcare in the United States has been the private practice model, dental hygienists are increasingly being utilized in areas other than the traditional clinical role.[1,15] Interdisciplinary settings in dental hygiene refer to collaborative environments where professionals from various disciplines work together to address comprehensive oral health and overall well-being.

Interdisciplinary settings often include long-term care facilities, public health clinics, hospital-based dentistry, school-based programs, federally qualified health centers (FQHCs), mobile dental clinics, teledentistry and educational institutions.[1]

Long-term care facilities such as nursing homes are a setting outside of traditional clinical practice where dental hygienists can provide oral health care services that help in treating those with complex overall health conditions. It is projected that between 2000 and 2050, there will be a surge in the older population by approximately 135%. Notably, the group 85 and above, who often require more oral health services, is predicted to soar by 350%.[16] Oral health in older individuals and those requiring long-term care can often be neglected and rarely does the standard of care match that of what would be expected in the general public. With much of the population aging, there is significant opportunity for dental hygiene to promote and push for more roles in long-term care facilities.[17] In this role a dental hygienist can be a liaison for scheduling treatment and be an educator for family members and other members of the medical team. Dental hygienists have also been effectively integrated into various hospital settings in the U.S. and across various countries including Canada, Israel, Australia, Nigeria, Portugal, Japan, New Zealand among others. They serve as members of interprofessional healthcare teams, collaborating closely with dentists and other essential healthcare providers.[3] Dental hygienists have the knowledge and skills to provide screenings for early detection of oral cancer, minimize oral pathogens to prevent ventilator-associated pneumonia and prevent and educate on many chronic illnesses associated with oral disease in a hospital setting.[16] The role a dental hygienist can play in medical specialties is invaluable as evidence-based dental hygiene practice requires in-depth knowledge on the oral-systemic link and can

help with understanding various inflammatory processes involved in oral disease that can lead to issues in distant sites within the body. Dental hygienists in hospital settings help bridge the gap between medical and dental care and facilitate people accessing care more easily. Not only that, but they can provide preventive services to those who may not regularly see a dentist. With the limited oral health education provided to most healthcare workers, dental hygienists can help to provide in-depth knowledge and training to the primary care providers and medical staff tasked with patient care. Like hospital settings, health access centers such as non-profit community health centers and federally qualified health centers (FQHCs) are community-based healthcare organizations that provide comprehensive medical, dental and behavioral health services to underserved populations. FQHCs have become a very important dental access point for vulnerable populations.[1] They serve diverse communities including individuals with limited financial means, uninsured or underinsured individuals, homeless populations, those in HPSA's and more.[1] School-based dental clinics have also shown to be an extremely valuable public health measure. The CDC reports that "on average, 34 million school hours are lost each year because of unplanned (emergency) dental care".[18] School-based clinics are typically comprehensive dental and medical programs that can dramatically influence the overall health of children receiving this type of care.[1] A hygienist has the ability to provide prophylaxis, fluoride, oral hygiene instruction and dental sealants in this type of setting.

Other emerging delivery settings include mobile dentistry and teledentistry. Because so many people live in HPSA's, the ability to bring treatment directly to the patient can help reduce barriers and make significant strides in increasing access to care.

Teledentistry and mobile dentistry are typically complementary, often allowing a third party such as a dental hygienist direct access to the patient to gather necessary medical and dental records. Using synchronous and asynchronous methods to communicate with a collaborating dentist, information about clinical findings can be given without the dentist having to be physically present.[19] Teledentistry relies on various technologies to gather information and allows dental professionals to interact with patients and make treatment plans from different geographic locations. The term synchronous communication would describe the use of shared information and images in real time, much like face-to-face examination, whereas asynchronous communication would indicate information is being stored and shared later enabling more flexibility for the providers.[19]

The shift toward integration in dentistry often involves granting dental hygienists more autonomy and the opportunity to deliver treatment collaboratively with dentists. The collaborative practice model is pivotal in expanding access to care, particularly in settings beyond traditional private practices. By enabling dental hygienists to work alongside dentists and independently provide certain treatments, these settings optimize the utilization of their skills and expertise, ultimately enhancing the overall accessibility and availability of dental services. These integration models not only enable dental hygienists to fully utilize their knowledge and skills as healthcare providers but also contribute to the broader goal of improving oral health outcomes for diverse populations. Dental hygienists can also be utilized in many other essential non-clinical roles such as administrators, researchers and educators. Dental hygienists who dedicate their time to these roles are integral in advancing the profession to allow for more interdisciplinary care opportunities.

The United States has explored various workforce models to introduce mid-level dental providers like those established in the medical field. For instance, Nurse Practitioners (NPs) and Physician Assistants (PAs) are highly trained with advanced clinical education and training allowing them the ability to perform many procedures comparable to that of a doctor with some limitations. Collaborative Dental Hygiene Practice, Community Dental Health Coordinators (CDHCs), Dental Health Aide Therapists (DHATs), dental therapists (DTs), and the Advanced Dental Hygiene Practitioner (ADHP) are among many model types proposed and actively being used in the U.S.[20] Legislation has been passed for these various collaborative models that allows for dental hygienists to offer preventive and even simple restorative and surgical procedures in a variety of different settings.[20] These dental auxiliary positions require different levels of education, and the services they can provide vary widely. Generally speaking, a dental therapist is a mid-level provider who is able to provide the following services: "examination, diagnosis and treatment planning; exposing and interpreting radiographs; oral health education; preventive services such as prophylaxis, fluoride therapy, fissure sealants and dietary counseling; preparation of cavities in primary and permanent teeth and restoration with amalgam and composite; preformed stainless steel crowns; pulpotomies; and the extraction of primary teeth".[21] Educational requirements may include certification programs or formal accredited degree programs which often require subsequent advanced training to perform expanded functions.[20] As these progressive workforce changes are more regularly implemented, changes in the provision of oral healthcare will likely move out of the dentist's office and into more frequently

visited interdisciplinary settings. Dental hygiene has made these adaptations in the diversity of the workforce to better assist populations in accessing care.

Dental Hygiene Curriculum

Dental hygiene education and training programs are available across various types of institutions including public, private nonprofit and private for-profit institutions. These programs offer different degrees from an entry-level associate or baccalaureate degree to degree completion programs and master's degree programs.[1] Both associate and baccalaureate degrees are considered entry-level. An associate degree typically requires an average of 84 credit hours and focuses on essential skills and knowledge needed for entry-level practice in dental hygiene. A baccalaureate degree involves a longer course of study, typically spanning four years with an average of 120 credit hours.[1,4,22] Both degree paths prepare students for licensure as dental hygienists, but a baccalaureate degree may offer a more comprehensive education with additional opportunities for specialization, leadership roles, and advanced or alternative practice.[4] Despite the number of credit hours, all associate and bachelor's degree dental hygiene students are required to meet the same basic educational standards, although degrees they obtain clearly differ. This discrepancy is primarily due to differences in each program's structure, duration and emphasis on specific coursework.[4,22] Although 82% of entry-level dental hygiene schools require their students to perform a clinical rotation in a community or public health setting, as of 2015, only 29% of entry-level dental hygiene programs facilitated off-site clinical activities beyond their campus.[23] Specifics on extramural experiences in dental hygiene curriculum are not well documented so these experiences may or may not include components of interdisciplinary care. Educational experiences with

interdisciplinary settings require additional time. This experience often stems from seeking a higher degree such as a bachelor's or master's degree because of the increased credit hour requirements associated with each degree.

The terminal degree in dental hygiene is a master's degree which allows for further opportunities in education, research, administration and more. This degree often includes additional coursework in areas like community health, education, administration, research, and more in-depth dental hygiene education. The American Dental Education Association (ADEA) and the American Dental Hygienists' Association (ADHA) specifically outline interprofessional collaboration and integrated care as one of the six focus areas for a master's degree in dental hygiene. The goal of this is to integrate dental hygiene into multidisciplinary teams.[24] The master's degree in dental hygiene enables one to become a member of a multidisciplinary healthcare team who can assume many roles and help to make changes in the healthcare delivery system.[24] Without the specialized focus on integrated care that a master's degree offers, it can be difficult for an entry-level dental hygienist to gain the knowledge necessary to assume such roles given the current curriculum standards. Dental therapy has more recently emerged as a similar but separate profession. The field is in the early stages of development but does have similar accreditation standards outlined to that of dental hygiene. There are currently four dental therapy programs in the United States, located in Alaska, Washington, and two in Minnesota which require at least three academic years of full-time instruction or its equivalent at the post-secondary college-level.[25] Like that of dental hygiene, dental therapy offers degrees ranging from an associate degree to a master's degree.[25] Both a dental therapy degree and a dental hygiene master's degree are much less obtained than

an entry-level dental hygiene associate or baccalaureate degree as they are not required to work in traditional clinical settings. Although fewer in number, the growing amount of master's degree and dental therapy programs reflects the increasing value in integrating dental hygiene into the healthcare landscape.

The Commission on Dental Accreditation

Founded in 1975, the Commission on Dental Accreditation (CODA) serves as the specialized accrediting body recognized by the U.S. Department of Education. Its role is to accredit dental and dental-related education programs, ensuring they meet established standards of educational quality. This accreditation guarantees that programs prepare students to enter the profession delivering safe and effective oral healthcare. CODA plays a vital role for dental schools, dental hygiene programs, dental assisting programs and other dental education institutions in maintaining high-quality educational standards. CODA serves as a foundational authority for establishing educational standards in dental hygiene education, providing essential baselines. However, CODA does not outline and require specific course objectives for individual educational institutions. Regardless of the degree awarded by individual educational institutions, the same CODA standards apply to all entry-level dental hygiene programs. The current educational requirements put forth for dental hygiene programs simply mandate a minimum of two years of full-time academic instruction.[23,26]

When discussing requirements for interdisciplinary care, CODA lacks explicit guidelines. Only briefly do CODA standards address this with Competency Standard 2-1 stating "The curriculum should include additional coursework and experiences, as appropriate, to develop competent oral health care providers who can deliver optimal

patient care within a variety of practice settings and meet the needs of the evolving healthcare environment". Section 2-15 also states, "Graduates must be competent in interprofessional communication, collaboration and interaction with other members of the health care team to support comprehensive patient care".[4] This indicates that individual institutions hold the responsibility to determine the appropriateness of the training provided and ensure competency among their students. One consequence of having such broad standards may be that dental hygiene graduates are unprepared for practice in interdisciplinary settings following graduation due to lack of specific requirements. Surveyed dental hygienists working in long-term care facilities provided insight on their experiences adapting to providing care in integrated settings. Most expressed a lack of training available from their educational institution for a clinical role in interdisciplinary settings.[27] When asked about how to better facilitate treating patients in these settings, the respondents felt gaining direct experience and exposure was the best way to introduce interdisciplinary settings. Didactic training is simply not enough. Szabo et al reports "that 'for some people it is out of their comfort zone' and many felt it was because students are never exposed to what they will see, hear, and smell in alternative settings".[27]

In 2020, dental hygiene program directors in the U.S. were surveyed on their opinions about current dental hygiene curriculum standards. Fifty-four percent of respondents said students should be educated in integrated care such as collaborative practice or dental therapy. Additionally, more than 93% of respondents believe that the current curriculum lacks sufficient time to prepare students for employment in diverse workforce settings. They also indicated a perceived insufficiency in the time necessary to educate on a variety of settings such as long-term care facilities, hospitals, school

settings, and more. Most comments on this topic indicated the need for more time, but again, time was discussed as the biggest barrier to implementing changes in the existing curriculum.[26] The program directors' opinions indicate a lack of preparation for interdisciplinary settings within the existing dental hygiene curriculum. Without students receiving specific exposure to interdisciplinary care through accreditation standards within the current dental hygiene curriculum, it is unclear whether they would feel prepared to take on these roles following the completion of their education.

Review

There are significant concerns about oral disease rates across the U.S. despite preventive measures. Access to care issues compounded with the current dental workforce shows the need for integrated oral health services. While dental hygienists are more commonly taking on roles in various interdisciplinary settings, current educational and accreditation standards may not be adequate in preparing students for these roles. Updating curriculum standards to be more focused on interdisciplinary care is an essential step toward addressing oral health disparities and improving health outcomes across the U.S. Integrating dental hygienists into the healthcare system through dental hygiene education can significantly improve the health of the public by ensuring more comprehensive and accessible oral healthcare.

Chapter III: Methods and Materials

Introduction

This descriptive research aimed to evaluate dental hygiene student experience and perspectives with interdisciplinary care provided within the current educational curriculum. The goal was to determine the adequacy of the current dental hygiene curriculum in offering the didactic and clinical experiences necessary to further dental hygiene practice in interdisciplinary settings.

Research Question

Were current dental hygiene students adequately prepared to work in interdisciplinary settings given the current dental hygiene curriculum standards and what are their perceptions about working in such environments?

Sample Defined

Final year dental hygiene students in accredited U.S. dental hygiene programs were the target recipients for this survey. The sample population for this study included students actively enrolled in CODA accredited dental hygiene programs. Information regarding CODA accreditation was found on the website coda.ada.org. Final year students enrolled in those programs identified on the CODA website were considered eligible for the survey.

Research Design

This study was a descriptive study. An original online survey was determined to be the most appropriate method for collecting comprehensive information on this topic. As previously discussed, the survey was distributed to final year students currently enrolled in a CODA accredited dental hygiene program in the United States. Since dental

hygiene program directors typically oversee and coordinate all student learning activities, they were identified as the ideal recipients for the initial email containing the survey and related information.

The survey was sent electronically via email to all CODA accredited dental hygiene program directors. They were asked to distribute the survey to actively enrolled final year students as of Spring 2024. Participation was entirely optional, and the participants remained anonymous throughout the process. The survey consisted of 18 questions designed to collect information on various aspects of each dental hygiene program such as program size and degree offered. Information about student attitudes and opinions were obtained through a series of Likert scale questions. These questions assessed their knowledge, experiences and confidence in treating patients independently, and preferences for further education. Additionally, the survey included questions to gauge the adequacy of the current curriculum in preparing students for interdisciplinary care settings. A section at the end of the survey allowed for open-ended responses where students could provide suggestions for curriculum improvements and share additional feedback. This combination of quantitative and qualitative questions was designed to provide comprehensive understanding of both the educational structure and the students' perspectives.

Data Collection and Analysis

Microsoft forms was used to create the survey. Once approved by UNM HRRC (Study ID 24-149), the survey was sent via email to current dental hygiene program directors with the request to disseminate the survey to all currently enrolled final-year students. This recruitment email contained information about the voluntary nature of the

survey and included a consent form. Consent was obtained when participants clicked the survey link provided in the recruitment email, which directed them to the survey in the Microsoft Forms website. Microsoft Forms ensured participants remained anonymous, as no personal identification information was requested in any survey questions.

Participants had three weeks to complete the survey. Two weeks after the initial email, a reminder email was sent as a reminder for those who had not yet completed the survey. After three weeks, the survey closed and became unavailable. The confidential data collected through Microsoft Forms was exported into an excel spreadsheet for review. Participant responses were converted to percentages for data presentation.

Chapter IV: Results, Discussion and Conclusion

Results

Eighty-two responses were gathered over three weeks. Sixteen of these responses were excluded because the respondents were not final-year dental hygiene students. Sixty-six respondents (n=66) were considered eligible for the survey.

Demographic Information (Questions 1-3):

Questions 1-3 focused on gathering demographic information such as students' academic year, program size and degree type. Question 1, "What is your current year in the program?" was designed to filter our respondents who were not final-year (senior) dental hygiene students. If respondents selected preclinical (sophomore) or 1st year (junior), they were automatically sent to the end of the survey and their responses were excluded from further analysis.

Program Type: 86% (n=57) of eligible respondents were enrolled in an associate's degree dental hygiene program, while 14% (n=9) were enrolled in a bachelor's degree program.

Program Size: 77% (n=51) of respondents attended a moderately sized program (15-30 students), 17% (n=11) attended a large program (more than 30 students), and 6% (n=4) attended a small program (fewer than 15 students).

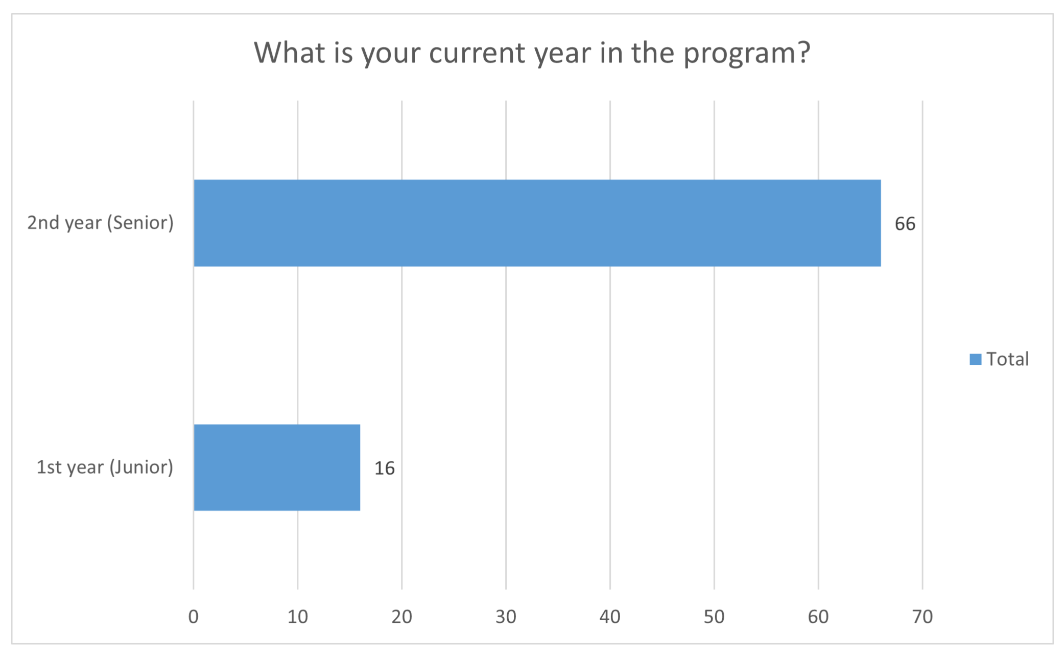

Figure 1. Participants' Academic Year

Interdisciplinary Care Experience (Question 4):

Question 4 assessed whether students have had academic experience with interdisciplinary care. Most students report having didactic, clinical or a combination of both types of training in interdisciplinary care. Since students could select more than one option, the percentages reflect the proportion of total responses for each type of training. Of the sixty-six eligible respondents, the training types reported were as follows:

Didactic training only: 1 respondent (1.5%)

Clinical training only: 23 respondents (34.8%)

Both clinical and didactic training: 40 respondents (60.6%)

No training in interdisciplinary settings: 2 respondents (3%)

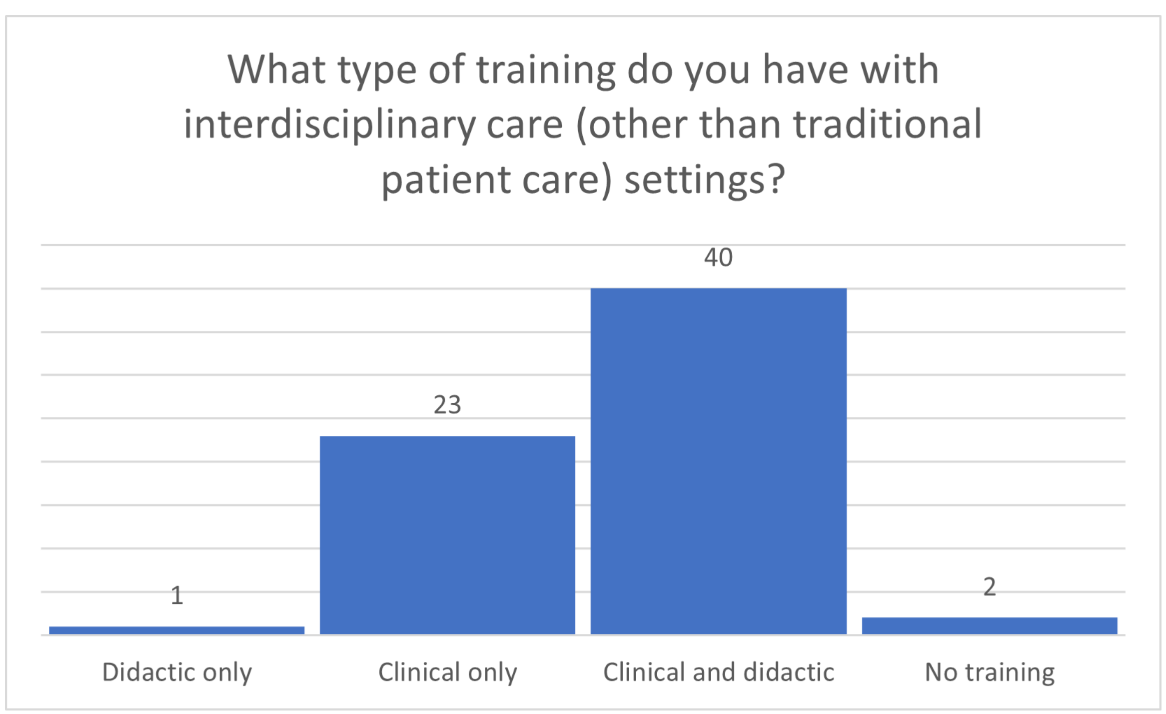

Figure 2. Type of Interdisciplinary Care Training

<u>Opinions and Preferences (Question 5):</u>

Question 5 gathered data on students' opinions and preferences regarding their educational experiences in interdisciplinary care settings and their future career aspirations. All respondents showed interest in gaining knowledge and experience in various interdisciplinary care settings. These settings included special needs, public health, community health, hospital, long-term care, nursing home, school-based, dental

therapy, and collaborative practice. Respondents could select multiple options. No respondents report a disinterest in interdisciplinary care settings.

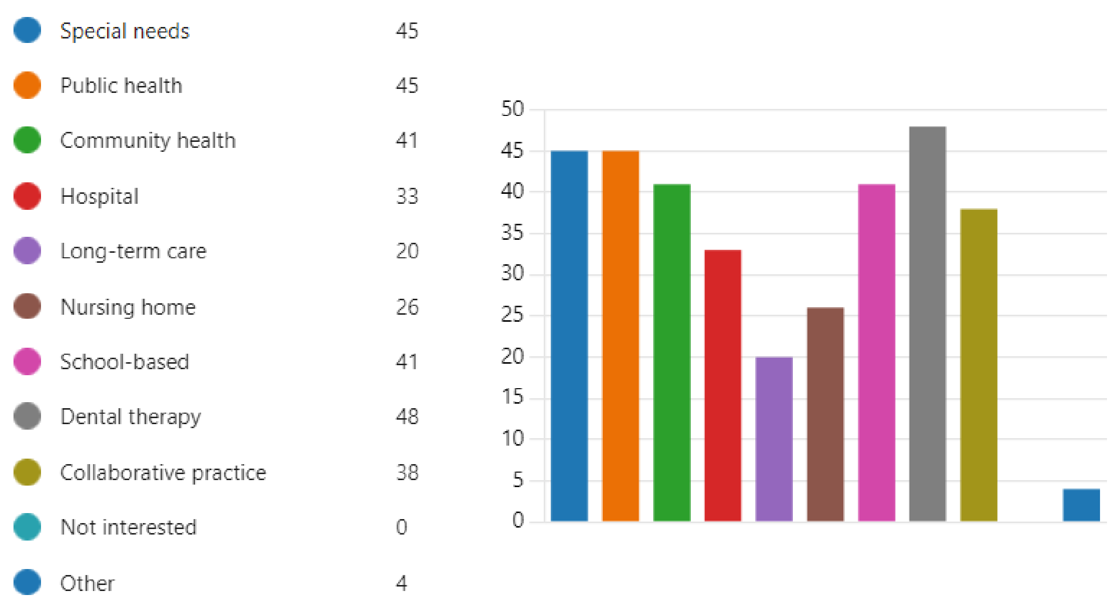

Figure 3. Student Interest for Interdisciplinary Care Settings

<u>Knowledge of Interdisciplinary Care Models (Question 6):</u>

Respondents rated their agreement with the statement, “I am knowledgeable about various interdisciplinary care models,”, using a Likert scale.

- 31.8% strongly agreed (n=21)
- 37.8% somewhat agreed (n=25)
- 25.8% were neutral (n=17)
- 4.5% somewhat disagreed (n=3)
- No respondents strongly disagreed (n=0)

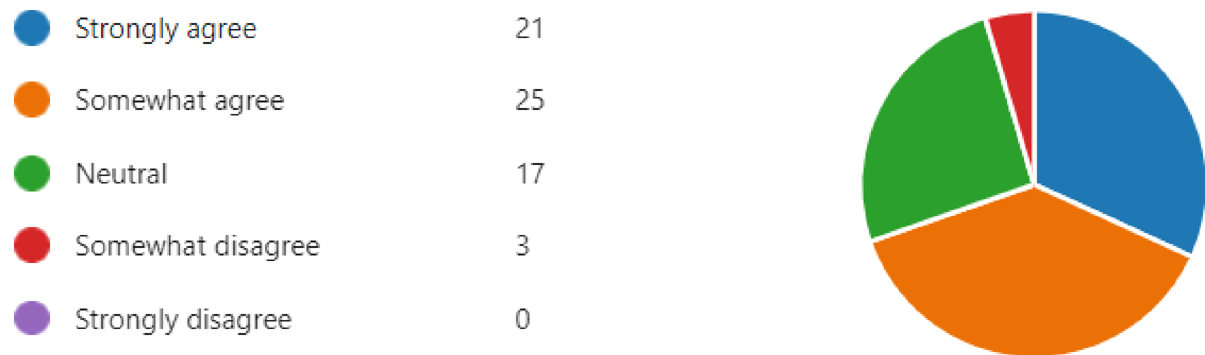

Figure 4. Student Knowledge about Interdisciplinary Care Models

Preferences for Working in Specific Interdisciplinary Care Models (Questions 7-12):

These questions aimed to gauge student preferences for working within specific interdisciplinary care models, using a series of Likert scale questions:

- Question 7: Private practice
- Question 8: Hospital setting
- Question 9: Nursing home setting
- Question 10: School-based setting
- Question 11: Public health
- Question 12: Independent dental hygiene practice settings

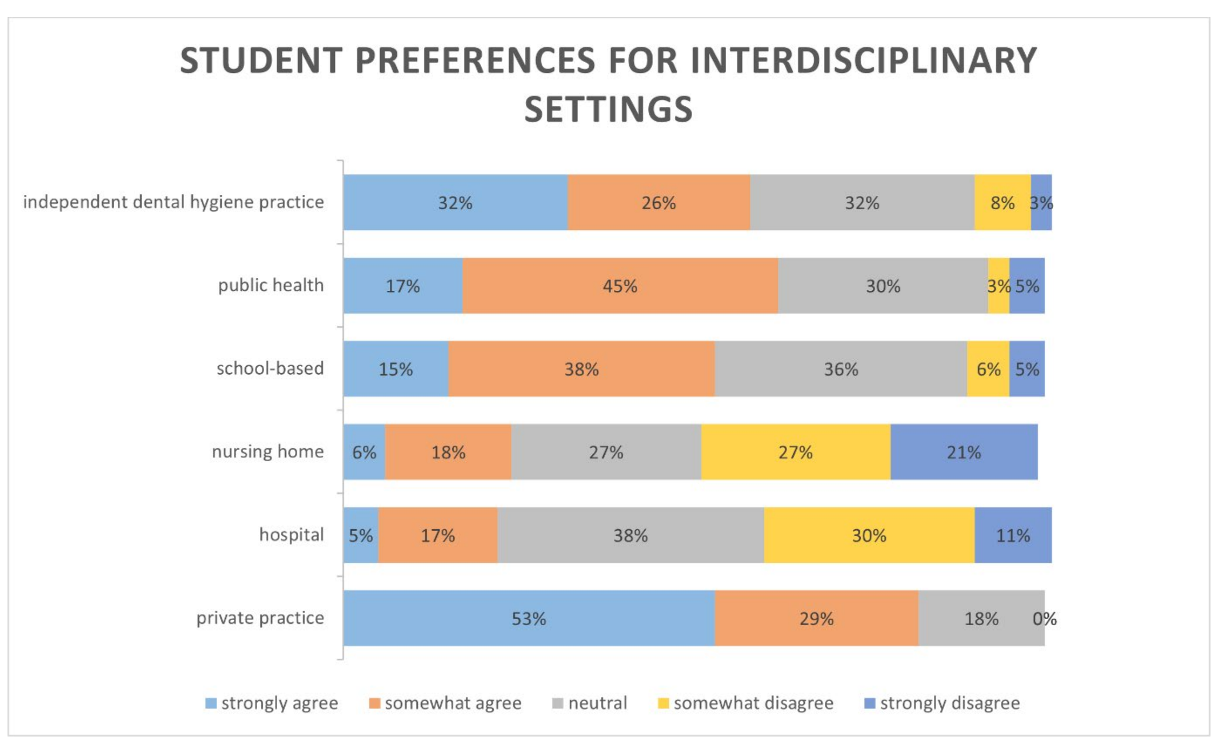

Figure 5. Student Preferences for Interdisciplinary Settings

<u>Adequacy of Current Curriculum (Question 13):</u>

The statement "The dental hygiene curriculum is preparing me to facilitate patient care with other members of the medical and dental team" was assessed.

- 60.6% strongly agreed (n=40)
- 27.3% somewhat agreed (n=18)
- 10.6% were neutral (n=7)
- 1.5% somewhat disagreed (n=1)
- No students strongly disagreed (n=0)

<u>Confidence in Independent Practice (Question 14):</u>

Responses to "I would feel confident in treating patients independent of other dental providers if given the opportunity" were:

- 50% strongly agreed (n=33)

- 32% somewhat agreed (n=21)
- 12% were neutral (n=8)
- 6% somewhat disagreed (n=4)
- No students strongly disagreed (n=0)

Interest in Further Education (Question 15):

Respondents, when asked if they would choose to further their education in interdisciplinary care if given the option:

- 52% strongly agreed (n=34)
- 30% somewhat agreed (n=20)
- 18% were neutral (n=12)
- No responses disagreed (n=0)

Importance of Interdisciplinary Education (Question 16):

Agreement with "Education in interdisciplinary care is an important aspect of the dental hygiene curriculum":

- 59% strongly agreed (n=39)
- 33% somewhat agreed (n=22)
- 8% were neutral (n=5)
- No responses disagreed (n=0)

Curriculum adequacy in Interdisciplinary Training (Question 17):

Responses to "The curriculum offered through my institution is providing me with adequate education and training in interdisciplinary care settings":

- 54.5% strongly agreed (n=36)
- 31.8% somewhat agreed (n=21)

- 12.1% were neutral (n=8)
- 1.5% somewhat disagreed (n=1)
- No respondents strongly disagreed (n=0)

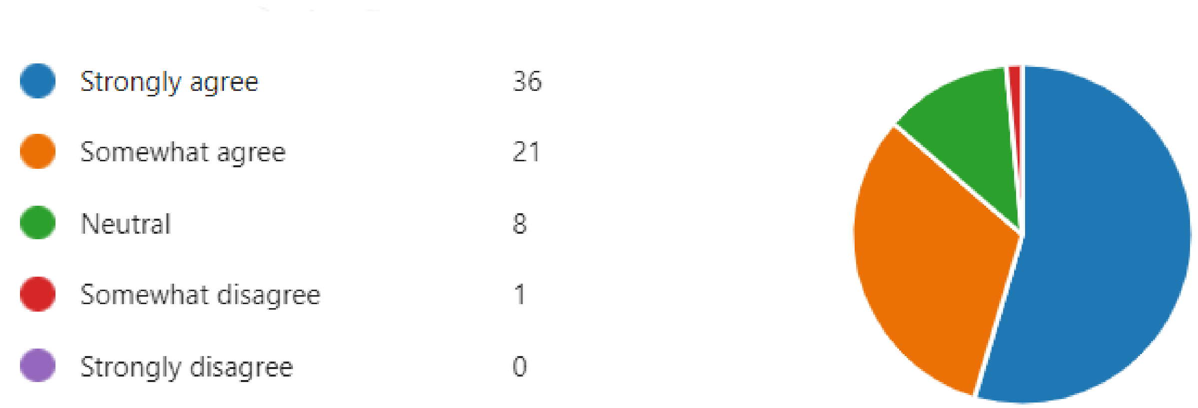

Figure 6. Curriculum Adequacy

<u>Suggestions for Curriculum Improvement (Question 18):</u>

Respondents provided suggestions for improving the dental hygiene curriculum to enhance interdisciplinary care experience.

- Twenty responses were received for this open-field question.
- Of these, 15% emphasized the need for more practical experience. Specific suggestions included:
    - "Being able to go outside of just our clinic to hospital/long term care settings to experience it."

- “I would love to have more hands-on experience with the community through volunteering or getting experience in a program.”
- “Actually working with patients outside the normal clinical setting to get hands on experience in different aspects of dental hygiene.”

- Additional recommendations included:
    - “Asking preferences when determining what clinical rotations are assigned.”
    - One respondent commented positively: “Our program does a great job”.

This question allowed for a wide range of input on enhancing interdisciplinary care in dental hygiene curriculum.

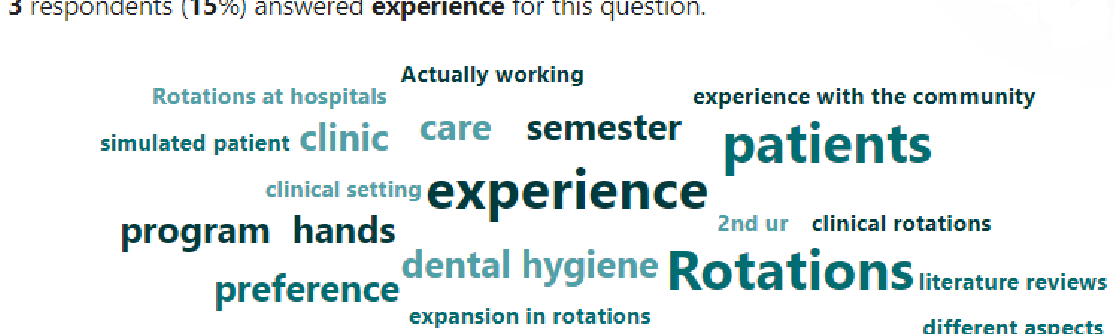

Figure 7. Curriculum Improvement Word Cloud

Discussion of Results

Findings from this study suggest that the current dental hygiene curriculum provides education and experience in interdisciplinary care in both associate and bachelor's degree programs. Most respondents indicated that their programs include both clinical and didactic training in interdisciplinary care. Only two respondents reported having no training outside of traditional patient care settings.

Most respondents (60.6%) strongly agreed that their curriculum prepares them to facilitate care with other members of the medical and dental team, with an additional

27.3% somewhat agreeing. This indicates there is a strong perception among students that their education prepares them for collaborative care. Similarly, 50% of students strongly agreed that they would feel confident treating patients independently if given the opportunity, with another 32% somewhat agreeing.

While 52% of students expressed a strong interest in furthering their education in interdisciplinary care, and 33% somewhat agreeing, there is a notable portion of students (18%) that remained neutral on this topic. This neutrality was also evident in the responses about the importance of interdisciplinary care in the curriculum, where 8% of respondents were neutral, despite the majority (59%) strongly agreeing and 33% somewhat agreeing. There were two other notable areas where students were neutral, even disagreeable, with the prompted questions. When asked if they would feel confident in treating patients independent of other dental providers, 12% (n=8) of students were neutral and 6% (n=4) somewhat disagreed. Again, when asking if students felt the curriculum offered through their institution provided them with adequate education and training on interdisciplinary care, 12% (n=8) were neutral and 2% (n=1) somewhat disagreed.

Interestingly, dental therapy emerged as the area of greatest interest among students for interdisciplinary care. This trend suggests that future dental hygienists want to expand their scope of practice and utilize their abilities more fully. Special needs, school-based care, public health and community health were also highly noted as areas where students desire more knowledge and experience in interdisciplinary care. There was also significant interest in collaborative practice, hospital, long-term care, and nursing home settings.

While it is not surprising that current dental hygiene students prefer to work in private practice settings, the survey shows there is significant interest in interdisciplinary settings too. This indicates a potential shift in the profession of dental hygiene toward greater integration within the healthcare system.

Students also provided qualitative feedback through open-ended responses, suggesting improvements such as more hands-on experience in interdisciplinary settings like hospitals, long-term care settings and community care. Others recommended greater flexibility in clinical rotations and more opportunities for practical experience outside of traditional dental clinics.

Overall, the survey results indicate a positive perception of interdisciplinary care education among dental hygiene students, with a significant number expressing satisfaction with their current level of education. However, the neutral and disagreeable responses suggest that there is room for improvement in enhancing student confidence and success in interdisciplinary care, possibly through increased practical experiences and more customized education opportunities.

Limitations

The biggest limitation of this study was the low response rate which restricted the number of responses needed to accurately determine the extent of interdisciplinary education in dental hygiene programs across the entire United States. There were significantly more responses from associate's degree programs compared to bachelor's degree programs which limited the ability to compare differences, if any, between the two program types.

With dental hygiene program directors acting as intermediaries in forwarding the survey link to students, there was a possibility that fewer students received the survey if the program director did not distribute it. Since this survey relies on student opinions and individual experiences, the results are inherently subjective.

Question #5 provided an “other” option for interdisciplinary care settings that students would like to have knowledge and experience in but did not allow for additional comments. This restricted the ability to gain further insights into other settings of interest.

Additionally, the survey was limited in the type of information received. It may have been beneficial to ask additional questions regarding the specific type of training and experiences currently offered by dental hygiene programs. These could include details about different clinical rotation, various didactic topics covered in the curriculum, and more.

Conclusion & Recommendations

Interdisciplinary care is an essential part of the dental hygiene curriculum. To effectively reduce oral disease and meet the needs of the U.S. population, dental hygienists must be trained to work in a variety of settings. Therefore, interdisciplinary care should be a mandated component in the basic accreditation standards that all dental hygiene schools must meet.

This survey revealed that while most dental hygiene students believe their curriculum provides adequate education and experience in interdisciplinary care, there is still room for improvement. Many students indicated a strong interest in certain settings, such as dental therapy, suggesting potential gaps in the current curriculum in these areas.

These findings provide valuable insights for educators when considering future curriculum changes to better meet student needs and to prepare them for diverse work environments. Understanding the interdisciplinary roles students aspire to can inform planning for future professional development opportunities and adjustments in educational standards. At a minimum, CODA accreditation should more clearly outline interdisciplinary care in its standards. However, given the limited time available in associate and bachelor's degree programs, incorporating this additional education may not be feasible. This shows a need to further education focused on interdisciplinary care such as a master's degree or post-graduate specialty track for dental hygienists.

As discussed previously, expanding dental hygienists' ability to work in different roles and environments in the healthcare workforce can help reduce oral disease rates across the U.S. For this reason, interdisciplinary care should be taught both didactically and clinically in every dental hygiene program. Learning about interdisciplinary care in an academic setting may encourage more hygienists to seek positions in settings other than private practice after graduation. Further research should be conducted on the best ways to integrate interdisciplinary care education into the current dental hygiene curriculum without sacrificing essential educational time.

Chapter V: Article of Submission

Journal of Dental Hygiene

Assessing Dental Hygiene Students' Perspectives: A Survey of Curriculum Adequacy for Interdisciplinary Settings in U.S. Dental Hygiene Programs

Brittany Elaine Tripp, RDH, BS

betripp@health.unm.edu

Abstract

Purpose: The purpose of this study was to investigate if dental hygiene programs implement interdisciplinary care into their curriculum and assess student preparedness for working in interdisciplinary settings. The study also aimed to identify student preferences for various interdisciplinary care settings.

Methods: A descriptive survey consisting of 18 questions was developed and distributed via email to program directors of accredited dental hygiene programs across the United States. Those programs directors were asked to forward the survey to currently enrolled final-year students.

Results: A total of eighty-two responses were received. Out of these , sixteen were excluded because those respondents were not final-year dental hygiene students. Sixty-six participants were considered eligible for the survey (n=66).

Conclusion: The data collected suggests that interdisciplinary care is covered in both didactic lectures and clinical experiences in the current dental hygiene curriculum. Most students expressed the opinion that interdisciplinary care is an important component of their education and showed interest in furthering their education in this area. Some

students were neutral about the importance of interdisciplinary care and the idea of furthering their education in this area.

Additionally, the survey identified specific areas of interest among students such as dental therapy, special needs care, public health and more. The insights obtained in this survey can ultimately help inform educators and curriculum developers about the needs and preferences of students. This information can also help improve educational programs and better prepare dental hygienists for diverse work environments. Overall, the findings suggest that while the current curriculum provides a foundation in interdisciplinary care, there is room for improvement to meet student and professional needs.

Introduction

Despite a decline in the prevalence of oral diseases and conditions such as dental caries, periodontal disease and tooth loss over the last decade, these conditions continue to persist. This data demonstrates the ongoing need for improvements in the current approach in dentistry. Dental hygienists, with their specialized focus on preventive treatment modalities, are best suited to assume the change toward integrated care due to their training and educational background. While traditionally working in private practice dentistry, dental hygienists are now increasingly working in interdisciplinary settings such as hospitals, long-term care facilities, public health centers and more.[3]

Dental hygienists are typically trained and licensed at an entry level associate or baccalaureate degree with a focus on providing preventive care in a traditional clinical setting. Accreditation is standardized across the United States ensuring dental hygiene graduates are competent in all aspects of patient care such as scaling, polishing, patient

education and therapeutic procedures.[4] Although this standardization exists, current educational standards have not kept pace with the evolving composition of the dental hygiene workforce. Outlined standards for integrated care are vague and are often interpreted differently depending upon the individual institution. Improvements in educational requirements across the country will need to be implemented for upcoming dental hygiene professionals to be prepared to practice within interdisciplinary settings.

Current Dental Workforce

Out of the 3,143 counties in the United States, 65% are classified as experiencing shortages in both primary care medical and dental professionals. Ensuring that there are enough providers distributed effectively is vital to guaranteeing access to necessary care for the population in any healthcare system. As of 2022, the American Dental Association (ADA) reported a total of 202,536 dentists actively practicing in the United States.[10] According to estimates provided by the Health Resources and Services Administration (HRSA), the U.S. currently experiences a deficit of 10,877 dentists.[11] Although workforce model projections show a trend toward an increase in the per capita supply of dentists in the U.S. through 2040, the current dentist to population ratio rests at 60.7 dentists per 100,000 population as of 2020.[11] While an ideal one-size-fits-all dentist to patient ratio may not exist, many patients report difficulty finding a dentist accepting new patients, extended appointment waiting times and general access to care issues often due to geographic location.[12] The ratio as it currently stands may indicate an insufficiency in the number of dentists to manage population needs across the United States when accounting for the number of people who continue to have difficulty accessing care.

A report published by the American Dental Association (ADA), *Dental Workforce Shortages: Data to Navigate Today's Labor Market*, outlines the current state of workforce shortages for other allied dental professionals. There is an upward trend in the number of job vacancies for both dental assistants and dental hygienists.[11] According to the U.S. Bureau of Labor Statistics (BLS), there were an approximated 214,700 working dental hygienists as of 2022.[13] This increase in job vacancies has resulted in a notable decline in dental practice capacity nationwide, with an estimated 10% reduction as of 2022.[11] Not only is there an already existing dental workforce shortage, but it is also stated that roughly one-third of the dental assistant workforce (33.7%) and dental hygienist workforce (31.4%) anticipate retiring within the next five years or sooner.[9] Allied dental health professionals play crucial roles in delivering oral healthcare as part of the dental team. Inadequate staffing levels limit the capacity to provide oral healthcare, particularly as a substantial part of the workforce is expected to retire.

Dental Hygienists in Interdisciplinary Settings

Dental care can be provided in various settings to meet people's diverse needs. Although historically the predominant delivery system for oral healthcare in the United States has been the private practice model, dental hygienists are increasingly being utilized in areas other than the traditional clinical role.[1,15] Interdisciplinary settings in dental hygiene refer to collaborative environments where professionals from various disciplines work together to address comprehensive oral health and overall well-being. Interdisciplinary settings often include long-term care facilities, public health clinics, hospital-based dentistry, school-based programs, federally qualified health centers (FQHCs), mobile dental clinics, teledentistry and educational institutions.[1]

Long-term care facilities such as nursing homes are a setting outside of traditional clinical practice where dental hygienists can provide oral health care services that help in treating those with complex overall health conditions. Oral health in older individuals and those requiring long-term care can often be neglected and rarely does the standard of care match that of what would be expected in the general public. With much of the population aging, there is significant opportunity for dental hygiene to promote and push for more roles in long-term care facilities.[17] Dental hygienists have also been effectively integrated into various hospital settings in the U.S. and across various countries. They serve as essential members of interprofessional healthcare teams, collaborating closely with dentists and other essential healthcare providers.[3] Dental hygienists have the knowledge and skills to provide screenings for early detection of oral cancer, minimize oral pathogens to prevent ventilator-associated pneumonia and prevent and educate on many chronic illnesses associated with oral disease in a hospital setting.[16] Dental hygienists in hospital settings help bridge the gap between medical and dental care and facilitate people accessing care more easily. Like hospital settings, health access centers such as non-profit community health centers and federally qualified health centers (FQHCs) are community-based healthcare organizations that provide comprehensive medical, dental and behavioral health services to underserved populations. FQHCs have become a very important dental access point for vulnerable populations.[1] School-based dental clinics have also shown to be an extremely valuable public health measure. The CDC reports that "on average, 34 million school hours are lost each year because of unplanned (emergency) dental care".[18] School-based clinics are typically comprehensive dental and medical programs that can dramatically influence the overall health of children receiving

this type of care.[1] A hygienist would be able to provide prophylaxis, fluoride, oral hygiene instruction and dental sealants in this type of setting. Other emerging delivery settings include mobile dentistry and teledentistry. Because so many people live in health professional shortage areas (HPSAs), the ability to bring treatment directly to the patient can help reduce barriers and make significant strides in increasing access to care.

The shift toward integration in dentistry often involves granting dental hygienists more autonomy and the opportunity to deliver treatment collaboratively with dentists. The collaborative practice model is pivotal in expanding access to care, particularly in settings beyond traditional private practices. By enabling dental hygienists to work alongside dentists and independently provide certain treatments, these settings optimize the utilization of their skills and expertise, ultimately enhancing the overall accessibility and availability of dental services.

The United States has explored various workforce models to introduce mid-level dental providers like those established in the medical field. For instance, Nurse Practitioners (NPs) and Physician Assistants (PAs) are highly trained with advanced clinical education and training allowing them the ability to perform many procedures comparable to that of a doctor with some limitations. Collaborative Dental Hygiene Practice, Community Dental Health Coordinators (CDHCs), Dental Health Aide Therapists (DHATs), dental therapists (DTs), and the Advanced Dental Hygiene Practitioner (ADHP) are among many model types proposed and actively being used in the U.S.[20] These dental auxiliary positions require different levels of education, and the services they can provide vary widely based on state legislation. Generally speaking, a dental therapist is a mid-level provider who is able to provide the following services:

"examination, diagnosis and treatment planning; exposing and interpreting radiographs; oral health education; preventive services such as prophylaxis, fluoride therapy, fissure sealants and dietary counseling; preparation of cavities in primary and permanent teeth and restoration with amalgam and composite; preformed stainless steel crowns; pulpotomies; and the extraction of primary teeth".[21] Educational requirements may include certification programs or formal accredited degree programs which often require subsequent advanced training to perform expanded functions.[20] As these progressive workforce changes are more regularly implemented, changes in the provision of oral healthcare will likely move out of the dentist's office and into more frequently visited interdisciplinary settings. Dental hygiene has made these adaptations in the diversity of the workforce to better assist populations in accessing care.

Dental Hygiene Curriculum

Dental hygiene programs offer different degrees from an entry-level associate or baccalaureate degree to degree completion programs and master's degree programs.[1] Both associate and baccalaureate degrees are considered entry-level. An associate degree typically requires an average of 84 credit hours and focuses on essential skills and knowledge needed for entry-level practice in dental hygiene. A baccalaureate degree involves a longer course of study, typically spanning four years with an average of 120 credit hours.[1,4,22] Both degree paths prepare students for licensure as dental hygienists, but a baccalaureate degree may offer a more comprehensive education with additional opportunities for specialization, leadership roles, and advanced or alternative practice.[4] Despite the number of credit hours, all associate and bachelor's degree dental hygiene students are required to meet the same basic educational standards, although degrees they

obtain clearly differ. This discrepancy is primarily due to differences in each program's structure, duration and emphasis on specific coursework.[4, 22] Although 82% of entry-level dental hygiene schools require their students to perform a clinical rotation in a community or public health setting, as of 2015, only 29% of entry-level dental hygiene programs facilitated off-site clinical activities beyond their campus.[23] Specifics on extramural experiences in dental hygiene curriculum are not well documented so these experiences may or may not include components of interdisciplinary care. Educational experiences with interdisciplinary settings often stem from seeking a higher degree such as a bachelor's or master's degree because of the increased credit hour requirements associated with each degree.

The terminal degree in dental hygiene is a master's degree which allows for further opportunities in education, research, administration and more. This degree often includes additional coursework in areas like community health, education, administration and research. The American Dental Education Association (ADEA) and the American Dental Hygienists' Association (ADHA) specifically outline interprofessional collaboration and integrated care as one of the six focus areas for a master's degree in dental hygiene. The goal of this is to integrate dental hygiene into multidisciplinary teams.[24] Without the specialized focus on integrated care that a master's degree offers, it can be difficult for an entry-level dental hygienist to gain the knowledge necessary to assume such roles given the current curriculum standards. Dental therapy has more recently emerged as a similar but separate profession. The field is in the early stages of development but does have similar accreditation standards outlined to that of dental hygiene. There are currently four dental therapy programs in the United States, located in

Alaska, Washington, and two in Minnesota which require at least three academic years of full-time instruction or its equivalent at the post-secondary college-level.[25] Like that of dental hygiene, dental therapy offers degrees ranging from an associate degree to a master's degree.[25] Both a dental therapy degree and a dental hygiene master's degree are much less obtained than an entry-level dental hygiene associate or baccalaureate degree as they are not required to work in traditional clinical settings. Although fewer in number, the growing amount of master's degree and dental therapy programs reflects the increasing value in integrating dental hygiene into the healthcare landscape.

The Commission on Dental Accreditation

Founded in 1975, the Commission on Dental Accreditation (CODA) serves as the specialized accrediting body recognized by the U.S. Department of Education. Its role is to accredit dental and dental-related education programs, ensuring they meet established standards of educational quality. This accreditation guarantees that programs prepare students to enter the profession delivering safe and effective oral healthcare. CODA serves as a foundational authority for establishing educational standards in dental hygiene education, providing essential baselines. However, it can be noted that CODA does not outline and require specific course objectives for individual educational institutions. Regardless of the degree awarded by individual educational institutions, the same CODA standards apply to all entry-level dental hygiene programs. The current educational requirements put forth for dental hygiene programs simply mandate a minimum of two years of full-time academic instruction.[23,26]

When discussing requirements pertaining to interdisciplinary care, CODA lacks explicit guidelines. Only briefly do CODA standards address this with Competency

Standard 2-1 stating “The curriculum should include additional coursework and experiences, as appropriate, to develop competent oral health care providers who can deliver optimal patient care within a variety of practice settings and meet the needs of the evolving healthcare environment”. Section 2-15 also states, “Graduates must be competent in interprofessional communication, collaboration and interaction with other members of the health care team to support comprehensive patient care”.[4] This indicates that individual institutions hold the responsibility to determine the appropriateness of the training provided and ensure competency among their students.

Methods and Materials

Final year dental hygiene students in accredited U.S. dental hygiene programs were the target recipients for this descriptive survey. The sample population for this study included students actively enrolled in a CODA accredited dental hygiene program. Microsoft forms was used to create the survey. Once approved by UNM HRRC (Study ID 24-149), the survey was sent via email to current dental hygiene program directors with the request to disseminate the survey to all currently enrolled final-year students. This recruitment email contained information about the voluntary nature of the survey and included a consent form. Consent was obtained when participants clicked the survey link provided in the recruitment email, which directed them to the survey on the Microsoft Forms website. Microsoft Forms ensured participants remained anonymous, as no personal identification information was requested in any survey questions. Participants had three weeks to complete the survey. Two weeks after the initial email, a reminder email was sent as a reminder for those who had not yet completed the survey. After the three-week period, the survey closed and became unavailable. The confidential data

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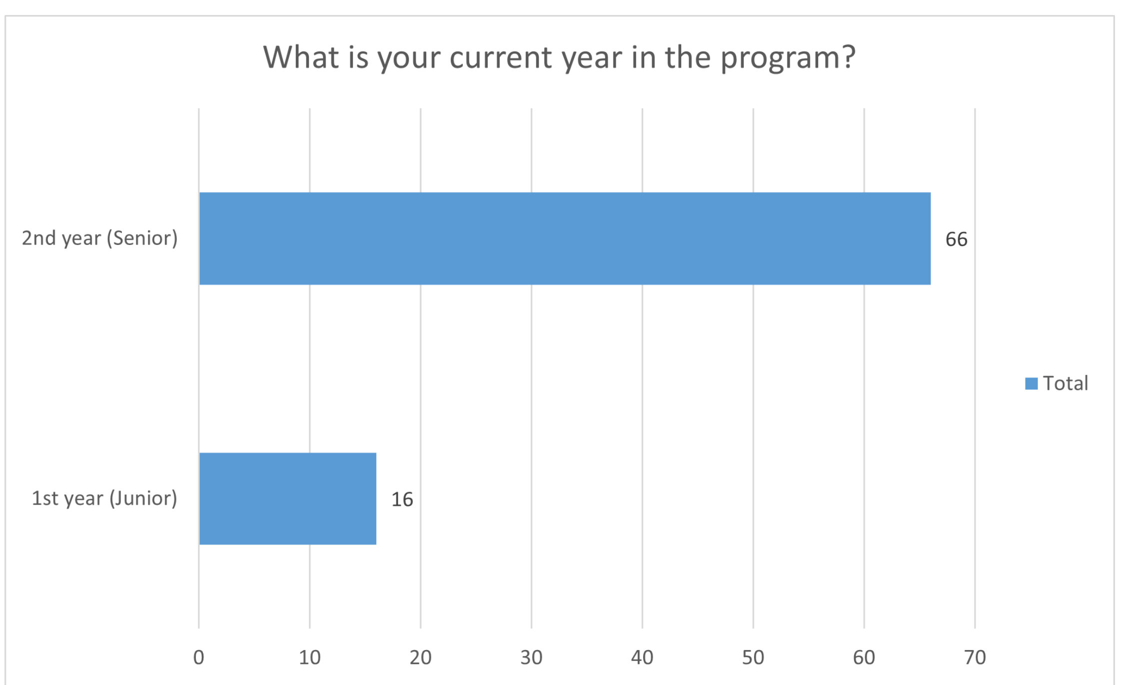

Figure 1. Participants' academic year.

<u>Interdisciplinary Care Experience (Question 4):</u>

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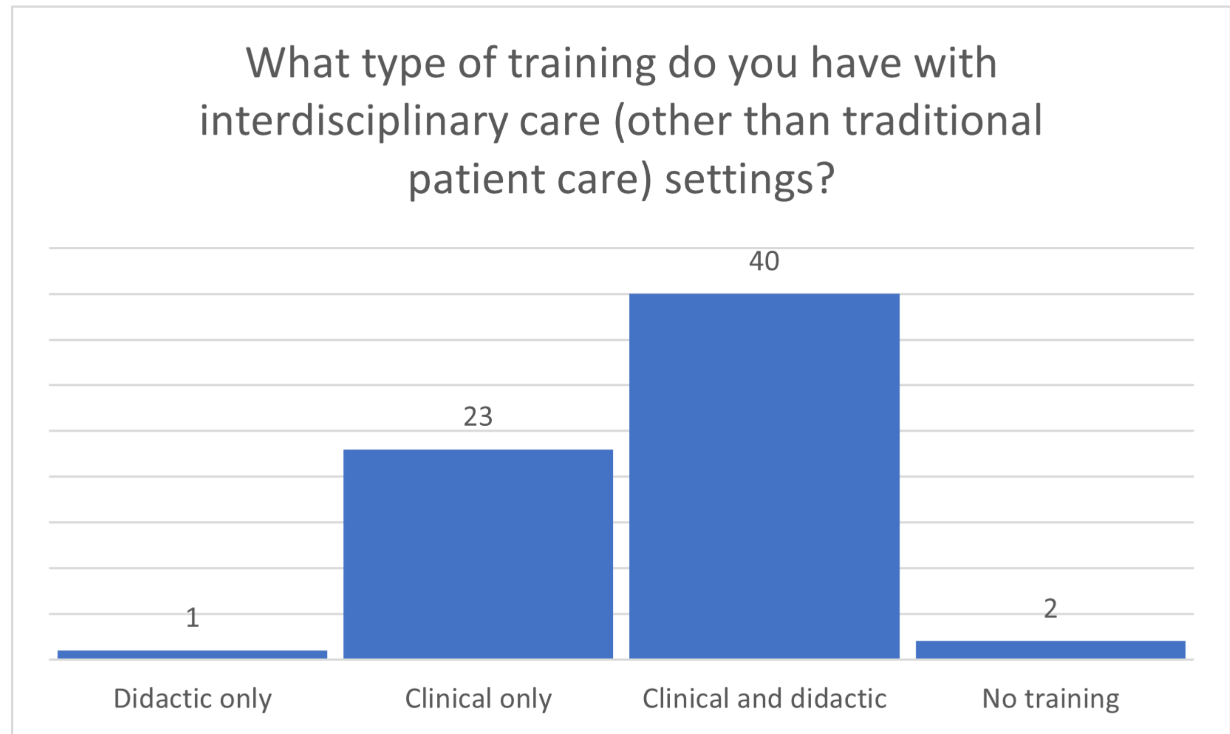


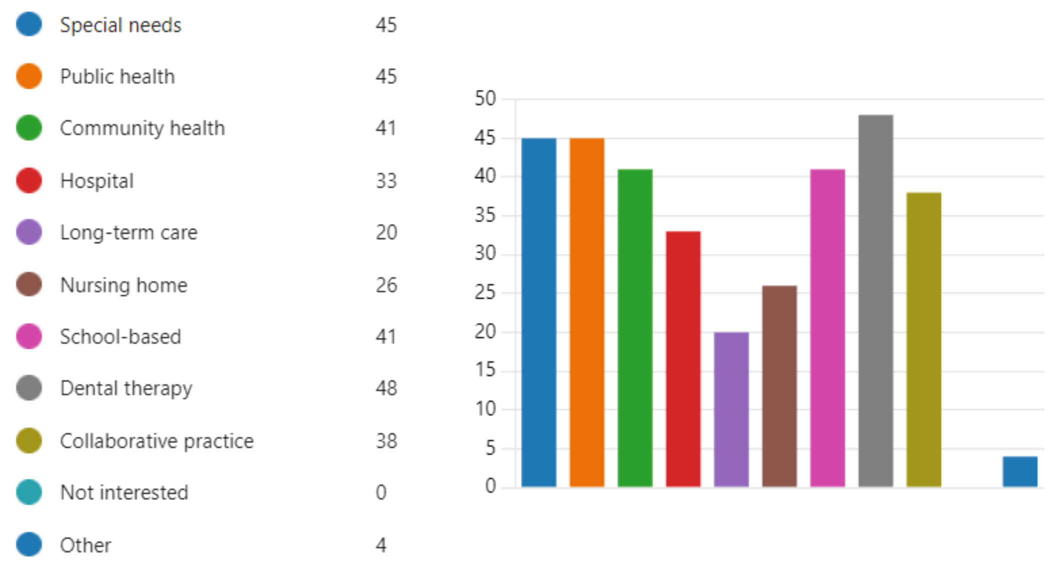
Figure 2. Type of Interdisciplinary Care Training.

<u>Opinions and Preferences (Question 5):</u>

Question 5 gathered data on students' opinions and preferences regarding their educational experiences in interdisciplinary care settings and their future career aspirations. All respondents showed interest in gaining knowledge and experience in various interdisciplinary care settings. These settings included special needs, public health, community health, hospital, long-term care, nursing home, school-based, dental

therapy, and collaborative practice. Respondents could select multiple options. No respondents report a disinterest in interdisciplinary care settings.

Figure 3. Student Interest for Interdisciplinary Care Settings



<u>Knowledge of Interdisciplinary Care Models (Question 6):</u>

Respondents rated their agreement with the statement, "I am knowledgeable about various interdisciplinary care models,", using a Likert scale.

- 31.8% strongly agreed (n=21)
- 37.8% somewhat agreed (n=25)
- 25.8% were neutral (n=17)
- 4.5% somewhat disagreed (n=3)
- No respondents strongly disagreed (n=0)

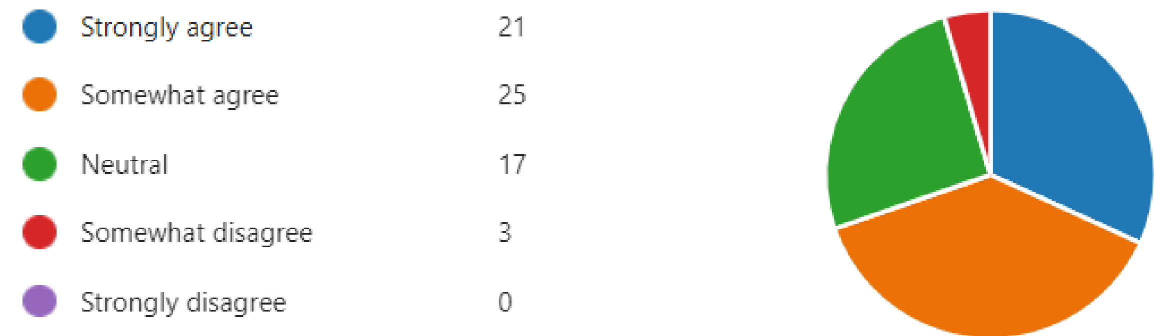


Figure 4. Student Knowledge about Interdisciplinary Care Models

Preferences for Working in Specific Interdisciplinary Care Models (Questions 7-12):

These questions aimed to gauge student preferences for working within specific interdisciplinary care models, using a series of Likert scale questions:

- Question 7: Private practice
- Question 8: Hospital setting
- Question 9: Nursing home setting
- Question 10: School-based setting
- Question 11: Public health
- Question 12: Independent dental hygiene practice settings

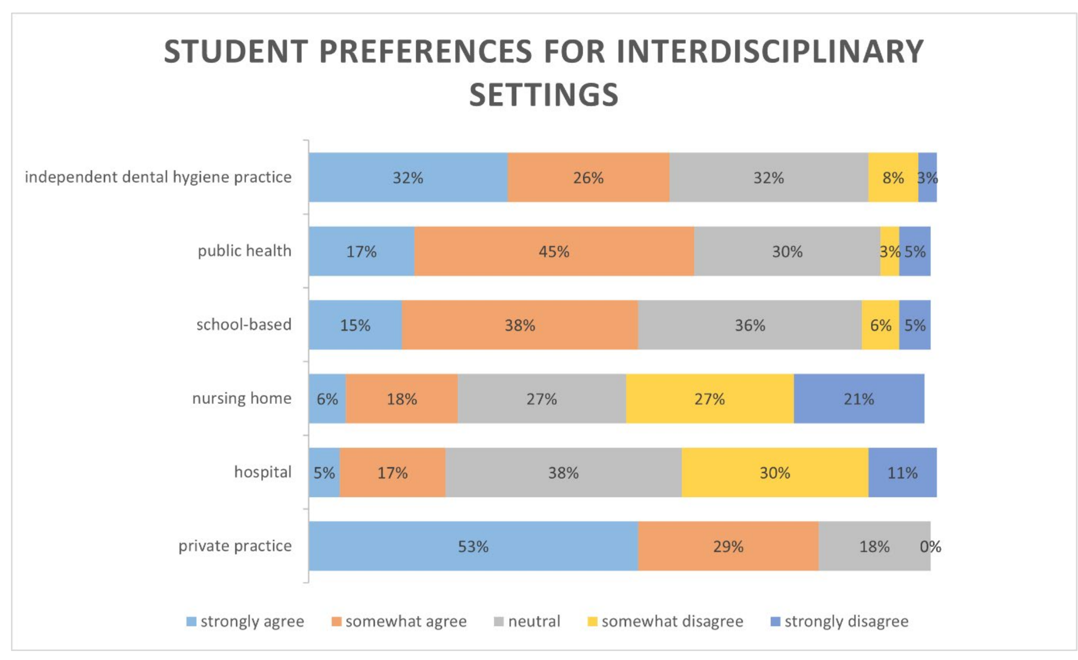


Figure 5. Student Preferences for Interdisciplinary Settings

Adequacy of Current Curriculum (Question 13):

The statement "The dental hygiene curriculum is preparing me to facilitate patient care with other members of the medical and dental team" was assessed.

- 60.6% strongly agreed (n=40)
- 27.3% somewhat agreed (n=18)
- 10.6% were neutral (n=7)
- 1.5% somewhat disagreed (n=1)
- No students strongly disagreed (n=0)

Confidence in Independent Practice (Question 14):

Responses to "I would feel confident in treating patients independent of other dental providers if given the opportunity" were:

- 50% strongly agreed (n=33)

- 32% somewhat agreed (n=21)
- 12% were neutral (n=8)
- 6% somewhat disagreed (n=4)
- No students strongly disagreed (n=0)

Interest in Further Education (Question 15):

Respondents, when asked if they would choose to further their education in interdisciplinary care if given the option:

- 52% strongly agreed (n=34)
- 30% somewhat agreed (n=20)
- 18% were neutral (n=12)
- No responses disagreed (n=0)

Importance of Interdisciplinary Education (Question 16):

Agreement with "Education in interdisciplinary care is an important aspect of the dental hygiene curriculum":

- 59% strongly agreed (n=39)
- 33% somewhat agreed (n=22)
- 8% were neutral (n=5)
- No responses disagreed (n=0)

Curriculum adequacy in Interdisciplinary Training (Question 17):

Responses to "The curriculum offered through my institution is providing me with adequate education and training in interdisciplinary care settings":

- 54.5% strongly agreed (n=36)
- 31.8% somewhat agreed (n=21)

- 12.1% were neutral (n=8)
- 1.5% somewhat disagreed (n=1)
- No respondents strongly disagreed (n=0)

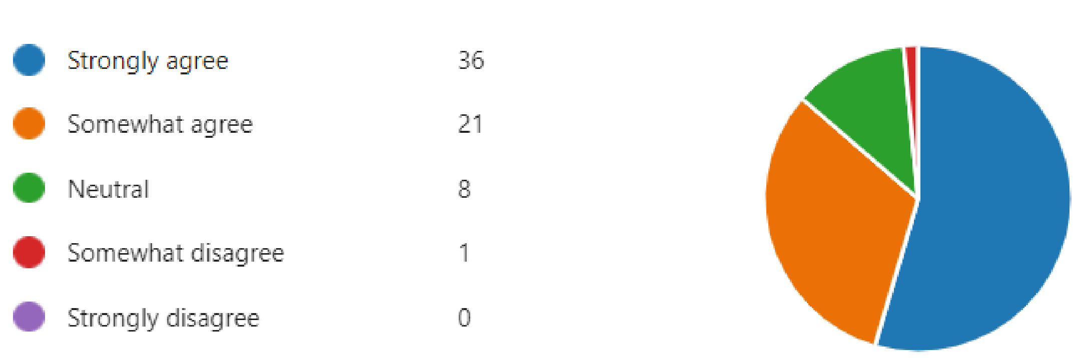


Figure 6. Curriculum Adequacy

Suggestions for Curriculum Improvement (Question 18):

Respondents provided suggestions for improving the dental hygiene curriculum to enhance interdisciplinary care experience.

- A total of 20 responses were received for this open-field question.
- Of these, 15% emphasized the need for more practical experience. Specific suggestions included:
  - "Being able to go outside of just our clinic to hospital/long term care settings to experience it."

- “I would love to have more hands-on experience with the community through volunteering or getting experience in a program.”
- “Actually working with patients outside the normal clinical setting to get hands on experience in different aspects of dental hygiene.”

- Additional recommendations included:
    - “Asking preferences when determining what clinical rotations are assigned.”
    - One respondent commented positively: “Our program does a great job”.

This question allowed for a wide range of input on enhancing interdisciplinary care in dental hygiene curriculum.

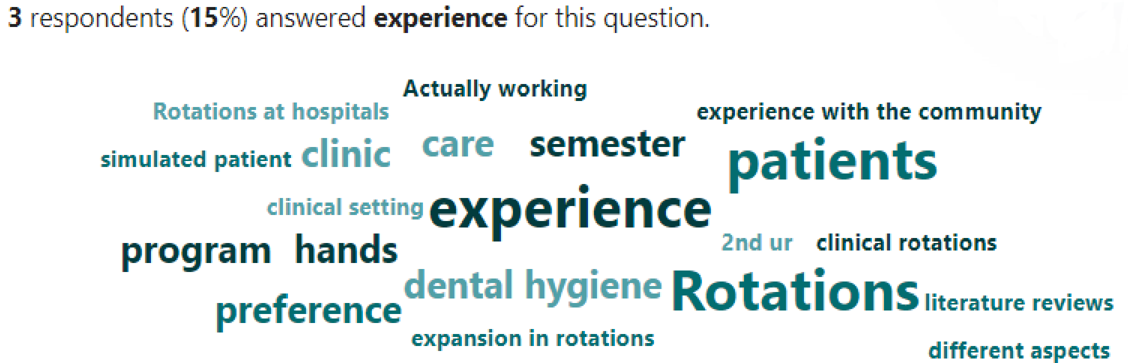


Figure 7. Curriculum Improvement Word Cloud

Discussion

The data collected in this survey suggests that interdisciplinary care is a topic covered in the current dental hygiene curriculum. Despite most respondents claiming this topic is covered in their education, a small percentage reports no introduction to

interdisciplinary care. With the small sample size, it is hard to determine if this information gathered can be generalized to all dental hygiene programs in the U.S. As of 2015, 82% of entry-level dental hygiene schools require their students to perform a clinical rotation in a community or public health setting, while only 29% of entry-level dental hygiene programs facilitated off-site clinical activities beyond their campus.[23] Without CODA standards being more specific on interdisciplinary care, the type of experiences will continue to vary widely.

This small sample size shows positive results with interdisciplinary care, but recent studies seem to indicate that inadequacies still exist. Surveyed dental hygienists working in long-term care facilities provided insight on their experiences adapting to providing care in integrated settings. Most expressed a lack of training available from their educational institution for a clinical role in interdisciplinary settings.[27] When asked about how to better facilitate treating patients in these settings, the respondents felt gaining direct experience and exposure was the best way to introduce interdisciplinary settings. Didactic training is simply not enough. Szabo et al reports "that 'for some people it is out of their comfort zone' and many felt it was because students are never exposed to what they will see, hear, and smell in alternative settings".[27] In 2020, dental hygiene program directors in the U.S. were surveyed on their opinions about current dental hygiene curriculum standards. Fifty-four percent of respondents said students should be educated in integrated care such as collaborative practice or dental therapy. Additionally, more than 93% of respondents believe that the current curriculum lacks sufficient time to prepare students for employment in diverse workforce settings. They also indicated a perceived insufficiency in the time necessary to educate on a variety of

settings such as long-term care facilities, hospitals, school settings, and more. Most comments on this topic indicated the need for more time, but again, time was discussed as the biggest barrier to implementing changes in the existing curriculum.[26] The program directors' opinions show a perceived lack of preparation for interdisciplinary settings within the existing dental hygiene curriculum. Without students receiving specific exposure to interdisciplinary care through accreditation standards within the current dental hygiene curriculum, it is unclear whether they would feel prepared to take on these roles following the completion of their education.

Conclusion

The majority of students attending associate and bachelor's degree programs were consistent with answering positively to questions about interdisciplinary care education in the current curriculum. Only a very small majority were neutral or slightly disagreeable about curriculum adequacy and feeling prepared to work in interdisciplinary settings. Current students show interest in a wide variety of interdisciplinary settings other than private practice. Many students expressed the need for hands-on experience to better prepare them to work in interdisciplinary settings. Overall, the findings suggest that while the current curriculum provides a foundation in interdisciplinary care, there is room for improvement to meet student and professional needs. The insights obtained in this survey can ultimately help inform educators and curriculum developers about the needs and preferences of students. This information can also help improve educational programs and better prepare dental hygienists for diverse work environments. At a minimum, CODA accreditation should more clearly outline interdisciplinary care in its standards. However, given the limited time available in associate and bachelor's degree programs,

incorporating this additional education may not be feasible. This highlights the need to further education focused on interdisciplinary care such as a master’s degree or post-graduate specialty track for dental hygienists.

Appendices

Appendix A: HRPO Approval Letter

Human Research Protections Program

April 3, 2024
Angela Cook
adcook@salud.unm.edu

Dear Angela Cook:

On 4/3/2024, the HRRC reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Assessing Dental Hygiene Students' Perspectives: A Survey of Curriculum Adequacy for Interdisciplinary Settings in U.S. Dental Hygiene Programs
Investigator:	Angela Cook
Study ID:	24-149
Submission ID:	24-149
IND, IDE, or HDE:	None
Submission Summary:	Initial Study
Documents Approved:	• A Survey of Interdisciplinary Care in Dental Hygiene Curriculum.pdf • HRP-583 (2).pdf • HRPO Consent Form (3).pdf, Category: Consent Form; • Letter of Support • Recruitment Email (3).pdf, Category: Recruitment Materials; • Reminder Email (3).pdf
Review Category:	EXEMPTION: Categories (2)(i) Tests, surveys, interviews, or observation (non-identifiable)
Determinations/Waivers:	Employees. Provisions for Consent are adequate. HIPAA Authorization Addendum Not Applicable.
Submission Approval Date:	4/3/2024
Approval End Date:	None
Effective Date:	4/3/2024

The HRRC approved the study from 4/3/2024 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 4/3/2024 is the date the HRRC approved your modifications and, in all cases, represents the date study activities may begin.

505.272.1129 | The University of New Mexico Health Sciences Office of Research Human Research Protections Program
1 University of New Mexico | MSC08 4560 | Albuquerque, NM 87131
hsc.unm.edu/research/hrpo

Human Research Protections Program

Because it has been granted exemption, this research is not subject to continuing review.

Please use the consent documents that were approved by the HRRC. The approved consents are available for your retrieval in the “Documents” tab of the parent study.

If the study meets the definition of an NIH Clinical Trial, the study must be registered in the ClinicalTrials.gov database. Additionally, the approved consent document(s) must be uploaded to the ClinicalTrials.gov database.

This determination applies only to the activities described in this submission and does not apply should you make any changes to these documents. If changes are being considered these must be submitted for review in a study modification to the HRRC for a determination prior to implementation. If there are questions about whether HRRC review is needed, contact the HRPO before implementing changes without approval. A change in the research may disqualify this research from the current review category. You may submit a modification by navigating to the active study and clicking the “Create Modification/CR” button.

If this study is approved for a waiver of HIPAA authorization, the IRB had determined the use or disclosure of protected health information in this study involves no more than a minimal risk to the privacy of individuals because the study contains a plan to protect the identifiers from improper use and disclosure, a process to destroy the identifiers at the earliest opportunity consistent with conduct of the research, and there are written assurances that the protected health information will not be reused or disclosed to any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of protected health information would be permitted. The IRB recognizes that the research could not practicably be conducted without the waiver, and could not practicably be conducted without access to and use of the protected health information.

If your submission indicates you will translate materials post-approval of English materials, you may not recruit or enroll participants in another language, until all translated materials are reviewed and approved.

In conducting this study, you are required to follow the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library.

Sincerely,

Thomas F. Byrd, MD

505.272.1129 | The University of New Mexico Health Sciences Office of Research Human Research Protections Program
1 University of New Mexico | MSC08 4560 | Albuquerque, NM 87131
hsc.unm.edu/research/hrpo

Appendix B: Consent Form

The University of New Mexico Health Sciences Center

Consent and Authorization to Participate in a Research Study

Dear Prospective Participant,

Angela Cook, from the University of New Mexico Division of Dental Hygiene, is conducting a research study about curriculum adequacy for workforce models in U.S. Dental Hygiene Programs. The name of the research is called *Assessing Dental Hygiene Students' Perspectives: A Survey of Curriculum Adequacy for Interdisciplinary Settings in U.S. Dental Hygiene Programs*
You are receiving this email because you are a final year dental hygiene student currently enrolled in a U.S. CODA accredited dental hygiene program.

To better help meet the population's oral health needs, dental hygienists must integrate into interdisciplinary settings other than the traditional clinical role. Although you may not get personal benefit from taking part in this research study, your responses may help us advocate for changes in the current dental hygiene curriculum. This study evaluates dental hygiene student experiences and perspectives on interdisciplinary settings given the current educational curriculum standards. This study was specifically designed to determine if dental hygiene students are adequately prepared to work in interdisciplinary settings given the current dental hygiene curriculum standards.

The survey will involve answering a series of 18 questions. The survey should take no longer than 10 minutes to complete. There are no names or identifying information associated with your responses. There are no known risks in this research.

We hope to receive completed questionnaires from most dental hygiene programs, so your answers are important to us. Your involvement in the research is completely voluntary. Of course, you have a choice about whether to complete the survey, but if you participate, you are free to discontinue at any time.

Please be aware, while we make every effort to safeguard your data once received on our servers, given the nature of online surveys, as with anything involving the Internet, we can never guarantee the confidentiality of the data while being transmitted to us.

If you have questions about the study, please feel free to ask. Contact information is given below. If you have questions regarding your legal rights as a research subject, you may call the UNM Human Research Protections Office at (505) 272-1129.

Thank you in advance for your assistance with this important project. To ensure your responses will be included, please complete the survey link provided within three weeks. By clicking on the link below, you will agree to participate in the above-described research study.

HRRC ID# 24-149

Appendix C: Recruitment Email

Recruitment Email

Subject Line: Call for Research Participation

Dear Prospective Participant,

Angela Cook, in collaboration with her team, is conducting a research study about the current dental hygiene curriculum within U.S. Dental Hygiene Programs at the University of New Mexico. Students will be asked about their opinions and experiences in interdisciplinary care during their education.

You are receiving this email because you are a program director in a dental hygiene program. We ask that you forward this to all currently enrolled final year (senior) dental hygiene students in your program.

This research aims to evaluate dental hygiene students' experiences and perspectives with interdisciplinary care given the current educational curriculum. This study was specifically designed to determine if dental hygiene students are adequately prepared to work in interdisciplinary settings given the current dental hygiene curriculum standards.

Participation in this study is completely voluntary. There are no known risks involved with this study. By clicking the survey link, you will be providing consent to participate in the study. The survey consists of 18 questions and should take no longer than 10 minutes to complete. The survey link will remain active for the next three weeks. The Principal Investigator of this study has chosen a setting that does not allow names and emails to be gathered, so the survey results remain anonymous.

To participate in the study, please click on the link below to begin the survey.

https://forms.office.com/Pages/ResponsePage.aspx?id=GOzcUUxfIE6MVfi6ThPv9OXgIKHV8bhEl9dSIkkfA1VUNFJGQVNSWEc1WEo5TzYzTU1DNkFLWjhFRy4u

If you have questions prior to participating, please contact the HSC Human Research Protections Office at (505) 272-1129. You may also reach the Principal Investigator at (505) 272-2111 or by email at adcook@salud.unm.edu

Thank you for your time,

Angela Cook

Division of Dental Hygiene

Department of Dental Medicine

University of New Mexico

(505) 272-2111

Team Member:

Brittany Tripp, RDH, MS Candidate

Appendix D: Reminder Email

Reminder Email

Subject Line: Call for Research Participation

Dear Prospective Participant,

Angela Cook, in collaboration with her team, is conducting a research study about the current dental hygiene curriculum within U.S. Dental Hygiene Programs at the University of New Mexico. Students will be asked about their opinions and experiences in interdisciplinary settings during their education.

You are receiving this email because you are a program director in a dental hygiene program. We ask that you forward this to all currently enrolled final year dental hygiene students in your program.

This research aims to evaluate dental hygiene students' experiences and perspectives with interdisciplinary care given the current educational curriculum. This study was specifically designed to determine if dental hygiene students are adequately prepared to work in interdisciplinary settings given the current dental hygiene curriculum standards. This study will be open for one more week.

This email is to remind you to participate in this study. There are no known risks involved with this study and your participation is entirely optional. By clicking the survey link, you will be providing consent to participate in the study. The survey consists of 18 questions and should take no longer than 10 minutes to complete. The Principal Investigator of this study has chosen a setting that does not allow names and emails to be gathered, so the survey results remain anonymous.

To participate in the study, please click on the link to begin the survey.

https://forms.office.com/Pages/ResponsePage.aspx?id=GOzcUUxfIE6MVfi6ThPv9OXgIKHV8bhEl9dSIkkfA1VUNFJGQVNSWEc1WEo5TzYzTU1DNkFLWjhFRy4u

If you have questions prior to participating, please contact the HSC Human Research Protections Office at (505) 272-1129. You may also reach the Principal Investigator at (505) 272-2111 or by email at adcook@salud.unm.edu

Thank you for your time,

Angela Cook

Division of Dental Hygiene

Department of Dental Medicine

University of New Mexico

(505) 272-2111

Team Member:

Brittany Tripp, RDH, MS Candidate

HRRC ID# 24-149

Appendix E: Survey

A Survey of Interdisciplinary Care in Dental Hygiene Curriculum

Interdisciplinary care (sometimes referred to interprofessional care) in dental hygiene refers to a collaborative approach involving professionals from different healthcare disciplines working together to address the oral health needs of patients.

* Required

1. What is your current year in the program? *

- ◯ Preclinical (Sophomore)
- ◯ 1st year (Junior)
- ◯ 2nd year (Senior)

2. Which of the following best described the program type you currently attend? *

- ◯ Associate's Degree in Dental Hygiene
- ◯ Bachelor's Degree in Dental Hygiene

3. What is the size of your program? *

- ◯ Small (fewer than 15)
- ◯ Moderate (15-30)
- ◯ Large (more than 30)

4. What type of training do you have with interdisciplinary care (other than traditional patient care) settings? Click all that apply. *

- ☐ Didactic
- ☐ Clinical
- ☐ I do not have training in interdisciplinary care settings

5. I would like the have knowledge and experience with the following interdisciplinary care settings during my dental hygiene education. Select all that apply. *

- [ ] Special needs
- [ ] Public health
- [ ] Community health
- [ ] Hospital
- [ ] Long-term care
- [ ] Nursing home
- [ ] School-based
- [ ] Dental therapy
- [ ] Collaborative practice
- [ ] Not interested
- [ ] Other

6. I am knowledgeable about various interdisiplinary care models *

- ○ Strongly agree
- ○ Somewhat agree
- ○ Neutral
- ○ Somewhat disagree
- ○ Strongly disagree

7. I would prefer to work in a private practice setting *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

8. I would prefer to treat patients in a hospital setting *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

9. I would prefer to patients in a nursing home setting *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

10. I would prefer to treat patients in a school-based setting *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

11. I would prefer to treat patient in a public health setting *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

12. I would prefer to work in an independent dental hygiene practice *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

13. The dental hygiene curriculum is preparing me to facilitate patient care with other members of the medical and dental team *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

14. I would feel confident in treating patients independent of other dental providers if given the opportunity *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

15. I would choose to further my education in interdisciplinary care if given the option *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

16. Education in interdisciplinary care is an important aspect of the dental hygiene curriculum *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

17. The curriculum offered through my institution is providing me with adequate education and training in interdisciplinary care settings *

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree

18. Are there any suggestions you have for changes to dental hygiene curriculum that could enhance your experience with interdisciplinary care?

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

Microsoft Forms

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