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Building a Foundation for Interprofessional-Education (IPE) Between Dietetic Students and Dental Hygiene Students at East Tennessee State University (ETSU)

Monique Richard
East Tennessee State University

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by

Monique Richard

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Dr. Michelle Lee PhD, RD, Chair

Dr. Charles Faust IV RDH, EdD, Committee Member

Mrs. Elizabeth Lowe MS, RD, LDN, Committee Member

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ABSTRACT

Building a Foundation for Interprofessional-Education (IPE) Between Dietetic Students and Dental Hygiene Students at East Tennessee State University (ETSU)

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Nutrition education is an integral part of dental education as well as a variety of other healthcare professions[1], but interprofessional education (IPE) between the fields of dietetics and dental hygiene is limited. The purpose of this pilot study was to define areas of opportunity to establish a foundation for the implementation of complimentary curriculum between the dietetics and dental hygiene programs at ETSU. A 76-question survey was developed and administered to dietetic interns (n=26), dental hygiene students (n=49), dietetic faculty (n=23), and dental hygiene faculty (n=19) at ETSU and Baylor College of Dentistry at Texas A&M Health Science Center. Data analysis reveals a knowledge proficiency deficit in dental hygiene students related to nutrition and oral health as well as significant findings in perceived roles of the 'other' profession. The potential for interdisciplinary education and training between dietetic and dental hygiene students at ETSU is promising, potentially leading to improved patient care.

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CHAPTER 1

INTRODUCTION

Nutrition education is critical to a variety of healthcare professions and is an integral part of dental education.[1] Literature suggests that oral health training for dietitians and nutrition training for dentists is limited.[2] The oral cavity is the entry point to the gastrointestinal tract[3], and dental hygienists (DH) have the unique role of identifying many nutrition related concerns or referring patients to a registered dietitian (RD). The relationship between nutrition and oral health is synergistic and multidirectional.[3] Therefore, it is important for future RDs and dental hygienists to be aware of the interdependent relationship between nutrition and oral health, defining their role in each while enhancing interprofessional collaboration.

The Academy of Nutrition and Dietetics position paper states that partnerships need to be established, expanded, and strengthened among dietetics and oral health care professionals (OHCP) as well as other health care professionals to encourage integrated and comprehensive education and practice across disciplines.[3] Promotion of oral health, disease prevention, and treatment intervention are recommended through the collaborative efforts of dietetics and oral health care professionals.[3] Interdisciplinary education has the potential to promote collaboration and enhance critical thinking skills, increase awareness, and educate students on dual roles and scope of practice in each profession.[1]

The purpose of this study was to define areas of opportunity to establish a foundation for the implementation of complimentary curricula, or interprofessional education (IPE), in the dietetics and dental hygiene programs at East Tennessee State University (ETSU). Furthermore, the foundation could be used to foster the development

of the students' skills in each discipline, enhance interdisciplinary collaboration, and ultimately improve the quality of life for their future patients.

In order to identify areas of opportunity one must first understand the perceived roles, knowledge, attitudes on interdisciplinary education, and perceived value of the "other" profession from dietetic and dental hygiene students and faculty. Data on these topics were collected and analyzed from ETSU, which currently does not have an integrated or collaborative program, and compared with Baylor College of Dentistry at Texas A&M Health Science Center dietetic and dental hygiene students and faculty survey data (one of several integrated programs linking dietetic and dental education). These findings may have the potential to be the foundation for ETSU to implement interprofessional curricula between the 2 programs as related to nutrition and oral health.

Nutrition education in the medical and dental settings has focused on disease management and treatment related to the current state of health.[1] Dietetic curriculum heavily emphasizes the RDs role in medical nutrition therapy (MNT) but also focuses on prevention, promotion, and overall care related to nutrition, exercise, and health. The RD has been trained in providing MNT in the treatment of eating disorders, diabetes, cardiovascular diseases, allergies, and a wide variety of other disorders and disease. On the contrary, a study found only 50% of nutritionists surveyed on dental nutrition knowledge understood dental caries are caused by bacterial infection and 66% incorrectly linked severity of dental caries to the sugar concentration in food.[4] Heimburger and colleagues state that going forward, health care should be comprehensive and focus on health promotion and prevention across the health care spectrum.[5, 6, 7]

Clarification of Terminology

The focus of this research is not to define the terms used for collaborative learning but rather is about enhancing professional camaraderie by exploring current perceptions

and roles of future professionals at one university compared to another currently implementing interprofessional-education between dietetics and dental hygiene. However, it is necessary to clarify the stated terms, as outlined in Table 1, in order to understand the purpose and intent of the study.

Table 1. Terminology Definitions

Term	Definition
Interprofessional-education (IPE)	"occasions when two or more professions learn from and about each other to improve collaboration and quality of care."[8, 9, 10] "the process by which a group of students (or workers) from the health related occupations with different educational backgrounds learn together during certain periods of their education, with interaction as an important goal, to collaborate in providing promotive, preventive, rehabilitative and other health related services."[8, 11]
'collaborative patient-centered practice'	"…designed to promote the active participation in each discipline in patient care. It enhances patient and family centered goals and values, provides mechanisms for continuous communication among caregivers, and optimizes staff participation in clinical decision making within and across disciplines fostering respect for disciplinary contributions of all professionals''[11, 12]

Furthermore, it is important to note that in the literature review "interprofessional" and "multiprofessional" are often used synonymously with IPE especially when paired or in context with words such as 'training', 'shared learning', and, in this study specifically, interdisciplinary education and interdisciplinary experiences.[13] The terms interprofessional "curriculum" and "curricula" are used in this paper in order to bring a more specific and narrow context compared to the general term of "education". It is the intent that this research will build a foundation for a specific curriculum to be implemented at ETSU between dietetic interns and dental hygiene students. Clinical rotations, shadowing, combined classroom education, and collaborative projects would be examples included in the curricula.

CHAPTER 2

LITERATURE REVIEW

Current Research: Interprofessional-education (IPE)

Professionals from other disciplines coming together and collaboratively learning together is not a new concept, with literature dating back to the 1950s.[13] Comprehensive literature reviews investigating the learning outcomes of IPE have been conducted in order to support evidence that IPE and interprofessional learning are beneficial, but implementation and outcome validation appear to be more difficult.[8] Learning outcomes common to IPE include enhanced understanding of roles and responsibilities of other health and social care professionals, improved knowledge of the nature of multidisciplinary teamwork, and development of teamwork skills.[8] Among 9 learning outcome aims for undergraduate students researched, several are aligned with the purpose of this study including:

- Respect, understand, and support the roles of other professionals
- Demonstrate a set of knowledge, skills, competencies, and attitudes that are common to all professions and that underpin the delivery of patient/client focused services
- Learn from others in the interprofessional team
- Collaborate with other professionals in practice
- Understand stereotyping and professional prejudices and the impact of these on interprofessional working
- Practice in a patient-centered manner

Benefits of IPE

Learning outcomes and themes identified by Thistlewaite's literature review and synthesis identified positive aspects that may result with the implementation of IPE. Table 2 lists the themes and subthemes resulting from IPE.

Table 2. Themes and Subthemes of Synthesized Outcomes[8]

Themes	Subthemes
Teamwork	• Knowledge of, skills for, and positive attitudes to collaborate with other health professionals • Improve collaboration with other health professionals in the workplace
Roles/responsibilities	• Knowledge and understanding of the different roles, responsibilities, and expertise of health professionals • Knowledge and development of one's own professional role • Knowledge of the health care system and organization of health care within it
Communication	• Communicate effectively with other health professional students, with other professionals • Negotiation and conflict resolution
Learning/reflection	• Identification of learning needs in relation to future development in a team • Self-questioning of personal prejudice and stereotyped views
The patient	• Working together and cooperatively in the best interests of the patient • Recognition of patient's needs
Ethics/attitudes	• Acknowledge views and ideas of other professionals. • Respect

IPE can help students recognize overlapping professional functions as well as activities and roles that are applicable to both professions.[13] IPE also has the potential to solidify the students' own professional identity and reduce stereotypes.[13] The

development of interprofessional teamworking skills was noted in preliminary evaluations of IPE courses as well as the attainment of knowledge and skills related to complex conditions requiring multiprofessional intervention.[13]

Although research related to attitudes and perception of nutrition education's role in areas of dentistry is sparse, other health care professionals have been researched. Primary care physicians do tend to hold positive views of the importance of nutrition but self-report a deficit of knowledge and confidence to disseminate it.[7, 14] It is important to note that this study did not include questions about the value or perception of other professionals such as registered dietitians or attitude about working as an interdisciplinary team, but more about being proficient in nutrition education for their patients.

The American Medical Student Association created a National Curriculum Project in order to communicate about nutrition topics essential to implement in the physicians' curriculum. Among other professionals the board consisted of educators, dietitians, physicians, and researchers. Referral of patients as well as addressing cultural issues was discussed and in a general sense supported the aspect that nutrition is an all-encompassing aspect of health and life. The most descriptive statement promoting this idea is: "Nutritional literacy means more than knowing technical aspects…teaching of nutrition should include examination of the world which generates nutrition problems."[7]

Challenges and Barriers of IPE

Nutrition and oral health are critical components of systemic health and have been recognized for the association related to health. However, nutrition education over the last 25 years has not increased to match expected proficiency for medical and dental students.[15] Overwhelming evidence supporting the importance of the interdependent relationship between nutrition education and oral health is not lacking. There are several

barriers to implementing and integrating said programs[7] including lack of resources, lack of an RD on faculty, faculty involvement, undeveloped core curricula, guidelines, and financial limitations.[1]

Diverse attitudes of faculty as well as lack of respect or knowledge about each other have been identified as major barriers to IPE learning and teaching.[16] Literature suggests evaluating the attitudinal constructs prior to implementation of IPE with continued monitoring. This may be helpful to identify specific barriers related to attitude allowing for change and faculty development in this area.[16]

The readiness and attitudes of healthcare students to learn together and from each other also needs to be assessed and may vary from one professional program to another.[17] A study using a longitudinal questionnaire survey found that if students were introduced to IPE at the start of their healthcare program and had positive attitudes they gained the most from the curriculum. Those who had negative attitudes found IPE to be the least rewarding.[17] In time, attitudes, stereotypes, and perceptions change with experience and context. IPE is considered to be an important tool in facilitating and promoting positive attitudes, professional identification, and behavior.[17]

Financial limitations have been repeatedly identified as a barrier to implementing many of these IPE programs.[1] Success has been identified in the literature describing IPE models in the United States (U.S.) since the 1940s, but it is noted that when the funding ends, most often so does the program.[18]

Health professionals are often trained in isolation and an unspoken rivalry takes place interprofessionally.[18] Most faculties are not adequately trained and prepared to foster interdisciplinary collaboration and joint problem solving.[18] These limitations can harbor a “silo approach” to learning and therefore make curriculum modification slow and difficult.[18]

Curriculum changes are often a critical barrier of IPE implementation. However, highlighting topics that are integral to dentistry and cross disciplinary, especially related to dietetics, may include needs for the aging population, pediatrics, special needs, craniofacial defects, and identification of risk factors for oral and systemic disease.[18] As values are promoted in a formal didactic setting, a clinical setting such as a community center or volunteer clinic can address practical application within complex health issues, reflecting the benefit of interprofessional education in patient care to students.[19]

Opportunity for Interprofessional Collaboration

The health report, Health Professions Education: A Bridge to Quality, released after the Health Professions Summit at the Institute of Medicine in 2002 revealed that physicians, pharmacists, nurses, and other health professionals were inadequately prepared to provide the highest quality of care for the patient. They concluded that the 5 core competencies needed to achieve this in the 21st century included: 1) provide patient-centered care; 2) work in interdisciplinary teams; 3) practice evidence-based medicine; 4) focus on quality improvement; and 5) utilize information technology. Dentistry was neither present nor included in the summit.[18] Literature suggests that dental school leaders not only do not get involved on a national level but neglect involvement within their own academic institutions.[18] Many institutions have an existing interprofessional initiative, and it is recommended dietetics and dental professionals be proactive and develop campus-wide interprofessional activities to promote student and faculty involvement.

A 2008 Cochrane review on IPE in several health professions concluded that patient satisfaction and collaborative team behavior resulted as positive outcomes of IPE implementation. IPE status in U.S. academic health centers was observed with several institutions reporting development of IPE programs, but dentistry was not included citing

various reasons such as lack of time, resources, and interest.[18] Concern for the nation's oral health care is escalating and literature suggests it is time to realize it is not a separate and less important issue than general health.[18] A collaborative network among dental professionals and other professionals would be beneficial to patients; it begins with the preparation of dental students to work effectively with other health care professionals.[18] Classroom and clinical environments where collaborative behaviors and IPE can be modeled and practiced by students will assist in appropriate patient care and interprofessional teamwork.[18]

Client-care education and research in the clinical, community, and public health settings by interprofessional teams can strengthen the bridge between the oral cavity connection to diet and nutrition.[3] Dietetics and oral health care professionals such as dental hygienists can provide baseline screening and intervention within their scope of practice, but can also partner with each other to provide the most comprehensive and appropriate care in both areas of nutrition and oral health.[3]

Overlapping Assessment and Screening Tools

Patient counseling techniques and general nutrition information may be found in the dental hygiene curricula; general oral health information may be found in the dietetic curricula, but encouragement of using a dental hygienist is generally not emphasized.[1, 3, 20] A recent study revealed that general dental practitioners lacked consistency and quality of delivering nutrition and dietary advice.[21] The type of diet interventions and counseling in dental practice are quite different from the services provided by a registered dietitian, but should be complementary.[22] A diet risk assessment is routinely administered in the dental clinical environment to screen for nutrition risk related to oral health and overall general health. This is not to be confused with a thorough nutritional assessment provided

by the RD, which provides physiological, anthropometric, and biochemical analysis to determine nutritional risk.[22]

Registered dietitians ask questions related to oral health, endentulism, and missing teeth in order to assess how nutrient intake is affected.[23] Often nutrition screening tools used by RDs and other professionals in health care settings provide little oral health information.[24] The fitting of dentures and ability to masticate food allow for the overlap opportunity for nutrition and dental hygiene education.[25]

Dental professionals and RDs can advance initiatives promoting the roles of oral health and nutrition relating to the prevention and promotion of overall systemic health.[3] Combining courses in screening, assessment, and counseling techniques could be beneficial to defining and expanding complementary roles of dietetics and dental hygiene. Juxtaposing the dietetic and dental hygiene student tracts may enhance the perceptions and roles of each other and illuminate the capacity of each profession to its patient's health. It could also potentially build a foundation among nutrition and oral health professionals, expanding the opportunity to improve the quality of life for patients.

Current Accreditation Standards

The Commission on Dental Accreditation as well as the Accreditation Council for Education in Nutrition and Dietetics (ACEND, formerly the Commission on Accreditation for Dietetics Education CADE) frame curriculum requirements for dental programs and dietetic programs, respectively.[26] However, the Academy of Nutrition and Dietetics and the American Dental Association do share the commonality of promoting and improving the health and quality of life for all individuals.[27]

Dietetics

The Commission on Dietetic Registration (CDR), the credentialing agency for the Academy, defines the Registered Dietitian (RD) as an individual who has met current

minimum academic requirements with successful completion of both specified didactic education and supervised-practice experiences through programs accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics and who has successfully completed the Registration Examination for Dietitians.[28] One specific competency stated in the *Standards for Nutrition and Dietetic Internship Programs* does support collaborative professional relationships defined as the ability to "Establish collaborative relationships with other professionals and support personnel to deliver effective nutrition services."[20] However, according to ACEND, neither oral health screening nor nutrition focused physical examination (NFPE) are cited as specific competencies in dental education as a standard for entry-level practice.[3] Lack of education and training on oral health screening as part of the NFPE has been reported by RDs in the U.S.[3]

The Academy of Nutrition and Dietetics encourages the integration of nutrition and oral health in the didactic program and supervised practice experience.[3] By understanding the perceived roles and awareness in nutrition and oral health among students and faculty in each discipline, an opportunity for implementing future integrated curriculum or program collaboration may be beneficial to each of the program's future professionals.

Dental Hygiene

Recognized by the United States Department of Education, The Commission on Dental Accreditation is the accrediting agency charged with ensuring dental programs will provide basic preparation for licensure or certification in dentistry and related disciplines.[29] Listed specifically in the curriculum content are subject areas students must be competent in including: tooth morphology, head, neck, and oral anatomy, oral embryology and histology, oral pathology along with others, and the intent stated is that

> *"These subjects provide the student with knowledge of oral health and disease as a basis for assuming responsibility for assessing, planning and implementing preventative and therapeutic services. Teaching methodologies should be utilized to assure that the student can assume responsibility for the assimilation of knowledge requiring judgment, decision making skills and critical analysis."*[29]

The implementation of IPE may solidify and create the segue necessary for dental hygiene students to be competent in these areas as well as modify the planning, assessment, and especially follow-up stages for treatment. To clearly understand the impact of nutrition on oral health as well as the role of a registered dietitian in oral disease treatment and prevention will only benefit the quality of care given to the patient. The outline of accreditation standards specifically including dental hygiene science goes on to describe inclusion of preventative counseling, and health promotion for the intent to be:

> *"Dental hygiene sciences provide the knowledge base for dental hygiene and prepares the student to assess, plan, implement and evaluate dental hygiene services as an integral member of the health team. Graduates must be competent in interpersonal and communication skills to effectively interact with diverse population groups and other members of the health care team."*[29]

Among other accreditation standards, those mentioned are directly in line with IPE, yet actual dental hygiene curriculum has typically not been reflective of these intentions or used interaction among other program in order to reach competency as part of an "integral member of the health team." Health professionals are often trained in isolation,

with faculty in a closed environment who may not be adequately trained to facilitate interdisciplinary collaboration.[18]

Limited Research on Current Attitudes of Education and Training in Dentistry

Results from a study done with dental students using a strength, weakness, opportunity, and threat (SWOT) analysis and survey indicated weaknesses that interprofessional education may have the opportunity to address. Two of the 4 major weaknesses noted in the study included lack of efficiency that resulted in unproductive clinical time and instructional strategies being more conducive to memorization than applicability in teaching and testing respectively.[26] Qualitative data and direct feedback from students generalizing a consensus concern included:

"Our curriculum falls short in addressing applicable learning that requires more open-ended thought, conceptual learning, and applied instruction. We see the steps, but not the staircase."[26]

"Lack of interdepartmental communication leads to lapses of educational topics and redundancies"[26]

Collaboration in Disease Prevention and Health Promotion

There are many systemic and oral diseases that affect nutrition and oral health directly, indirectly, or simultaneously. Impaired dentition- endutulism, ill-fitting dentures, dental caries, mouth sores, and other oral problems may contribute to weight changes and possible malnutrition especially in the aging population.[30] Along with weight changes, nutrient intake may be affected, in turn, contributing to systemic disease.[30]

The confounding variables that contribute to dental caries (genetic predisposition, microflora, socioeconomic factors affecting nutrition choices and education level, etc.) allow the roles of a registered dietitian and dental hygienist to complement each other and may overlap in addressing the patient's quality of care.[31] For example, longitudinal

studies have observed lower levels of dental caries in children that are breastfed.[31] Registered dietitians are extensively trained in maternal and child health and work with patients to educate about the positive benefits of breastfeeding; this could be an added talking point in both professional areas. Food frequency questionnaires, food preferences, and food pattern information obtained and assessed by a registered dietitian can be directly indicative of development of dental caries and/or potential for prevention.[32] Knowing the cause of dental caries and sharing nutritional advice, instruction, and preventative measures among the professions as well as using each other in the pediatric and various populations could be beneficial to both areas. Figure 1 denotes the interdependent relationship between nutrition and oral health.

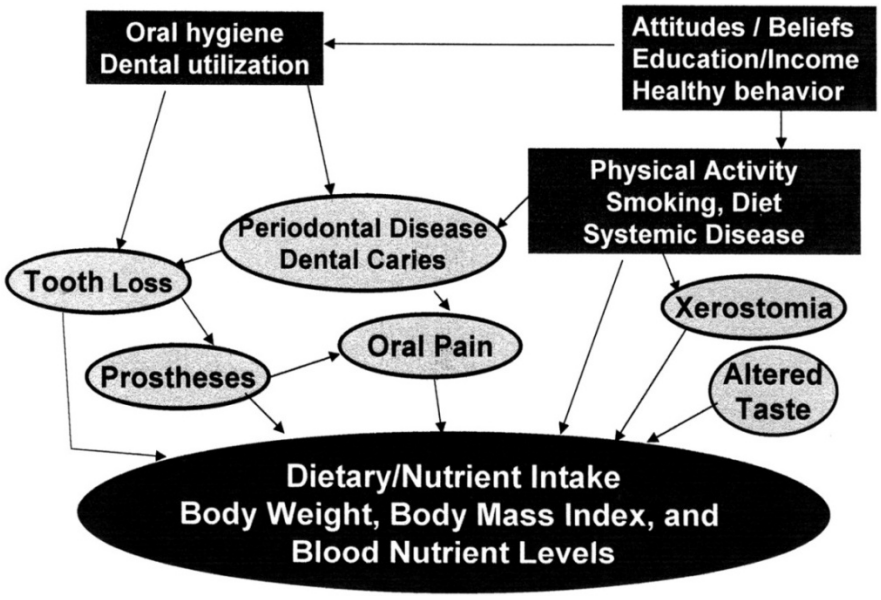

Figure 1. Pathways for the Oral-Nutrition Relationship[30]

Registered dietitians are extensively trained in several areas directly related to oral cavity manifestations resultant of systemic disease or disorders a dental hygienist may see in practice. These include but are not limited to diabetes, cardiovascular disease, eating disorders, cancer, HIV/AIDS, dental caries, and food allergies. Three significant areas of concern common among the American population where dietitians and dental

hygienists can work together to improve quality of care for their patient includes: diabetes, cardiovascular disease, and eating disorders.

Diabetes

The prevalence of type 2 diabetes has increased and accounts for approximately 90-95% of all diagnosed diabetes cases.[33] Periodontal disease is a common result of diabetes mellitus and in turn can affect metabolic control of the disease.[34] Periodontal disease and dental caries can result in tooth loss, swelling of gums, and other negative complications affecting oral health which could alter food selection and quality again impacting nutrient intake and nutritional status.[30] The treatment of diabetes requires patient compliance and an interdisciplinary approach to educating the patient.[33]

Specific nutrition and diet counseling related to a medical condition, such as diabetes, is not in the scope of practice of dental hygienists.[25] However, registered dietitians are specifically trained in preventing and treating this disease state that is included in the medical nutrition therapy (MNT) part of their curriculum. As well as MNT, registered dietitians are trained in motivational interviewing and various counseling techniques in order to tailor proper treatment and intervention for patients.[20]

Dental hygienists are encouraged to counsel patients on lifestyle and offer general advice in preventing periodontal disease and reducing dental caries. These may include sipping on water or chewing gum to alleviate dry mouth, practicing daily plaque removal with appropriate brushing and flossing techniques and including cariostatic foods in a balanced varied diet as prescribed by a physician or registered dietitian.[25] In a joint effort to address the patient's needs, a registered dietitian and dental hygienist could be efficient and effective professional partners.

Cardiovascular Disease

Cardiovascular disease (CVD) is one of the leading causes of death in the U.S. and approximately one person from America dies every 37 seconds of CVD.[35] CVD must be prevented and managed through a multi-disciplinary approach.[22] Research has provided evidence of CVD's role in contributing to periodontal disease (PD).[35] Concurrently, a meta-analysis conducted in 2004 found that periodontal infection increases risk of coronary heart disease (CHD) by 15% compared to healthy individuals.[36] The exact mechanism and cause and effect relationship between PD and CVD and the reverse has not been established, but research has consistently suggested that the inflammatory state of CVD contributes to the development of PD.[30, 35, 37] The release and elevated levels of C-reactive protein (CRP) has been found to be a common thread between the two.[30, 35] This process contributes to the infection of supportive tissue and the immune-mediated destruction of the oral cavity causing PD.[30, 35]

Although the direct correlation between oral health and systemic disease outcomes such as CVD and cancer have been debated, the pathophysiological relationship of oral health and disease continues to be researched.[30] Often studies exhibit a consensus that oral health and systemic disease are interrelated with varying degrees of direct impact due to the body connection and response to inflammation and accumulation of chronic bacterial infections.[30] Modifiable risk factors leading to CVD that can be addressed by a registered dietitian in conjunction with a dental hygienist's assessment and prevention plan are overweight, obesity, dyslipidemia (high serum cholesterol levels), poor diet, type 2 diabetes, and hypertension.[35] Dental hygienists can play a role in primary prevention of CVD by working with a registered dietitian as well as educating their patient on healthy diet and lifestyle habits.[35] As the coverage and financial burden of healthcare changes many people may be able to visit their dental professional as opposed

to a primary care physician, lending to the importance of interprofessional communication and care.

The American Heart Association (AHA) recommends diet as the most significant priority in lessening the risks for CVD as well for treating the disease.[35] Increased physical activity along with diet and lifestyle changes has accompanied the recommendation for registered dietitian referrals in oral health professional settings.[35] Registered dietitians have many tools that address CVD, hypertension, and dyslipidemia including the Therapeutic Lifestyle Changes (TLC) plan, the Dietary Approaches to Stop Hypertension (DASH), and a combination of diet interventions. They work with patients facing multiple disease diagnoses on an individual needs basis. Registered dietitians can also work with dental hygienists discerning etiology and interpreting impact of patient medications on nutrition status and oral health status due to impact on oral tissue.[22] Because oral health is not in isolation from total systemic health, diet and lifestyle changes beneficial in addressing CVD and cancer will also be preventative against dental caries and a promoter of general health.[37]

Eating Disorders

The integrity of the oral cavity can be compromised by eating disorders, notably bulimia and anorexia.[3] Dentists and dental hygienists may be the first to identify manifestations of eating disorders, with the opportunity to facilitate intervention and possible treatment.[38] Mouth, face, and neck examinations by a dental hygienist could be a critical first step in the early detection of eating disorders as well as other systemic diseases.[39] Dental erosion, chapped lips, anemic tissues, and a variety of other signs and symptoms related to, bulimia, anorexia, or other eating disorders can be identified by the dental hygienist.[25] Textbook guidelines state that a dental hygienist is to refer a patient with a suspected eating disorder to a physician or psychologist and provide nutrition

counseling.[25] However, dental hygienists do not have the training or expertise to provide nutrition counseling for eating disorder patients, whereas registered dietitians have been trained in counseling patients with eating disorders.

The Institute of Medicine has stated that oral health is an integral part of systemic health, and accrediting institutions have recommended that dental schools take on new roles incorporating prevention, detection, and early recognition of oral and systemic disease.[40] However, despite the recommendations for interprofesssional collaboration and comprehensive care (referral to other professionals, examinations, assessments, in-home treatment), optimal care remains idealistic because of training limitations and current dental curricula.[40] The potential for interdisciplinary collaboration and building rapport with a registered dietitian would potentially benefit the dental community as well as the health of the patient.

Programs Implementing Interprofessional Curriculum

Integration for combining oral health and nutrition has been discussed among faculty at East Tennessee State University for several years. Dietetic rotations in the clinical setting have been implemented for many years in programs at Baylor College of Dentistry at Texas A&M Health Sciences Center, Tufts University, New York University (NYU), and University of Medicine and Dentistry of New Jersey (UMDNJ). Below are descriptions of curriculum, vision and mission statements, or specific classes that focus on interdisciplinary education implemented in this particular area.

Baylor College of Dentistry at Texas A&M Health Science Center

The Dietetic Internship Program at Texas A&M Health Science Center, Baylor College of Dentistry, located in Dallas, Texas offers a 10-month training program with a Clinical/Nutrition Therapy Concentration Area for individuals who have met the academic requirements of the Accreditation Council for Education in Nutrition and

Dietetics (ACEND). Since the graduation of the first class in 1955, the program has maintained accreditation status through ACEND and currently accepts 12 dietetic students each year.

The Texas A&M Health Science Center Dietetic Internship Program's mission is to provide an atmosphere in which the dietetic intern can apply and augment the knowledge base acquired from the academic setting. The program strives to prepare qualified dietetic professionals by imparting to each student the educational standards established by ACEND.

The principles of clinical nutrition, food service management, and community nutrition are taught on an individualized level supplemented with 'hands-on' application. The interns also attend classes taught by physicians, dietitians, department managers, and guest speakers throughout the year to augment the intern's current knowledge and prepare the intern for hands-on experiences. This approach reflects the belief that this will result in entry-level professionals who possess an advanced knowledge base, professional skills, and an ability to think independently.

Successful completion of the dietetic internship requires each intern to satisfactorily meet all educational competencies. Interns requiring additional learning experiences to meet competencies will be allowed up to 15 months from the beginning of the program to fulfill graduation requirements. After completing the dietetic internship at Baylor, the intern will be qualified to take the registration examination for dietitians. Table 3 lists the clinical and community rotations included in the Texas A&M Health Science Center program.

Table 3. Clinical Dietetics Rotations Through Texas A&M Health Science Center

•Bariatric Surgery
•Cardiology
•Diabetes
•Gastrointestinal Disease
•Hematopoietic Stem Cell Transplantation
•Liver Disease
•Neonatology
•Nutrition Support-Enteral/Parenteral Nutrition
•Oncology
•Outpatient Counseling
•Organ Transplantation
•Pediatric Specialized Programs
•Rehabilitation
•Renal Disease
Community Rotations:
•Long-term Care Facility
•Central Admixture Pharmacy
•Dental- a three hour supervised practice rotation in the dental hygiene clinic
•Dialysis
•Eating Disorders
•Food Bank
•School Food Service and Head Start
•Home Infusion Therapy
•Pharmaceutical Sales

Tufts University

Nutrition education has become a fundamental component of the curriculum at the School of Dental Medicine. Courses on nutrition are included in the undergraduate and post-graduate programs, and related workshops, seminars, and clinical training further prepare students to make more accurate diagnoses, plan treatment, and advise their patients on nutrition. In addition to educating dental students on nutrition, the division also introduces nutrition students to important dental issues. Through a special program students from the Tufts Friedman School of Nutrition Science and Policy attend School of Dental Medicine classes and observe in the dental clinic.

The division's research initiatives focus on relationships between diet, nutrition, and oral conditions. Recent research includes studies on the connection between diet and

plaque bacteria in severe early childhood caries (with Forsyth Dental Research Center), dietary factors in Sjogren's syndrome, dietary factors in adult root caries, dental status in populations with salivary hypofunction, and dietary aspects of the prevention of adult caries.

One IPE course offered is oral health promotion (OHP)/nutrition seminar 1292. The course goals include providing students with an understanding of the oral health implications of patients with special health care needs and nutritional issues commonly confronted in general practice.

After participating in the OHP/nutrition seminar, the student will be able to discuss common oral problems of patients with special health care needs, prescribe the appropriate oral health interventions to overcome these problems, discuss the types of nutritional implications of common life situations and medical conditions (e.g., aging, diabetes, cancer), and discuss the dental practice implications of these considerations. They will also be able to offer dental-dietary advice and management consistent with accepted practice for these patients.

University of Medicine and Dentistry of New Jersey

The University of Medicine and Dentistry of New Jersey offers a course that explores the role of the dietitian and other health care providers in various programs, agencies, and organizations that offer nutrition services for the public. Observations and clinical practice encompass programs of prevention and intervention, normal and remedial nutrition care, and education. Six weeks of clinical experiences include community health promotion (CHP), oral health, community education and food access, (CEFA) and a specialized practice in dietetics rotation in community or clinical nutrition. The dietetic interns also participate in a variety of legislative and food access activities during a week of cross-training and "multiskilling" activities.[41]

New York University

The Department of Nutrition, Food Studies, and Public Health located in the Steinhardt School of Education (Department of Nutrition) includes an accredited dietetic internship. The NYU Dietetic Internship educates students to integrate dietetic theory into practice and apply their skills in many settings. There are 5 major rotations in the supervised clinical practice component: clinical nutrition therapy, community nutrition, food service management, staff relief, and an elective. The Pediatric Dental Clinic at the NYU College of Dentistry is a new site for the Dietetic Internship elective. Students must complete 13 weeks of nutrition therapy in their core hospital site before beginning a 2-week long dental elective.

In 2001, the NYU College of Dentistry implemented a new curriculum designed with 6 major themes, one of which was epidemiology and health promotion. Within this theme there are several concentrations including developing critical thinking skills, application of technology in solving intellectual problems, assessing the scientific literature, professionalism and ethics, and health promotion. Health promotion includes nutrition and is integrated early in students' education. It is believed entering students can become competent in the application of health promotion and nutrition early in their education leading to greater sensitivity to health promotion issues and activities and the development of a "health promotion" mindset.[27]

CHAPTER 3

METHODS

Survey Instrument

The survey instruments for data collection are unique to this study and originally designed and created by the principal investigator (PI) using a variety of sources.[2, 14, 25, 42, 43] Once the format and categorical topics for the research were established, questions were created and extracted from existing research surveys with a similar area of focus, then re-worded for the intended participant, and appropriately cited.[2, 14, 25, 42, 43] Three specific questionnaires included the fundamentals to support the framework and development of these surveys.[14, 42, 43] Many questions relating to attitudes of IPE and knowledge of dietetics and dental hygiene were drawn from academic content, professionals in each discipline, or specific instruments developed from previous research and were adapted to suit this research.

Four surveys were created to survey dietetic and dental hygiene students and faculty in each, respectively (Appendix A). Five experts from the fields of nutrition and oral health evaluated the surveys for content validity. The survey composition is as follows:

- A total of 76 questions, covering 8 sections developed to address the research questions and to be able to compare and cross-reference data. The 8 sections include self-perceived proficiency, knowledge, perceived roles, attitude of interdisciplinary education among dietetic students and dental hygiene students, attitude of interdisciplinary education in general, attitudes on current curriculum, perception, and open-ended questions/feedback.
- 54 questions using the Likert Scale
- 14 true or false questions
- 6 multiple choice questions

- and 2 open-ended qualitative questions

Institutional Review Board (IRB) Approval

Approval from ETSU's Office of Research and Sponsored Programs and Texas A & M Health Science Center's Institutional Review Board (IRB) was obtained. Proper procedures and instruction were followed when disseminating surveys. All appropriate steps and procedures were taken to ensure safety and confidentiality, including informed consent disclosures for all surveys given.

Study Sample

The subjects included males and females at least 18 years and older who were enrolled in the dietetic internship or dental hygiene programs or nutrition and dental hygiene faculty at ETSU and Baylor College of Dentistry.

Research Questions

In order to establish the foundation necessary to move forward at ETSU with IPE it was determined that 4 important categories of information had to be collected and compared from the dietetic and dental hygiene participants. The categories include perceived roles, level of knowledge, attitudes on interdisciplinary education, and perceived value of the 'other' profession. It was postulated that comparing and contrasting these particular topic areas would be most informative and telling of the possible opportunity for interdisciplinary intervention. It was also the intention to be able to identify strengths and weaknesses of each program in knowledge base and explore disparities in perceived roles, attitudes, and perceived value of the "other" profession in order to gain insight of specific areas to address as both professions relate to nutrition and oral health. Research questions investigated in this study include:

1) How do dietetic students, dental hygiene students, and faculty compare in level of knowledge related to nutrition and oral health?

2) How do dietetic students, dental hygiene students, and faculty compare in their perceived roles related to nutrition and oral health?
3) How do dietetic students, dental hygiene students, and faculty compare in their attitudes of interdisciplinary education among dietetic and dental hygiene students related to nutrition and oral health?
4) How do dietetic students, dental hygiene students, and faculty compare in their perceived value of the 'other' professional?

Data Analysis

The Statistical Package for Social Sciences (SPSS), Version 19.1 was used for all data analyses. Descriptive statistics were reported for demographical information, knowledge proficiency, and knowledge testing. Independent t-tests were used to determine means and standard deviations (SD) of perceived roles (includes question numbers 28-41), attitudes of interdisciplinary education (includes question numbers 42-51), and perceived value of the 'other' profession (includes question numbers 71-74). An alpha value of 0.05 was used for all statistical tests.

CHAPTER 4

RESULTS AND DISCUSSION

ETSU currently does not institute any type of interdisciplinary education or experiences among dietetic students and dental hygiene students. Baylor College of Dentistry at Texas A&M Health Science Center currently includes a 3-hour supervised practice rotation in the dental hygiene clinic with an RD who also holds a Bachelor of Science in Dental Hygiene (BSDH). The dietetic interns also work alongside dental hygiene students on projects and patient care case studies.

ETSU's dental hygiene program is housed adjacent to the nutrition department on campus. Additionally, each of the program directors work closely together as colleagues and professors in the Allied Health Sciences Department within the College of Clinical and Rehabilitation Sciences. ETSU has an opportunity to explore future changes in curriculum in order to connect these 2 programs. This may promote camaraderie and increase nutrition knowledge and the understanding of the 'other' profession's roles. Ultimately, it could foster the importance of each profession in regards to the relationship between oral health and nutrition related to patient care.

The majority of dietetic students, dental hygiene students, dietetic and dental hygiene faculty surveyed from each facility were female. Both ETSU dietetic and dental hygiene students and Baylor dietetic and dental hygiene students were between the ages of 20-35. The majority of participants surveyed from both ETSU and Baylor identified themselves as white (Table 4).

Table 4. Demographic Variables of Dietetic and Dental Hygiene Students and Faculty at ETSU and Baylor

	ETSU				Baylor			
Variable	Dietetic Students %	Dental Hygiene Students %	Dietetic Faculty %	Dental Hygiene Faculty %	Dietetic Students %	Dental Hygiene Students %	Dietetic Faculty %	Dental Hygiene Faculty %
Gender	(n=16)	(n=24)	(n=12)	(n=5)	(n=10)	(n=24)	(n=1)	(n=10)
Male	0	0	8.33	20.00	0	4.17	0	10.00
Female	100	100	91.67	80.00	100	95.83	100	90
Age (years)	(n=16)	(n=24)	(n=13)	(n=7)	(n=10)	(n=23)	(n=1)	(n=12)
20-35	93.75	87.50	30.77	42.86	100	82.61	100	16.67
36-45	6.25	12.50	30.77	14.29	0	17.39	0	25.00
46-55	0	0	30.77	14.29	0	0	0	25.00
56-65	0	0	7.69	28.56	0	0	0	16.67
66 +	0	0	0	0	0	0	0	16.66
Race	(n=16)	(n=24)	(n=13)	(n=7)	(n=10)	(n=25)	(n=1)	(n =12)
White	100	95.84	100	100	80	60.00	100	83.33
African American	0	4.16	0	0	20	4.00	0	8.33
Hispanic	0	0	0	0	0	12.00	0	0
Other	0	0	0	0	0	24.00	0	8.34

Research Question:

1) How do dietetic students, dental hygiene students, and faculty compare in level of knowledge related to nutrition and oral health?

Analysis of the data reveals 81.2% of ETSU dietetic students were proficient in knowledge related to nutrition and oral health, while 70% of Baylor dietetic students were proficient (Proficiency is defined as correctly answering 17 of 21 questions, or 80%, of the knowledge-based nutrition questions numbered 7-27). Dietetic and dental hygiene faculty were comparable in proficiency with 100% of dietetic faculty at ETSU and Baylor proficient and 71.4% of ETSU dental hygiene faculty and 75% of Baylor dental hygiene faculty, respectively, proficient in knowledge related to nutrition and oral health. The most significant discrepancy in knowledge proficiency is that 45.8% of dental hygiene students and 96% of Baylor dental hygiene students were considered proficient (Tables 5 & 6).

Table 5. Knowledge Proficiency* of ETSU Dietetic and Dental Hygiene Students and Faculty

Dietetic Faculty n=13 # (%)	Dietetic Students n=16 # (%)	Dental Hygiene Students n=24 # (%)	Dental Hygiene Faculty n=7
13 (100%)	13 (81.2%)	11 (45.8%)	5 (71.4%)
*Proficiency measured by answering 80% of knowledge questions from survey correctly (17 of 21 questions)			

Table 6. Knowledge Proficiency* of Baylor University Medical Center Dietetic and Dental Hygiene Students and Faculty

Dietetic Faculty n=1 # (%)	Dietetic Students n=10 # (%)	Dental Hygiene Students n=25 # (%)	Dental Hygiene Faculty n=12 # (%)
1 (100%)	7 (70%)	24 (96%)	9 (75%)
*Proficiency measured by answering 80% of knowledge questions from survey correctly (17 of 21 questions)			

Of the dental hygiene students surveyed in question 11, which stated "I know a registered dietitian is trained to treat patients with eating disorders," only 58% of ETSU dental hygiene students answered it correctly. Registered dietitians are educated and trained in treating eating disorders, and dental hygienists have the potential for assessing eating disorder etiologies through oral health. Therefore, dental hygiene students should be aware of the benefits in referring their patients to a registered dietitian for further nutrition assessment.

Thirty-seven percent of ETSU dietetic students answered number 14 correctly, which states "Diet soda is healthier than regular soda". Ninety-one percent of ETSU dental hygiene students answered this question correct. While caloric and carbohydrate content may be less in diet sodas, the alternate choice may not necessarily be healthy related to oral health. They often still contain phosphorus (phosphoric acid), artificial sweeteners, and other additives that may be detrimental to the integrity of the oral cavity. Soft drinks have also been found to reduce calcium absorption and contribute to

osteoporosis. It can be assumed by the number of students who answered correctly that dental hygiene students are aware of these facts.

The term "healthier" used in the context of this question may be a limitation in the survey instrument due to the interpretation and perception of those surveyed. For example, some dietetic students may consider diet sodas healthier than regular sodas in terms of sugar content but still do not perceive them as a "healthy" choice. The words "healthy" and "healthier" were not defined.

Ninety-two percent of Baylor dental hygiene students answered question number 11 correctly, which stated "I know a registered dietitian is trained to treat patients with eating disorders." It is assumed that Baylor dental hygiene students understand registered dietitians are educated and trained in treating eating disorders. Therefore, the potential for referring their patients to a registered dietitian in the future for further nutrition assessment is more likely from those that completed the dental hygiene program at Baylor.

Forty percent of Baylor dietetic students answered number 14 correctly, which states "Diet soda is healthier than regular soda." Ninety-six percent of Baylor dental hygiene students correctly identified that the statement is false. While caloric and carbohydrate content may be less in diet sodas, the alternate choice may not necessarily be healthy related to oral health. It can be assumed by the number of students who answered correctly that dental hygiene students are aware of these facts.

2) How do dietetic students, dental hygiene students, and faculty compare in their perceived roles related to nutrition and oral health?

The difference in responses to question number 30 were significant ($p = 0.000$) (Table 7). ETSU dietetic students are "unsure" they are adequately trained to discuss oral health issues with patients while ETSU dental hygiene students "somewhat agree" that they are

adequately trained to discuss nutrition. Each of these programs includes a nutrition and oral health component, and the results indicate there is opportunity to increase confidence and competency in their perceived roles to address oral health and nutrition.

The difference in responses to question number 32 is significant as it relates to dental hygiene students ($p = 0.042$). ETSU dental hygiene students "somewhat agree" registered dietitians go through an accredited program, complete an internship, and take a national board exam. It would be beneficial for dental hygiene professionals to understand the depth of knowledge and education registered dietitians receive to better understand dietitian's role in nutrition related to oral health.

The results in response to question number 40 are significant ($p = 0.001$; $p = 0.003$) in that ETSU dietetic students are "unsure" they are comfortable in counseling those patients with periodontal disease in lifestyle and nutrition related choices, whereas dental hygiene students are more comfortable and "somewhat agree" (Table 7). Both dietetic students and dental hygiene students have training and education in this area, yet neither "somewhat agree" or "strongly agree" they are comfortable in counseling those specific patients. Collaboration in this area could solidify the foundation already established in each of these programs in order for each discipline to become more comfortable in counseling patients with periodontal disease.

Table 7. Independent t-Tests of Perceived Roles of Nutrition and Oral Health Between ETSU Dietetic and Dental Hygiene Students

Survey Question	Group	n	Mean ± SD[a]	*P* value[b]
30. Registered dietitians (dental hygienists) are adequately trained to discuss oral health (nutrition) issues with patients.	Dietetic Dental Hygiene	16 24	3.31 ± 0.95 2.13 ± 0.90	0.000* 0.000*
32. I know registered dietitians (dental hygienists) attend accredited programs, complete an unpaid internship, and take a national board examination.	Dietetic Dental Hygiene	16 24	1.81 ± 0.91 2.54 ± 1.28	0.057 0.042*
40. I am comfortable in counseling patients with periodontal disease about foods and lifestyle choices to improve their condition.	Dietetic Dental Hygiene	16 24	3.06 ± 1.00 2.13 ± 0.61	0.001* 0.003*

[a] 1 =strongly agree; 2 = somewhat agree; 3 = unsure; 4 = somewhat disagree; 5 = strongly disagree

[b] significant if $\alpha \leq .05$

When comparing the perceived roles of nutrition and oral health between ETSU dietetic and dental hygiene faculty there were no significant results; however, some noteworthy points can be extracted from the data. ETSU dietetic faculty are more certain than dental hygiene faculty about the food and beverage choices that may lead to cardiovascular disease, HTN, etc. Also, dietetic faculty are "unsure" more so than dental hygiene faculty that the other profession is adequately trained and able to discuss oral health with patients and dietetic faculty "somewhat agree" that the patient has to be close to sick before motivated to change while dental hygiene "somewhat disagree." The potential for elaborating on and discussing perspectives, knowledge, and outcomes between the 2 may in turn influence their students' thoughts and perceptions as well.

In comparing perceived roles of nutrition students and oral health between ETSU and Baylor no significant results were found. However, it is interesting to note that ETSU dietetic students are "unsure" registered dietitians are adequately trained to discuss oral health with patients while Baylor dietetic students "somewhat agree" they are

comfortable discussing and counseling oral health with patients. It may be postulated that Baylor dietetic students are better trained in oral health than ETSU dietetic students and the Baylor dietetic students complete a supervised practice rotation with the dental hygiene clinic at Baylor College of Dentistry.

When reviewing the perceived roles of nutrition and oral health between ETSU and Baylor dental hygiene students, ETSU dental hygiene students "somewhat agreed" while Baylor dental hygiene students "strongly agreed" that registered dietitians are adequately trained to assess oral health issues (p = 0.050) (Table 8). ETSU dental hygiene students "strongly agreed" patients need specific oral health instructions while Baylor "somewhat agreed" (p = 0.006; 0.006). ETSU dental hygiene students "somewhat agree" with their ability to counsel patients with periodontal disease while Baylor students "strongly agree" (p = 0.035; p = 0.034, respectively) (Table 8).

These results indicate that dental hygiene students at ETSU are not sure about the role of education of registered dietitians or that Baylor dental hygiene students are more confident in their role and abilities in counseling and oral health.

Table 8. Independent t-Tests of Perceived Roles of Nutrition and Oral Health Between ETSU and Baylor Dental Hygiene Students

Survey Question	Group	n	Mean ± SD[a]	*P* value[b]
31. Patients need specific instructions about how to change their eating behavior.	ETSU Baylor	24 25	1.58 ± 0.65 2.24 ± 0.93	0.006* 0.006*
40. I am comfortable in counseling patients with periodontal disease about foods and lifestyle choices to improve their condition.	ETSU Baylor	24 25	2.13 ± 0.61 1.68 ± 0.80	0.035* 0.034*
[a]1 =strongly agree; 2 = somewhat agree; 3 = unsure; 4 = somewhat disagree; 5 = strongly disagree [b] significant if $\alpha \leq .05$				

After comparing perceived roles of nutrition and oral health between Baylor dietetic and dental hygiene students, Baylor dietetic students "somewhat agreed" they are capable

of counseling on oral health issues while Baylor dental hygiene students "strongly agreed" (p = 0.000; p = 0.008, respectively) (Table 9). Baylor dietetic and dental hygiene students were more positive and confident than ETSU dietetic and dental hygiene students.

Baylor dental hygiene students "somewhat agreed" that patients need specific instructions about changing behavior related to oral health, while dietetic students "strongly agreed" (p = 0.006; p = 0.024, respectively) (Table 9). Dietetic students "somewhat agree" patients need follow-up and ongoing guidance after an initial assessment, while dental hygiene students "strongly agree" (p = 0.003; p = 0.013, respectively) (Table 9). Dietetic students are "unsure" they are comfortable in counseling patients with periodontal disease while dental hygiene students "strongly agree" (p = 0.000; p = 0.000, respectively) (Table 9).

Table 9. Independent t-Tests of Perceived Roles of Nutrition and Oral Health Between Baylor Dietetic and Dental Hygiene Students

Survey Question	Group	n	Mean ± SD[a]	*P* value[b]
30. Registered dietitians (dental hygienists) are adequately trained to discuss oral health (nutrition) issues with patients.	Dietetic Dental Hygiene	10 25	2.80 ± 1.03 1.68 ± 0.63	0.000* 0.008*
31. Patients need specific instructions about how to change their eating behavior.	Dietetic Dental Hygiene	10 25	1.50 ± 0.53 2.24 ± 0.93	0.024* 0.006*
35. Patients need follow-up and ongoing guidance after my initial instruction to maintain behavior changes consistent with a healthier diet.	Dietetic Dental Hygiene	10 25	2.10 ± 0.74 1.36 ± 0.57	0.003* 0.013*
40. I am comfortable in counseling patients with periodontal disease about foods and lifestyle choices to improve their condition.	Dietetic Dental Hygiene	10 25	3.40 ± 1.07 1.68 ± 0.80	0.000* 0.000*

[a] 1 =strongly agree; 2 = somewhat agree; 3 = unsure; 4 = somewhat disagree; 5 = strongly disagree

[b] significant if $\alpha \leq .05$

There seems to be a common thread among these groups that resulted in significant findings related to perceived roles. Both dietetic and dental hygiene students share similar views in agreeing to what their patient needs, how they can assist within their scope of practice, and necessity for specific instruction. However, dietetic students are less comfortable with the counseling component related to periodontal disease especially when looking at Baylor dietetic and dental hygiene students compared to ETSU students. This may be attributed to the fact that Baylor dietetic students complete a supervised practice rotation with the dental hygiene clinic at Baylor College of Dentistry.

3) How do dietetic students, dental hygiene students, and faculty compare in their attitudes of interdisciplinary education among dietetic and dental hygiene students related to nutrition and oral health?

When comparing the attitudes of interdisciplinary education among ETSU dietetic and dental hygiene students no significant results were found. However, the overall data reveal a positive outcome in attitudes regarding the implementation of IPE in the 2 programs. The results positively identify that both dietetic and dental hygiene student groups at ETSU “strongly” or “somewhat agree” on the benefits of interdisciplinary education.

After comparing the attitudes of interdisciplinary education among ETSU dietetic and dental hygiene faculty, results were significant for the difference in responses to question number 47. ETSU dietetic faculty “strongly agree” team-working skills are essential to learning effectively while dental hygiene faculty “somewhat agree” ($p = 0.001$; $p = 0.028$, respectively) (Table 10). Team-working skills are a concentrated focus within interdisciplinary education and experiences. The fact that faculty in each department agree it is essential to learning indicates they may be more likely to understand the importance and necessity of IPE implementation.

Table 10. Independent t-Tests of Attitudes of Interdisciplinary Education Among ETSU Dietetic and Dental Hygiene Faculty

Survey Question	Group	n	Mean ± SD[a]	*P* value[b]
47. Team-working skills are essential for dental hygiene students to learn effectively.	Dietetic Dental Hygiene	13 7	1.08 ± 0.28 2.29 ± 1.11	0.001* 0.028*
[a]1 =strongly agree; 2 = somewhat agree; 3 = unsure; 4 = somewhat disagree; 5 = strongly disagree [b] significant if $\alpha \leq .05$				

After comparing Baylor dietetic and dental hygiene students' attitudes of interdisciplinary education all "strongly agree" and "somewhat agree", respectively, that shared learning will increase their ability to understand clinical problems. Both groups were also very positive and all answered "strongly agree" and "somewhat agree" to questions related to their attitude of interdisciplinary education, which is currently implemented in their programs.

When comparing the attitudes of interdisciplinary education among ETSU and Baylor dietetic students there were no significant results but both groups "strongly agree" and "somewhat agree" shared learning and interdisciplinary learning can be beneficial to effective learning, understanding clinical problems, and improving patient care.

Comparing attitudes of interdisciplinary education among ETSU and Baylor dental hygiene students had no significant results. However, ETSU and Baylor dietetic and dental hygiene students "strongly agree" or "somewhat agree" shared learning and interdisciplinary learning can be beneficial to effective learning, understanding clinical problems, and improving patient care.

The results were overwhelmingly positive from all groups at both universities in terms of attitude on interdisciplinary education. They "somewhat agreed" or "strongly agreed" on question numbers 42-51 about the benefits, value, and positive outcomes of

interdisciplinary education. This is an encouraging finding because literature has found many benefits and lasting results when implementing IPE and collaboration.

4) How do dietetic students, dental hygiene students, and faculty compare in their perceived value of the 'other' professional?

There were no significant results when comparing the perceived value of the 'other' professional among ETSU dietetic and dental hygiene students, but the overall data reveal the majority of ETSU dietetic and dental hygiene students "strongly value" the 'other' profession. This may be solidified if they were to understand the roles of the 'other' profession and the benefits of working together.

After comparing the perceived value of the 'other' professional among ETSU dietetic and dental hygiene faculty, it was concluded that most of the faculty "strongly value" the 'other' profession. Data show that although they value the other profession they may not promote clarification of what their roles are or encourage interdisciplinary collaboration. Lack of nutrition knowledge proficiency in less than half (45.8%) of the ETSU dental hygiene students may be reflective of current curriculum taught.

When comparing the perceived value of the 'other' professional among Baylor dietetic and dental hygiene students, there were significant results ($p = 0.040$) among Baylor dietetic students answering they "strongly valued" the 'other' profession's expertise and view them as a colleagues but dental hygiene students more positively answered "strongly value" (Table 11). Both groups "strongly value" the 'other' profession.

Table 11. Independent t-Tests of Perceived Value of the 'Other' Professional Among Baylor Dietetic and Dental Hygiene Students

Survey Question	Group	n	Mean ± SD[a]	*P* value[b]
72. As a future professional, I believe a registered dietitian (dental hygienist) will value my expertise as colleagues and fellow health-care professionals who have the best interest of the patient in mind.	Dietetic Dental Hygiene	10 25	1.70 ± 0.68 1.28 ± 0.46	0.040* 0.095

[a] 1 = strongly value; 2 = somewhat value; 3 = unsure; 4 = do not value;
[b] significant if $\alpha \leq .05$

After comparing the perceived value of the 'other' professional among ETSU and Baylor dietetic students, no significant findings were found. The results did reveal ETSU and Baylor dietetic students answered similarly in regards to valuing the 'other' profession. Both groups "strongly value" the 'other' profession.

When reviewing the perceived value of the 'other' professional among ETSU and Baylor dental hygiene students, the differences in responses to questions 71 and 72 were significant for both dietetic and dental hygiene students at ETSU and Baylor ($p = 0.024$; $p = 0.025$, respectively and $p = 0.009$ for both groups). ETSU dental hygiene students and Baylor dental hygiene students "strongly agree" they are valued by the 'other' profession. Again all students strongly feel they are valued and value the other profession (Table 12).

Table 12. Independent t-Tests of Perceived Value of the 'Other' Professional Among ETSU and Baylor Dental Hygiene Students

Survey Question	Group	n	Mean ± SD[a]	*P* value[b]
71. As a future professional, I believe I will value registered dietitians (dental hygienists) as colleagues and fellow health-care professionals who have the best interest of the patient in mind.	ETSU Baylor	24 25	1.67 ± 0.57 1.32 ± 0.48	0.024* 0.025*
72. As a future professional, I believe a registered dietitian will value my expertise as colleagues and fellow health-care professionals who have the best interest of the patient in mind.	ETSU Baylor	24 25	1.71 ± 0.62 1.28 ± 0.46	0.009* 0.009*
[a] 1 = strongly value; 2 = somewhat value; 3 = unsure; 4 = do not value; [b] significant if $\alpha \leq .05$				

The perceived value of the 'other' professional among all groups at both universities was very positive and similar across the board. The questions related to perceived value of the 'other' profession included content on referral, collaboration, and contribution of the 'other' professional. Both dietetic and dental hygiene students and faculty in each identified that they "somewhat valued" or "strongly valued" the 'other' professional.

Survey Comments

Question numbers 75 and 76 state: 75) What do you *expect* a future registered dietitian (dental hygienist) to know about the role of a dental hygienist (registered dietitian)? 76) What would you *like* a future registered dietitian (dental hygienist) to know about the role of a dental hygienist (registered dietitian)? The comments were transcribed and organized to aid in understanding the participants' perspectives and thoughts on the 'other' profession (Appendix B). There were many similar comments attesting to the importance of team collaboration, communication, and learning in order to enhance patient care and quality of life. Key terms related to the benefits of IPE were

common in the statements and showcase the mutual respect but also common misperceptions about each other's professional role. Some examples include:

- "I expect a dental hygienist to know the roles of an RD and the knowledge they have to work together with a dental hygienist."
- "I would expect dental hygienists to know that RD's are the food and nutrition experts, and that they should acknowledge situations that call for our expertise."
- "That oral health status is an essential determinant in the nutrition intervention."
- "That an RDH is not simply a person who "cleans teeth" no more than a dietitian is one who helps people "eat right." "

CHAPTER 5

CONCLUSION

Ray C. Williams, DDS from the School of Dentistry, University of North Carolina, Chapel Hill stated "Apparently oral disease could, in fact, contribute to systemic diseases, such as atherosclerosis, diabetes, and adverse outcomes in pregnancy. This concept of the oral health–general health connection is now supported by sound and rational evidence-based observations."[44] He goes on to say that "there is a promising future for preventing and treating this common and troubling condition that affects not just the mouth but the whole body." Dietetic students and dental hygiene students could be the future professionals engaging interprofessional camaraderie by working together to promote general health and to prevent systemic disease.

Disease, medication, and oral factors have significant impact on the patient's nutritional status, and the opposite is also true.[32] If the conditions and treatments are interrelated and reciprocal, would interprofessional education and training not be beneficial?

Limitations

The length of the survey composed of 76 questions could be considered a limitation. Participants verbalized the intensity of the survey because of the volume of the questions. This may have skewed the results because participants' attention and focus may have decreased as the questions continued past their threshold of concentration. The lack of dietetic faculty surveyed at Baylor inhibited comparison of dietetic faculty from each institution. Despite being specific to certain inclusion criteria, the small sample size of the groups may not allow the findings to be generalizable to other institutions with dietetic internship and dental hygiene programs. The data collected on proficiency,

perceived roles, attitudes, and value were analyzed by self-reported surveys. Other limitations such as the definition of "healthy" have been noted previously.

Further Discussion

The survey data results on attitudes on IPE as well as value of the 'other' profession were encouraging and positive. They were consistent among the ETSU and Baylor dietetic, dental hygiene, and faculty groups. However, the knowledge proficiency related to nutrition and oral health between ETSU (45.8% of those surveyed who were considered proficient) compared to Baylor (96% of those surveyed who were considered proficient) is evidence to support the proposal of implementing an interdisciplinary curriculum plan. The questions asked were simple, basic nutrition knowledge questions related to oral health found to be appropriate by experts in the disciplines and program faculty. If dental hygiene students are counseling patients on nutrition choices related to oral health, it is important to understand critical points that may assist in counseling. Some of the most significant areas of opportunity include:

- Question number 8- carbohydrates contain 4 kilocalories per gram
- Question number 11- registered dietitians are trained to treat eating disorders

The latter finding was observed in the qualitative part of the study and is documented below:

> *When I shadowed a clinical round of routine cleaning I asked a dental hygiene student "What do you do if you have a patient with a suspected eating disorder?" The student replied "I don't know. I mean, we have been trained to identify what to look for, but we don't know where to direct them or what to do above and beyond what we do here."*

The opportunity to clarify each profession's role is a major area of opportunity for each discipline and could affect the patient population for both groups. IPE could segue the disconnect that is observed among dietetics and dental hygiene at ETSU.

Data in the area of perceived roles were interesting among the groups. It is significant related to areas of ETSU dietetic students not feeling comfortable counseling patients on oral health issues related to nutrition, which the majority answered "unsure" and Baylor dietetic students "somewhat agreed".

Also, ETSU and Baylor dietetic students were "unsure" about counseling on periodontal disease, which is commonly related to diabetes, an area of expertise for the registered dietitian. This is interesting because ETSU does not have an interdisciplinary program, but Baylor currently does.

The results, especially in areas of proficiency of nutrition knowledge related to oral health and perceived roles among the groups, may be evidence enough to support exploring future IPE possibilities at ETSU. The potential for interdisciplinary education and training between dietetic and dental hygiene students is promising. Learning together to teach each other may have multi-dimensional benefits. We are each an expert in our field but must comply with the scope of practice outlined in our profession. When our knowledge is congruently applied to our colleagues' knowledge, the result may be quality treatment and more long-term solutions versus temporary "Band-Aid" fixes. One of several comments from the qualitative part of the survey revealed similar sentiments including "The importance of the collaboration in the knowledge of both roles (hygienist and dietitian) to effectively treat our patient." and "I expect for a future registered dietitian to work very close with RDH. It is very important for both systemic and intraoral diseases to be discussed by both parties when patients are at risk."

Two survey comments revealed a profound contrast between ETSU and Baylor dental hygiene students' nutrition knowledge related to oral health. An ETSU dental hygiene student stated "I would like them to know even though we deal with the oral cavity daily we do not know a great deal about nutrition" while a Baylor student stated "That we are very educated about health, nutrition, and the oral connection of vitamins, etc." The study results clearly highlight the opportunity for intervention in the area of nutrition knowledge and perceived roles in dental hygiene at ETSU and between ETSU dietetic and dental hygiene students. The positive attitudes related to the benefits, need, and contributions of IPE were undisputed. The self-reported value expressed toward the 'other' profession establishes a strong foundation for IPE to enhance and use the strength of each professional and possibility to impact the future of their practice. Refer to Appendix B for more comments from ETSU and Baylor dietetic and dental hygiene faculty.

The integration of skills from each future professional may lead to increased prevention of dental caries, promoting oral health and strong nutrition practices for the pediatric population, treatment and prevention of diabetes, eating disorders, heart disease, and a plethora of other diet, behavioral, and lifestyle related diseases. By understanding the role and contributions of each of these professions, clarity of the interdependent relationship between oral health and nutrition will be established. In turn this will continue to build a stronger inter-professional foundation focusing on a team approach to healthcare and wellbeing, and ultimately leading to an improvement in systemic health for future patients.

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APPENDICES

APPENDIX A: SURVEY INSTRUMENT

(Appropriately worded and adjusted for each version which included ETSU and Baylor dietetic and dental hygiene students and faculty in each discipline)

Thank you for supporting our research by completing this survey. We realize your time is valuable and we appreciate your participation. The purpose of this research study is to define areas of opportunity to establish a foundation for the implementation of complimentary curricula in dietetics and dental hygiene. The procedures, which will involve you as a research subject, include completing this survey that will take about 30 minutes of your time. Participation in this research experiment is voluntary. You may refuse to participate. You can quit at any time. If you quit or refuse to participate, the benefits or treatment to which you are otherwise entitled will not be affected. You may quit by contacting Monique Richard at richardmm@goldmail.etsu.edu or Dr. Michelle Lee at 423-439-7524 or leeml2@etsu.edu. For questions, comments or concerns, please contact Monique Richard at richardmm@goldmail.etsu.edu or Dr. Michelle Lee at 423-439-7524 or leeml2@etsu.edu. You may contact the ETSU Institutional Review Board at 423-439-6054 for any questions you may have about your rights as a research subject. By continuing to answer the questions in the rest of the survey, you confirm that you have read this document.

PLEASE NOTE: “Shared learning” and “interdisciplinary education/experiences” are used interchangeably

Sex: Male Female

Age: _____

Race/ethnicity: ___White ____African American ____Hispanic ____Other:_____

I am a:

____ First year dietetic intern

____ Second year dietetic intern

Please state the University/Program_____

Section I: (Self-perceived proficiency)

Please rate your answers:

1-Strongly agree 2-Somewhat agree 3-Unsure 4-Somewhat Disagree 5-Strongly Disagree

1.) I am educated about the choices of food and beverages which may lead to the development of risk factors associated with diabetes, cardiovascular disease, hypertension, and other disease.

1 2 3 4 5

2.) I know how many calories are in a gram of fat, protein, and carbohydrate and know their basic metabolic roles.

1 2 3 4 5

3.) I know what vitamins and minerals are important to obtain from a diet in order to promote dental health.

1 2 3 4 5

4.) I am knowledgeable about recommending dietary guidelines for patients with diabetes.

1 2 3 4 5

5.) I am very comfortable educating my clients about complex carbohydrates and simple sugars.

1 2 3 4 5

6.) I am knowledgeable about identifying signs and symptoms of eating disorders.

1 2 3 4 5

Section II (Knowledge)

7.) High quality protein-rich foods are associated with a decreased risk of developing dental caries.

T F

8.) Carbohydrates have 4 kcal/g.

T F

9.) Glossitis could be a result of inadequate folate and/or niacin.

T F

10.) Magnesium is important for bone health.

T F

11.) I know a dental hygienist is trained to identify dental erosions, therefore able to identify patients with a possible eating disorder.

T F

12.) It is the *type* of carbohydrate consumed that affects blood glucose levels as well as increases risk of dental caries.

T F

13.) Simple sugars will elevate blood glucose levels more than complex carbohydrates.

T F

14.) Diet soda is healthier than regular soda.

T F

15.) An appropriate amount of calories for an average individual is approximately between 1500-2000 calories a day (depending on height, weight, and health).

T F

16.) Release of sugar in the body will be the same for a candy bar and a potato.

T F

17.) It is possible to prevent the onset of diabetes with diet.

T F

18.) Exercise stimulates the body to become more sensitive to the effects of insulin.
T F

<u>Please refer to the nutrition facts label to the right to answer the next three questions</u>

Nutrition Facts

Serving Size 1 ounce Servings in bag 4

Amount Per Serving	
Calories 155	Calories from Fat 93
	% Daily Value*
Total Fat 11g	16%
Saturated Fat 3g	15%
Trans Fat	
Cholesterol 0mg	0%
Sodium 148mg	6%
Total Carbohydrate 14g	5%
Dietary Fiber 1g	5%
Sugars 1g	
Protein 2g	

Vitamin A	0%	• Vitamin C	9%
Calcium	1%	• Iron	3%

19.) This food has a low total fat content per serving.
T F

20.) The entire bag contains 155 calories.
T F

21.) A serving is about as big as both your palms cupped together.
T F

22.) Which eating disorder is characterized by binging and purging?
A. Anorexia nervosa
B. Bulimia nervosa
C. Binge eating
D. Anorexia athletica

23.) The number of ounces in a cup is:
A. 10
B. 12
C. 8
D. 5

24.) Two tablespoons of peanut butter looks most like:
A. A ping pong ball
B. A softball
C. A marble
D. A tennis ball

25.) If left untreated, diabetes can cause all of these conditions EXCEPT:
A. Retinopathy (blindness)
B. Nephropathy (kidney failure)
C. Pancreatic cancer
D. Neuropathy (nerve damage)

26.) Insulin is made in the:
A. Liver
B. Pancreas
C. Kidney
D. Blood

27.) Insulin functions to:
A. Lower blood glucose levels
B. Break down carbohydrates
C. Help the GI tract with digestion
D. Make an enzyme that transports nutrients

Section III: (Perceived roles)
Please rate your answers:
1-Strongly agree 2-Somewhat agree 3-Unsure 4-Somewhat Disagree
5-Strongly Disagree

28.) Oral health assessment and counseling should be included in any routine appointment, just like nutrition diagnosis and treatment.
1 2 3 4 5

29.) I have an obligation to improve the health of my patients, which may include discussing oral health care with them.
1 2 3 4 5

30.) Registered dietitians are adequately trained to discuss oral health issues with patients.
1 2 3 4 5

31.) Patients need specific instructions about how to change their behavior regarding oral health.
1 2 3 4 5

32.) I know dental hygienists attend an accredited program, take a national board examination, and a clinical board examination.
1 2 3 4 5

33.) I know dental hygienists are oral health care experts that provide specific instruction in dental and oral health behavior and value them as health care professionals.
1 2 3 4 5

34.) I would refer my future patient to a dental hygienist.
1 2 3 4 5

35.) Patients need follow-up and ongoing guidance after my initial assessment to maintain behavior changes consistent with adequate oral health care.
1 2 3 4 5

36.) It is NOT worth my time to counsel patients with poor oral health about nutrition and the impact on oral care.
1 2 3 4 5

37.) For most patients, oral health care education does LITTLE to promote improvement of dietary habits.
1 2 3 4 5

38.) For most patients, oral health care education does LITTLE to promote improvement of oral health and overall health.
1 2 3 4 5

39.) Patients are NOT motivated to change unless they are sick, have pain, or have a very serious condition.

1 2 3 4 5

40.) I am comfortable in counseling patients with periodontal disease about foods and lifestyle choices to improve their condition.

1 2 3 4 5

41.) A dental hygienist can help a patient understand methods to prevent dental caries.

1 2 3 4 5

Section IV: (Attitude of interdisciplinary education among dietetic students and dental hygiene students)

Please rate your answers:

1-Strongly agree 2-Somewhat agree 3-Unsure 4-Somewhat Disagree 5-Strongly Disagree

42.) Learning with dental hygiene students will help me become a more effective member of the health care profession.

1 2 3 4 5

43.) Patients would ultimately benefit if dietetic students and dental hygiene students worked together to solve patient problems.

1 2 3 4 5

44.) Shared learning with dental hygiene students will increase my ability to understand clinical problems.

1 2 3 4 5

45.) Counseling-based communication skill sets should be learned alongside dental hygiene students.

1 2 3 4 5

46.) Shared learning will help me to positively view dental hygienists and dental professionals.

1 2 3 4 5

47.) Team-working skills are essential for dietetic students to learn effectively.

1 2 3 4 5

48.) Shared learning will help me to understand my own limitations in my nutrition/dietetic practice.

1 2 3 4 5

49.) Shared learning with dental hygiene students will help to clarify the nature of my patients' problems, related to oral health care.

1 2 3 4 5

50.) Interdisciplinary education or experiences with dental hygiene students will benefit my discipline/profession.

1 2 3 4 5

51.) Interdisciplinary education or experiences with dental hygiene students will benefit my patients' quality of life.

1 2 3 4 5

Section V: (Attitude of Interdisciplinary education in general)

Please rate your answers:

1-Strongly agree 2-Somewhat agree 3-Unsure 4-Somewhat Disagree 5-Strongly Disagree

52.) Learning with other students will help me become a more effective member of the health care profession.

1 2 3 4 5

53.) Patients would ultimately benefit if health care students worked together to solve patient problems.

1 2 3 4 5

54.) Shared learning with other health care students will increase my ability to understand clinical problems.

1 2 3 4 5

55.) Counseling-based communication skill sets should be learned alongside other health care students.

1 2 3 4 5

56.) Shared learning will help me positively view other health care professionals.

1 2 3 4 5

57.) Team-working skills are essential for all health care students to learn effectively.

1 2 3 4 5

58.) Shared learning will help me to understand my own knowledge-based limitations.

1 2 3 4 5

59.) Shared learning will help to clarify the nature of the patients' problems.

1 2 3 4 5

60.) Interdisciplinary education or experiences will benefit my discipline/profession.

1 2 3 4 5

61.) Interdisciplinary education or experiences will benefit my patients' quality of life.

1 2 3 4 5

Section VI: (Attitudes on current curriculum)
Please rate your answers:
1-Strongly agree 2-Somewhat agree 3-Unsure 4-Somewhat Disagree
5-Strongly Disagree

62.) I believe my experiences in my current curriculum have supported familiarity with the dental hygienist's roles in health care.
1 2 3 4 5

63.) I believe my experiences in my current curriculum have taught me about inter-professional collaboration with dental hygienists.
1 2 3 4 5

64.) I believe my experiences in my current curriculum have supported communication and understanding about what a dental hygiene student does.
1 2 3 4 5

65.) I believe my experiences in my current curriculum have taught me about how collaborating with dental hygiene students can help me understand the oral health care needs of my patients.
1 2 3 4 5

66.) I believe the faculty in my program and throughout my current curriculum have advocated for interdisciplinary education and activities among dental hygiene students and dietetic students.
1 2 3 4 5

67.) I believe my experiences in my current curriculum have expanded my knowledge of oral health care.
1 2 3 4 5

68.) I believe my experiences in my current curriculum have expanded my knowledge of what dental hygienists are capable of doing.
1 2 3 4 5

69.) I believe my experiences in my current curriculum have clearly defined the interdependent relationship between oral health and nutrition.
1 2 3 4 5

70.) I believe my experiences in my current curriculum have clearly defined the interdependent relationship between oral health and nutrition, while emphasizing the importance of the dental hygienist and registered dietitian's roles in working together to improve the patient's health.
1 2 3 4 5

Section VII: (Perception)
Please rate your answers:
1-Strongly value 2-Somewhat value 3-Unsure 4-Do not value
71.) As a future professional, I believe I will value dental hygienists as colleagues and fellow health-care professionals who have the best interest of the patient in mind.
1 2 3 4

72.) As a future professional, I believe a dental hygienist will value my expertise as colleagues and fellow health-care professionals who have the best interest of the patient in mind.
1 2 3 4

73.) As a future professional, I believe I will value the dental hygienist's role in the healthcare setting.
1 2 3 4

74.) As a future professional, I believe I will value the dental hygienist's role in improving a patient's quality of life.
1 2 3 4

Section VIII: (Open-ended questions/feedback)
75.) What do you *expec*t a future dental hygienist to know about the role of a registered dietitian?
Explain:
_____
_____
_____
_____
76.) What would you *like* a future dental hygienist to know about the role of a registered dietitian?
Explain:_____
_____
_____
_____

Sources:
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Richard, M. A Pilot Study: Comparison of Eating Behaviors of College Students Who Self-Identify as At-Risk for Type II Diabetes and Same-Sex Cohorts Without Risk Factors for Type II Diabetes Using an Ecological Momentary Data Collection Process. Middle Tennessee State University: *McNair Research Review* 2010*:* 8: 156-162.

Shah K, Hunter ML, Fairchild RM and Morgan MZ. A comparison of the nutritional knowledge of dental, dietetic, and nutrition students. *Br Dent J* 2011: 210(1): 33-38.

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APPENDIX B: SURVEY COMMENTS

ETSU Survey Comments Questions 75 & 76

What do you *expect* a future dental hygienist to know about the role of a registered dietitian?	Comments from Dietetic Students and Dietetic Faculty
	-I expect a dental hygienist to know the roles of an RD and the knowledge they have to work together with a dental hygienist. *-That they can refer a patient to an RD if he or she notices a nutritional problem with a patient.* *-I would expect dental hygienists to know that RD's are the food and nutrition experts, and that they should acknowledge situations that call for our expertise.* *-Hopefully enough to know that we have a certain extent of knowledge about oral health and that the mouth is the beginning of GI tract.* *-Oral health/nutrition relationship can be initiated by dental hygienist, would expect them to refer patients with poor oral health to RD.* *-That we exist and are responsible for making sure patients get fed no matter the modality.* *-I would expect the hygienist to know that an RD is a nutrition expert and a vital part of any healthcare team.* *-I would expect a dental hygienist to know the role the RD has in improving the nutritional health of individuals.*
What would you *like* a future dental hygienist to know about the role of a registered dietitian?	*-That oral health status is an essential determinant in the nutrition intervention.* *-The role of an RD is to help patients be as healthy as possible and nutrition related problems are also linked to oral health.* *-I would like them to realize the key role of the registered dietitian in someone's overall health.* *-It's valuable! Our combined expertise can positively impact the patients' overall health.* *-To know the benefit of incorporating a registered dietitian in oral health.* *-I would like dental hygienists to know that there are many health conditions that affect oral hygiene and also have a nutrition component and that RD's are able/willing to assist in the care of these patients.* *-Just basics of what an RD does on a daily basis (diet ed. med. nutrition therapy, educational background etc.)* *-What "RD" stands for; basic idea that we are the "nutrition experts"* *-RD's can assist your patients in selecting dietary choices that may positively impact their patients' oral health.* *-The RD's can be a proactive part of oral health by encouraging healthier food choices and everyday dental care, especially starting at an early age.*

What do you *expect* a future registered dietitian to know about the role of a dental hygienist?	Comments from Dental Hygiene Students and Dental Hygiene Faculty
	-To know that dental hygienists do more than just clean teeth. *-The role that food choices play in oral disease and the roles that oral disease play in overall health.* *-To know that we value their oral health therefore we want to know about the best foods for them.* *-That an RDH is not simply a person who "cleans teeth" no more than a dietitian is one who helps people "eat right."* *-That dental hygienists are licensed professionals and that they are health promotion/disease prevention specialists.*
What would you *like* a future registered dietitian to know about the role of a dental hygienist?	*-I would like them to know even though we deal with the oral cavity daily we do not know a great deal about nutrition.* *-That we also care about their full body health and that oral and body health both ties together. For them to help us collaborate what's best for the patients.* *-I would like them to understand that we can explain connection about diet and dental caries and periodontal disease and that we can recommend they see a dietitian for more in depth knowledge about how their diet impacts them.* *-The role of an RDH covers a wide scope of treatment and approaches to a patient's overall health. As dental hygiene professionals we Assess, Diagnose, Plan, Implement, and Evaluate treatment plans primarily concerning oral needs, however, we attempt/accomplish bridging gap and "connecting dots" to patients overall health.* *It would be nice if they understood the dental hygiene process of care (assessment, diagnosis, treatment planning…*

Baylor Survey Comments Questions 75 & 76

What do you *expect* a future dental hygienist to know about the role of a registered dietitian?	Comments from Dietetic Students
	-I expect a dental hygienist to know that an RD's roles include identifying malnutrition and the contributors of a person's health status; clinical, physical, emotional, environmental etc. *-RD's help people with disease prevention, athletic performance, feeding concerns, manage medical conditions, create meal plans, provide motivation.* *-That we are experts in food; nutrition and can help patients improve their health through diet* *That we are a valuable part of the healthcare team, working to provide quality care to patients using nutrition to heal/strengthen patients and improve their overall health*
What would you *like* a future dental hygienist to know about the role of a registered dietitian?	*-Could use the help of dental hygienist to further our education.* *-I would like for a dental hygienist to know just how seriously a person's oral health contributes to their overall nutrition status.* *-That we can help with dental hygiene by encouraging patients not to drink sugary drinks/snacks and help with reduction of chewing/swallowing problems.* *-When an individual would benefit from seeing a dietitian.* *-That we know more than just how to help a patient lose weight and our goal is to make the patient as healthy as possible.*
What do you *expect* a future registered dietitian to know about the role of a dental hygienist?	Comments from Dental Hygiene Students and Dental Hygiene Faculty
	-I expect for a future registered dietitian to work very close with RDH. It is very important for both systemic and intraoral diseases to be discussed by both parties when patients are at risk. *-I would expect a future registered dietitian to know the role of a dental hygienist in the dental office and our ability to correlate diet to oral health.* *-That we are very educated about health, nutrition and the oral connection of vitamins etc.* *-We do more than just "clean teeth". We can do basic nutrition counseling, but may refer patient for a more in depth look at diet.* *-I would expect them to k now that we have been educated on their roles in dental health as well as overall health and we can help inform the patient of the importance of a healthy lifestyle.* *-The importance of the collaboration in the knowledge of both roles (hygienist and dietitian) to effectively treat our patient.* *-That dental hygienist want to be part of the health care team for patients and that hygienists educate patients about nutrition related to their mouth/body.* *-The RDH treats the whole body when treating the mouth. Active partnerships and networking are key to educating the RDH and giving them referral info for patients.* *-That a hygienist interest in a patient's diet is directly related to their patient's oral health which can lead to poor physical health.*

What would you *like* a future registered dietitian to know about the role of a dental hygienist?	*-I would like the RD to know that we should work as a team for our patients. If we work together to better educate patients there will be a big change.* *-I would like for them to know that we are interested in learning more about the ways we too can help with their nutritional health.* *-I would like for a registered dietitian to be open to share her information/knowledge in regards to patient care.* *-I would like for them to know that we are knowledgeable about nutrition and its effects on the mouth and body. Also dietitians and hygienist need to work together.* *-One of our roles is to work cooperatively with other health professionals especially for the benefit of our patients* *-That we do more than just clean teeth. We educate our patient on how to achieve/maintain optimum oral health through self-care as well as treating the entire body.* *-We are prepared to refer our patients to dietitians when the needs are out of our scope of practice.* *-I would like for them to know that we have the knowledge of nutrition and the relation it has to our teeth but that great communication with a dietitian is essential to patient care.* *-That dental hygienist can prophylactically help their patient with nutrition.* *-Dental hygienists, for the most part, know our limitations when it comes to nutritional counseling and are very willing to refer to a registered dietitian when indicated.*

VITA

MONIQUE M. RICHARD

Personal Data:	Date of Birth: June 7, 2012 Place of Birth: Newport, Vermont Marital Status: Married
Education:	Public Schools, Hardwick, Vermont B.S. Nutrition and Dietetics, Middle State University, Murfreesboro, Tennessee 2010 M.S. Clinical Nutrition, East Tennessee State University, Johnson City, Tennessee 2013
Professional Experience:	Diet Clerk, StoneCrest Medical Center, Smyrna, Tennessee 2009-2010 Assistant Consultant, Allison Nutrition Consulting; Nashville, Tennessee, 2009-2011 Writer, blogger East Tennessean and 2 your health, Johnson City, Tennessee, 2011-2012 Graduate Assistant, East Tennessee State University, College of Clinical and Rehabilitative Sciences Department of Allied Health Sciences, 2011-2012
Publications:	Richard, M. (2011, December) Monique Richard interviews Chuck Haren, Board Advisor of Plenty International and Peg Gregson on international nutrition and food security. American Overseas Dietetic Association (AODA) affiliate of American Dietetic Association, Newsletter- *AODA Passport*, Vol. 34(2), pgs. 16-20. Richard, M. (2012, January 30) Are 'superfoods' really that super for you? *East Tennessean*, p. 7. Richard, M. (2012, September) How to…Write and Publish a Cookbook, *Vegetarian Nutrition Dietetic Practice Group Newsletter.* Vol. 21(2), p. 8-10. Richard, M. (2012, August) Olive Oil: The Mediterranean Diet Staple Remains a Nutritional Workhorse and Dynamic Functional Food. *Dietitians in Integrative and Functional Medicine Dietetic Practice Group Newsletter* Vol. 15 (1), p. 7-9.
Honors and Awards:	Who's Who Among Students at American Universities and Colleges January 2010 Tennessee Dietetic Association Dietetic Intern Scholarship Tennessee Dietetic Association April 2012 International Scholarship

Hunger and Environmental Nutrition Dietetic Practice Group (HEN DPG) The Academy of Nutrition and Dietetics
May 2012
International Foodservice Editorial Council Scholarship
May 2012
Dr. Jane V. White Scholarship
The Academy of Nutrition and Dietetics
June 2012
Susan T. Borra Fellowship
The Academy of Nutrition and Dietetics
July 2012