

# Abstracts: Research Posters

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\*Indicates presenter

## Readiness and Attitudes of Dental Hygiene Students Towards Interprofessional Teamwork and Education: A Homeless Veteran Simulation

Kelly Anderson, RDH, MHS\*;  
Mary Koehn, APRN, PhD;  
Natalie Delacruz, RDH, MAEd\*;  
Barbara S. Smith, PhD, PT

Wichita State University, Wichita, KA, USA.

**Problem Statement:** In recent years, participation in interprofessional activities among healthcare related disciplines has increased. Yet, there is little research regarding dental hygiene student's readiness and attitudes towards interprofessional education and collaboration in comparison to other healthcare professions.

**Purpose:** The purpose of this study was to assess if dental hygiene (DH) students would report increased knowledge and understanding of a homeless veteran's healthcare needs. In addition, we hoped to show that DH students demonstrated higher levels of readiness for interprofessional practice; reported higher levels of knowledge regarding roles of other professions; and demonstrated integration of patient and families within the team in comparison to other healthcare professions over a two-year period.

**Methods:** A convenience sample of graduate and undergraduate students from two universities were used for this mixed-methods study. Students from eight disciplines were invited including: dental hygiene (n=43), social work (n=24), nursing (n=72), physician assistant (n=31), physical therapy (n=46), and medicine (n=6). Speech pathology and pharmacy had no participants in the study's first year. All students participated in the same simulation from year one to year two using a standardized patient who was a homeless veteran, accompanied by a family member. Quantitative data was collected with a pre-and post-test using the Readiness for Interprofessional Learning Survey (RIPLS). A change score was computed by subtracting post RIPLS scores from pre RIPLS scores. Independent samples *t* test was used to compare change scores for each discipline.

**Results:** Change scores did not increase in the second year in dental hygiene or nursing. Post simulation comments

showed students were satisfied with the event. Almost all students reported increased knowledge and understanding of a homeless veteran's healthcare needs; demonstrated higher levels of readiness for interprofessional practice; reported higher levels of knowledge regarding roles of other professions; and demonstrated integration of patient and families within the team. Open-ended responses indicated positive results with students valuing and desiring further interprofessional simulation activities. Data will be further analyzed to identify how DH students compare with the other disciplines.

**Conclusion:** Dental hygiene students were respected for their expertise regarding the oral health needs of the homeless veteran and were considered an integral member of the team. All students gained significant insight into other professional roles and demonstrated improved collaboration especially within non-traditional futuristic teams.

## Collecting Oral Health Data and Providing Care to Nursing Home Residents

Brenda Armstrong RDH MDH<sup>1</sup>\*  
Staci Stout RDH BSDH<sup>2</sup>

<sup>1</sup>Dixie State University, St. George, UT, USA

<sup>2</sup>Salt Lake Community College, Salt Lake City, UT, USA

**Purpose:** Residents of long-term care facilities experience barriers to receiving oral health care including financial, the priorities of caregivers, reduced access to professional dental providers, and even resistance from the residents themselves. In an attempt to address these barriers, Senior Charity Care Foundation and the Utah Dental Hygienists' Association received a grant from Civil Money Penalty Funds to provide comprehensive oral health services to residents in 10 certified nursing homes along the Wasatch Front of Utah. This pilot project addresses the oral health need of residents, trains staff and administration on daily oral healthcare, collects data for further advocacy, and demonstrates the use of a dentist/dental hygienist collaborative agreement.

**Significance:** Data is lacking in Utah to demonstrate to stakeholders and legislators the dental need of nursing home residents. Previous screenings of residents residing in assisted living residence have presented with substantial oral debris,

need for periodontal care, untreated decay, root fragments and broken teeth, severe dry mouth, poor fitting dentures, and suspicious lesions. It is expected that the oral health of residents in nursing homes will be similar or worse given lack of patients' ability for self-care. In addition, lack of understanding of oral health by the staff and administration is addressed with training by dental hygienists participating in the project. Finally, collaborative agreements are relatively new to the profession of dental hygiene and this project will further provide experience and education to dental hygienists providing care in long-term care facilities.

**Key features:** Implementation of the project includes creating contracts with nursing homes, collaborative agreements between dental hygienists and dentists, and designing training programs for both the collaborative agreement dental hygienists and the staff/administration of the long-term care facilities. Collaborative agreement dental hygienists obtain experience in providing place-based care in the nursing home environment. Importantly, the residents receive much needed dental and dental hygiene care at no cost, which previously has not been available.

**Evaluation plan:** To evaluate staff and administration, a researcher-designed pre and post-test questionnaire will be used for quantitative and qualitative data collection. Recommended oral health indicators from the ASTDD will be utilized to collect the resident's oral health data for the surveillance and reported with descriptive statistics. At completion of the project, a qualitative study of dental hygienists utilizing collaborative agreements will be designed and proposed. Funding for this project is provided by the Civil Money Penalty Fund.

### Does Equine Assisted Pediatric Dental Health Education Improve Learning Outcomes?

Meghan McGuinness RDH, BS, MA, EdD

SUNY Broome Community College, Binghamton, NY, USA

\*Helen Battisti PhD, RDN, CDN

Marywood University, Scranton, PA, USA

**Problem:** Upstate New York struggles with health disparities in health professional shortage areas (HPSA). The Academy of Nutrition and Dietetics (2013) states, "As knowledge of the link between oral and nutrition health increases, dietetics practitioners and oral health care professionals must learn to provide screening, education, and referrals as part of comprehensive client/patient care." A gap in the literature exists in examining the utilization of the dental hygienist to

assist in HPSA. Equine Assisted Learning (EAL) is a model that uses purposeful equine-assisted activities to educate individuals and groups. EAL has the potential to assist the inter-professional team to enhance knowledge, change behavior and improve outcomes in pediatric oral health.

**Purpose:** The objective of this pilot study was to provide foundational information as to the efficacy of delivery of nutrition and oral health care information, by dental hygienists, registered dietitians and the horse, especially in HPSA.

**Methods:** A convenience sample of two groups of children, ages 5 – 17 years, (n=36) were recruited from Valley Pediatric Dental Office, Endicott, New York and Unity Stables, Binghamton, New York. The study was a cross-sectional design utilizing the Health Belief Model to highlight susceptibility, severity and benefits of good oral care. EAL was used to highlight the same in horses. Group one received nutrition and oral health education at the dental office and group two received theirs at Unity Stables. Group two was also educated on the oral care and practices of horses. Pre- and post-testing to examine change in nutrition and oral health knowledge and attitude was conducted at baseline and again at six months.

**Results:** Using the Statistical Package for the Social Sciences (SPSS) vs. 24, demographic characteristics of the children showed no significant differences between groups. Group one participants did have more siblings and group two was composed of more girls but neither was significant. When asked how the children felt about having their teeth cleaned at the dental office, there was a significant Timex group effect ( $p=0.05$ ), as the Equine Group, who received dental education at Unity Stables, answered "like" significantly more often than the control group, who received education at the dental office (specific at time 3, Chi-square = 0.007).

**Conclusion:** Results from this pilot study indicate a need for further research in the area. As a result, a research study has received a two-year grant from the Colgate Palmolive Fellowship in Nutrition, Oral Health/Dental Education and the principal investigators are currently recruiting.

### Associate Degree Dental Hygiene Students' Attitudes Toward Service-learning

Wanda Cloet, RDH, MS, DHSc\*

Central Community College, Hastings, NE, USA

**Problem:** Service-learning has been shown to provide students with experiences so they can gain learned skills and abilities. Incorporating service-learning into a dental hygiene

curricula, allows dental hygiene students to see a wider variety of patients as well as providing treatment services and working in clinical settings that they may not experience in their own institutional clinic.

**Purpose:** The purpose of this study was to evaluate associate degree dental hygiene students' attitudes toward service-learning.

**Methods:** The study used a cross-sectional survey design with quantitative and descriptive statistical methods. Methods included an on-line survey emailed to the 288 associate degree dental hygiene programs in the United States. The inclusion criteria included all associate degree dental hygiene students in an associate degree dental hygiene program in the United States. The criteria for exclusion included all dental hygiene students who were currently not enrolled in an associate degree dental hygiene program. These students would include students enrolled in baccalaureate dental hygiene programs, bachelor dental hygiene completion programs, and master dental hygiene programs in the United States. The survey was sent to program directors of associate degree programs. Program directors forwarded the survey to their students and was completed by 550 associate degree dental hygiene students. The survey assessed variables associated with service-learning dental hygiene didactic education and variables associated with value of service-learning in the treatment of patients.

**Results:** The service-learning input variables were correlated with the output variable of overall service-learning providing knowledge using the Pearson Correlation test. The strongest positive correlation was the descriptive variable of helps with critical thinking ( $r=.743$ )  $p<.05$ . The weakest positive correlation was the descriptive variable of helps treat special needs ( $r=.583$ )  $p<.05$ . The correlation analysis demonstrated a significant correlation with the relationships of both the variables of service-learning dental hygiene didactic education and service-learning in the treatment of patients to the output variable of overall attitudes of service-learning.

**Conclusion:** Results indicate that associate degree dental hygiene students have an overall positive attitude of service-learning. Additional research may be found beneficial to include dental hygiene faculty perceptions of service-learning in the dental hygiene curricula. Other research could also identify how service-learning can be incorporated into the dental hygiene curricula.

## A Comparison of Dentists' and Dental Hygienists' Opinions on Dental Therapists

Yvette Ly, BSDH(c)

Elizabeth Schuberg, BSDH(c)

Kathryn Bell, RDH, MS

Amy Coplen, RDH, MS\*

Pacific University, Hillsboro, OR, USA

**Problem:** As the United States (U.S.) continues to face an increasing demand for oral health care, many states are examining alternative provider models as well as the role of the dental hygienist (DH) to meet their access to care needs.

**Purpose:** The purpose of this study was to assess the acceptance of incorporating a dental therapist (DT) into Willamette Dental Group (WDG), a regional corporate dental group.

**Methods:** A survey tool using a cross-sectional study design was adapted from a previous study of DHs in Oregon and approved by Pacific University's IRB. The survey link was emailed via Qualtrics in March of 2017 to all dentists (220) and DHs (187) employed by WDG.

**Results:** Responses were received from 172 individuals, 85 dentists and 86 DHs, for a response rate of 42%. Dentists and DHs differ significantly on their opinion of the need of a DT ( $p<.001$ ), the level of supervision necessary for a DT ( $p<.001$ ), their scope of practice ( $p<.001$ ), and appropriate tuition for potential DT programs ( $p<.001$ ). Seventy-five percent of DHs at WDG are either very or somewhat interested in becoming a DT. Dentists and DHs differed significantly on their opinion on the appropriate salary of a dental therapist ( $p<.001$ ). Dentists reported a mean salary of \$78,766.67 and dental hygienists' reported a mean salary of \$108,434.48 was appropriate. The majority of dentists and DHs agreed that a DT should be an existing registered dental hygienist (RDH) (61% and 89% respectively). The majority of DHs and dentists were open to having a DT on site (63% and 76% respectively,  $p=0.017$ ).

**Conclusion:** Although analysis of the data collected showed that dentists and DHs at WDG differed significantly in their opinions about DTs, the majority of dentists and DHs at WDG are open to having a DT as part of their dental team. Additionally, a large number of DHs at WDG are interested in becoming DTs.

## North Carolina Nurses' and Dental Hygienists' Knowledge Regarding Electronic Cigarettes

Kayla M. Cunningham RDH, BSDH, MS<sup>1\*</sup>  
Lynne C Hunt RDH, MS, Med<sup>1</sup>  
Lauren L. Patton, DDS<sup>1</sup>  
Rebecca S. Wilder, RDH, MS<sup>1</sup>  
Devon Noonan, PhD, MPH, FNP-BC<sup>2</sup>

<sup>1</sup>University of North Carolina, Chapel Hill, NC, USA

<sup>2</sup>Duke University, Raleigh, NC, USA

**Problem:** E-cigarettes have become popular among teens and adults, but little is known about health professionals' knowledge and practices regarding patient education on e-cigarette safety and efficacy in place of tobacco products.

**Purpose:** To assess North Carolina (NC) dental hygiene (DH) and nursing students' and practitioners' knowledge, opinions, and behaviors regarding e-cigarette use.

**Methods:** A convenience sample of DH students and registered dental hygienists (RDHs) in attendance at the NC Dental Hygienists' Association 2017 Annual Fall Scientific Meeting and nursing students and registered nurses (RNs) in attendance at the 2017 NC Nursing Association Annual Convention completed anonymous surveys designed for the respective student and practitioner group. Following pre-testing, the final surveys contained 36 questions across domains of practice behaviors, knowledge, opinions, curriculum/training, and demographics. Data were analyzed using Cochran-Mantel-Haenszel tests.

**Results:** There were 146 completed student surveys (65 nurse/81 DH) and 144 completed practitioner surveys (90 nurse, 54 DH). After controlling for status (practitioner or student), there was an association between status and knowledge that e-cigarettes frequently deliver less nicotine per puff than cigarettes ( $p=0.003$ ). Practitioners answered correctly more often. There was an association between status and knowledge regarding FDA's regulation of e-cigarette use in the United States ( $p=0.04$ ). Practitioners answered correctly more often. After controlling for status, there was a significant average difference in comfort level discussing tobacco cessation with patients between the two groups ( $p=0.005$ ); however, there was not a significant average difference in comfort level discussing alternative tobacco products (snus, dip, chew, Hookah, etc.) with patients between the two groups ( $p=0.09$ ).

**Conclusion:** To improve NC DH and nursing providers' knowledge about the health impact of e-cigarettes, impacting their patient tobacco education efforts, DH and nursing curricula and continuing education programs need to address e-cigarettes, their health effects, and how to deliver tobacco and alternative tobacco product cessation counseling.

## Dental Hygiene and Dental Student Knowledge of HPV-related Oropharyngeal Cancer and HPV Vaccination

Barbara Leatherman Dixon, RDH, BS, MEd<sup>1\*</sup>  
Deanna Kepka, PhD<sup>2</sup>  
Lilliam M. Pinzon, DDS, MS, MPH<sup>1</sup>  
Laura Martel, BS<sup>2</sup>  
Holdunn Rutkoski, BS<sup>3</sup>  
Djin Lai, RN, BS<sup>4</sup>  
James R. Winkler, DDS, PhD<sup>1</sup>

<sup>1</sup>University of Utah, School of Dentistry, Salt Lake City, UT, USA

<sup>2</sup>Huntsman Cancer Institute, Salt Lake City, UT, USA

<sup>3</sup>University of Nevada, Las Vegas: School of Dental Medicine, Las Vegas, NV, USA

<sup>4</sup>College of Nursing, University of Utah, Salt Lake City, UT, USA

**Problem:** Oropharyngeal cancer (OPC) caused by human papilloma virus (HPV) is dramatically increasing across the United States (US). An estimated 16,500 people will be diagnosed with OPC this year, and 70% of those will be attributed to HPV. HPV vaccination, although effective, remains underutilized. Oral healthcare professionals (OHP) should play a direct role in educating patients on HPV-OPC and the importance of vaccination.

**Purpose:** This cross-sectional study assessed dental and dental hygiene students' knowledge and perceptions regarding HPV, HPV-OPC, and HPV vaccination.

**Methods:** Final year dental hygiene (DH) students and 3rd or 4th year dental students (DS) from 15 schools (6 dental hygiene and 9 dental) in the US were surveyed using a validated online 153-item data collection tool to determine HPV, HPV-OPC and HPV vaccination knowledge, as well as perceived scope of practice regarding patient education, and role in recommending and administering the HPV vaccination. A total of 120 DH students and 1245 DS were eligible to participate. For DH the response rate was 69% ( $n=83$ ) and for DS the response rate was 22% ( $n=276$ ). The overall study response rate was 26%. Descriptive statistics were calculated using SAS.

**Results:** The acceptable knowledge level was a minimum of 70% correct answers. Overall knowledge was poor for DH (34%) and DS (37%). Adequate knowledge of HPV was lower for DH compared to DS (57% vs. 75%) while adequate knowledge of vaccination was slightly higher in DH (46%

to DS 44%). More DH students (99% vs. 57%) felt a head and neck exam (HNE) should be conducted each office visit. 94% of all students communicate with patients about the purpose and results of the HNE, yet 80% of both student groups cited not feeling comfortable discussing HPV-OPC etiology and sexual history. Insufficient appointment time was another critical factor in lack of willingness to discuss HPV-OPC. Fewer students said they had insufficient time to discuss vaccines (DH 37% vs. DS 54%.) 77% of both groups cited lack of vaccine information as a barrier to communication. Interestingly, a high percentage of students (DH 82%, DS 86%) are willing to be trained to administer the HPV vaccine.

**Conclusion:** The world has vastly benefited from vaccine programs to control the morbidity and mortality of infectious diseases. Dental education curricula emphasis on HPV disease management through vaccination holds great potential for decreasing HPV-OPC rates. OHPs must play a major role in addressing the public health cancer crisis associated with HPV.

### Dental Hygienist's Knowledge, Attitudes, and Practice for Patients with Dental Anxiety

Debra Drown, RDH, MSDH\*  
Lori Giblin-Scanlan, RDH, MS  
Jared Vineyard, PhD  
Dianne Smallidge, RDH, MDH  
Christine Dominick, CDA, RDH, MEd  
Carl-Otto Brahm, PhD  
Jason Armfield, PhD  
MCPHS University, Boston, MA, USA

**Problem:** There is a lack of recent research regarding the association between dental anxiety (DA) education and dental hygienists (DHs), suggesting a high demand for updated research implicating DHs experiences regarding their approach to patients with DA.

**Purpose:** The objective of the study was to assess the knowledge, education, attitudes, confidence, and practice of DHs providing dental care to adult patients with DA.

**Methods:** The cross-sectional study used a purposive sample of DHs (n=412), using a snowball sampling technique, were recruited through dental hygiene social media sites. Inclusion criteria were limited to actively practicing RDHs in the United States (US) who completed the entire survey. The modified survey had 29 questions regarding DA knowledge, education, attitudes, confidence, and practice. A regression analysis and chi square tests were performed on the data with research outcomes represented through frequency tables and percentiles.

**Results:** Dental hygienists reported DA as a “somewhat serious” to “extremely serious” issue when treating patients (72.7%). Those reporting their education had not prepared them to address DA were more likely to report the need for greater DA education. Those who reported their education prepared them to address DA, 48% reported the need for additional education in DA. Dental hygienists who reported a higher level of confidence in addressing DA in their patients resulted in giving themselves extra time during their appointment to treat patients with DA.

**Conclusion:** Increased DA education in DH undergraduate curriculum, and post-graduate education opportunities may increase confidence and capability for management of DA.

### Implementation of Oral Health Education in Nursing Curriculum

Roxanne Dsouza, RDH, MS<sup>1\*</sup>  
Jennifer Brame, RDH, MS<sup>1</sup>  
Rocio Quinonez, DMD, MS, MPH<sup>1</sup>  
Sara Hubbell, DNP, RN, NP-C<sup>2</sup>

<sup>1</sup>University of North Carolina at Chapel Hill School of Dentistry, Chapel Hill, NC, USA

<sup>2</sup>University of North Carolina at Chapel Hill School of Nursing, Chapel Hill, NC, USA

**Problem:** Nurses are part of the primary care team and are in a perfect position to complete oral health assessments and provide counseling and referrals for their patients using current oral health content for nurses.

**Purpose:** The objective of the study was to evaluate the knowledge, confidence, practice behaviors, and perceived barriers of nursing students regarding preventive oral health services.

**Methods:** Using a pre-post survey study design, 64 Accelerated Bachelor of Nursing (ASBN) first-year students at the University of North Carolina at Chapel Hill were asked to complete oral health related questionnaires following a didactic and hands-on small group training workshop on principles of oral health, oral health screening, counseling, and referral to a dentist. A post-survey following clinical rotations was completed testing the long term effectiveness of the oral health training. Questionnaires were pilot tested prior to study initiation. Descriptive statistics were completed on pre-post surveys. Inferential statistics will be completed to compare pre-post questionnaire data.

**Results:** Fifty-five ASBN students completed the pre-survey, 49 completed the post-survey; 44 completed both surveys. Participants' that completed both surveys showed an

increase in knowledge scores from pre-post surveys for four of five questions. Confidence scores showed an increase in performing oral screenings (34% to 91%) and counseling patients about their oral health (91% to 98%); scores decreased in confidence regarding dental referrals (89% to 86%). Following intervention and clinical rotations, 45% of post-survey respondents indicated that they provided oral health counseling, 37% performed oral health screenings, and 8% provided dental referrals. Post-survey respondents reported that the oral health training increased their willingness to perform oral screenings (96%), provide oral health counseling (98%), and refer patients to a dentist (96%). One hundred percent of post-survey respondents recommended the oral health training for future nursing students.

**Conclusion:** Interprofessional didactic and simulated oral health educational opportunities increased knowledge, confidence, and willingness among ABSN students in delivering preventive oral health services in the medical home.

### **Efficacy of Glycine Air Polishing for the Maintenance of Dental Implants and Treatment of Peri-Implant Diseases: A Systematic Review**

Iwonka T. Eagle RDH, MS\*

Danielle Furgeson RDH, MS, DHS

University of Michigan School of Dentistry,  
Ann Arbor, MI, USA

**Problem:** Due to their biological composition, peri-implant diseases have become a challenge in the maintenance of dental implants. Glycine air polishing (GAP) is used for dental implant maintenance. There is no standardized protocol for the use of GAP in the maintenance of peri-implant diseases.

**Purpose:** To evaluate the clinical effectiveness of GAP for the maintenance of dental implants with or without peri-implant diseases including peri-implant mucositis and peri-implantitis.

**Methods:** PubMed and Medline were used to identify clinical trials that assessed the effectiveness of GAP in reducing clinical indices of inflammation. The authors utilized key terms such as; dental implants, implant maintenance, peri-implantitis, peri-implant mucositis, randomized control trial, glycine, and air polishing. Search limitations included human studies, published in the English language between 1995-2018. One hundred sixty-three (163) titles and abstracts were independently screened by two reviewers. Differences between the reviewers regarding included articles were discussed, and decisions were made to include or exclude the disputed articles. Articles with abstracts that were not relevant to the topic were eliminated.

**Results:** Eleven articles were identified, and nine were included in the analysis. A meta-analysis could not be performed due to the heterogeneity of the studies. Instead, a descriptive, systematic review was performed. Studies evaluated the effects of a variety of professionally applied treatments: GAP, ER:YAG laser, mechanical debridement, ultrasonic device, and localized application of chlorhexidine. All studies reported periodontal pocket depths (PPD), and bleeding upon probing (BOP). Other primary outcomes analyzed were plaque index/score (PI, PS), bleeding index/score (BI, BS), mucosal recession and overgrowth, clinical attachment level (CAL), bone height, implant crevicular fluid, and bacterial counts. All studies found GAP to have comparable results with other treatments in producing clinically beneficial outcomes. Data from two studies showed areas treated with GAP to have a significantly higher reduction in BOP, while one study determined a decrease in PPD when using GAP vs. mechanical debridement. Both the Er:YAG laser and glycine air polishing treatment methods were shown to reduce bacterial count one month after therapy, however failed to reduce bacterial load at six months. Follow up periods ranged from one week to 12 months.

**Conclusion:** The use of GAP has beneficial effects in the maintenance of dental implants by significantly decreasing clinically relevant measures. Furthermore, GAP is effective in non-surgical treatment of peri-implant diseases. More clinical studies are needed to evaluate and develop standardized protocols for the use of GAP for the maintenance of dental implants and non-surgical treatment of peri-implant diseases.

### **Integration of Forensic Dentistry/Catastrophe Preparedness Course in Dental Hygiene Curricula: A Twelve-Year Study**

Winnie Furnari, RDH, MS, FAADH\*

New York University College of Dentistry,  
New York, NY, USA

**Purpose:** The study sought to measure students' perception of gaining advanced knowledge in core content and the effect this knowledge has on the decision to become more involved by furthering education or participation in community efforts in forensic dentistry and catastrophe preparedness. It also sought to relate the reasons for students taking the course and if it effected their future plans to seek further education and participation in forensic dentistry and catastrophe preparedness.

**Significance:** A Forensic Odontology/Catastrophe Preparedness course is uncommon in dental hygiene program curricula. The addition of these types of courses has the potential to raise

professional awareness and effect participation and professional development. Using these as a guideline, a Forensic Dentistry/ Catastrophe Preparedness course is offered at New York University College of Dentistry.

**Key features:** Core Content of Forensic Odontology courses are in place and published by the American Board of Forensic Odontology (ABFO). The research received IRB approval from NYU and consisted of a survey with eighteen questions. A total of 85 students in the bachelor degree track completed the surveys, which represents 100% participation. The survey asked questions about gaining knowledge from each of the modules. This study cumulates twelve years of surveys taken by dental hygiene students upon completion of the course from 2005 to 2016.

**Evaluation plan:** A descriptive analysis was completed and the surveys indicate significant acceptance and satisfaction with the course objectives, content and experiences. Results: Fifty-nine percent of the students stated they are interested in furthering this type of education. Fifty-two per cent stated they planned to join a forensic team and thirty-five per cent stated they plan to join a reserve corps for preparedness and response. This study found that students are accepting in expanding their knowledge and experience in this field of study.

### **Glycine Powder or Sodium Bicarbonate Powder Air-Abrasive Debridement Around Implants: Which Is More Effective and Safer in Reducing Biofilm and Inflammation?**

Marie Varley Gillis, RDH, MS, DHSc\*

Nova Southeastern University, Fort Lauderdale, FL, USA

**Problem:** Dental hygienists need to make evidence-based decisions when treating the bacterial infections associated with mucositis or peri-implantitis. Dental hygiene educators need to prepare students for clinical practice and licensing examinations and to present evidence-based course material.

**Purpose:** In patients with dental implants showing clinical signs of mucositis or peri-implantitis, will air-abrasive debridement using glycine-based powder compared with sodium bicarbonate powder, reduce more biofilm and inflammation without damaging the implant surface?

**Methods:** This systematic review sought to determine which agent to use in an air-abrasive debridement handpiece to treat signs of inflammation of mucositis or bone loss associated with peri-implantitis around titanium dental implants without damaging the implant surface. The literature review included peer-reviewed clinical trials and laboratory research

that compared the use of glycine-based powder and/or sodium bicarbonate in reducing inflammation and biofilm scores using recognized clinical indices, and implant morphology using scanning electronic microscopy. The NSU Health Professions Division Library, Cochrane Library, MEDline, PubMed, and the sub-specialty dental database of the U.S. Medical Databases were used. Resource information was used from the American Academy of Prosthodontics for best practices for implant maintenance instrumentation.

**Results:** Criteria included: confidence assessment, high quality of reporting, hierarchy of evidence, researcher credibility, timeliness, and suitable research designs in studies fewer than five years old. Twelve articles meeting the criteria supported glycine-based powder as a better choice than sodium bicarbonate to use in an air-abrasive handpiece when treating patients with mucositis or peri-implantitis. The surface of the titanium implants showed no damage with either agent; sodium bicarbonate-treated implant surfaces harbored more salt deposits.

**Conclusions:** The results indicate that air-abrasive debridement on ailing implants with glycine-based powder (a) reduces biofilm equally to sodium bicarbonate, (b) produces a greater reduction in inflammation, (c) does not damage the implant surface, and (d) could be a better choice for patients with sodium restrictions.

\*Funding for this project was provided by the National Center for Dental Hygiene Research and Practice.

### **Perceived Barriers to Academic Success for International Students Studying at Dental Hygiene Programs in the United States**

Susan Jenkins, RDH, PhD\*

MCPHS University, Boston, MA, USA

**Problem:** Academic difficulty can often be a significant problem for students in health professions programs, including dental hygiene. International students often encounter various barriers to their academic success, yet little is known about this phenomenon. International students may face a higher attrition rate due to their English language skills, adapting to a new educational system, and adjusting to different cultural norms. International and native dental hygiene students also need to learn the language of dentistry. Although research has been done in this area, there are no studies looking at the discipline of dental hygiene.

**Purpose:** The purpose of this study was to investigate international students' perceptions related to the barriers that

interfere with their academic success as students in a U.S. dental hygiene program.

**Methods:** This qualitative study utilized a purposive, sample of 12 dental hygiene students, from 3 baccalaureate level dental hygiene programs. Students participated in blended methodology research consisting of focus groups or interviews. A semi-structured interview guide was utilized. Demographic information was also collected. Data was gathered in a face-to-face focus group or through ZOOM® video conferencing. IRB approval was obtained from Simmons College and MCPHS University.

**Results:** The most significant barrier, for all 12 participants, was a lack of understanding of the English language. Differences in customs, especially classroom behaviors, and adjusting to a different educational system were also found to present challenges.

**Conclusion:** The findings of this study were similar to those in other disciplines, with language literacy and communication skills presenting the biggest challenges. A new finding was the level of respect, or lack thereof, between students and faculty. Some international students overcome these barriers and are ultimately successful others are not so fortunate. Future research should address study habits of international students and how interventions/recommendations have aided international students in achieving academic success.

### Dental Hygiene Student Perceptions Regarding Loupes and Headlights

Denise Kissell, BSDH, EFDA, MPH\*

The Ohio State University, Columbus, OH, USA

**Problem:** The use of magnification loupes and coaxial illumination, commonly known as headlights, in dentistry has been dramatically increasing in past years. Research has discussed the benefits to ergonomics that the use of this technology offers to dental professionals during patient care. Based on this research, some dental hygiene programs are requiring the use of magnification loupes and headlights. There is limited research regarding the use of this technology in the educational setting to support whether these should be mandated for student and faculty use as part of patient care.

**Purpose:** The purpose of this study was to determine the perceived value of using loupes and headlights among dental hygiene students. Objectives included determining the perceived impact on the ergonomics, accuracy and efficiency of patient care. The study also assesses the attitudes toward the required use of this technology by dental hygiene students and faculty.

**Methods:** This IRB approved study was conducted using an online Qualtrics survey. The 24-question survey was distributed through university email to all dental hygiene students at 7 of the 13 dental hygiene programs in Ohio who chose to participate. The 148 responses from this convenience sample were collected anonymously.

**Results:** Of the respondents 90.5% reported wearing loupes and 86% reported using a headlight. Those who agreed or strongly agreed that loupes improves accuracy and efficiency of patient care were 94% and 91%, respectively, with a slight drop to 92% and 90% regarding a headlight. 98% perceived improved ergonomics with loupes, 81% with a headlight. Only 5.1% felt that they would be as comfortable providing patient care without loupes while 23.4% would be comfortable without a headlight. 67% agreed or strongly agreed that loupes should be required of students, 82% of whom indicated that this equipment should be introduced during pre-clinical courses. The number of positive responses dropped to 48% regarding a headlight mandate. The students felt less strongly that faculty be required to use loupes and a headlight at 55% and 31%, respectively.

**Conclusion:** Although 61% were mandated, the results between those within a program mandating loupes and those that did not were similar regarding improved ergonomics, accuracy and efficiency of patient care. Loupes were perceived as more valuable for patient care than headlights. Respondents indicated that they would feel compromised in providing patient care without magnification or a headlight. Respondents who were not mandated to purchase loupes or headlights were less supportive of a mandate.

### A Way with Words: A Pilot Study Using Tailored Provider-Patient Communication to Advance Oral Health Literacy

Jamillee Krob RDH, MPH, DHEd\*

Aultman College of Nursing and Health Sciences,  
Canton, OH, USA

**Problem:** Poor oral health literacy (OHL) can lead to unnecessary oral disease, which has been associated with systemic diseases like cardiovascular disease, diabetes, some cancers, and pre-term low birth weight. More study is needed concerning practical ways to improve OHL in dental clinical settings.

**Purpose:** The purpose of this pilot study was to determine if an oral health education intervention, using a tailored provider-patient communication technique called the teach-back method, could affect OHL levels in adults; and, to determine

the practicality and acceptability of the intervention's delivery model in the dental clinical setting.

**Methods:** A pilot study, pre-experimental one-group pretest-posttest design, was implemented at a FQHC. The Health Literacy in Dentistry (HeLD) (Parker et al., 2012) assessment tool was used pre/post intervention to assess participants' OHL levels. The intervention consisted of a 30-minute, single face-to-face patient education module using the teach-back method covering the oral/systemic link and proper oral hygiene. Changes in total score from pre/post-intervention OHL data were analyzed via a paired samples Student's t test to determine a statistical significant mean change post intervention. Study participants' age and self-efficacy were also assessed for effect post intervention. All statistical testing was two-sided with  $p < 0.05$  considered statistically significant. Effectiveness of tailored provider-patient communication and patient understanding of information presented in the intervention was evaluated through the use of a learning outcome rubric and tracking log specifically developed for this project. The instrument was used to assess patient understanding of the face-to face oral health education intervention encounter.

**Results:** Of the 36 participants who participated in pre-assessment and the initial portion of the intervention, 29 returned for the 2-week follow-up and post assessment. Although there was a positive change in the overall mean HeLD score from pre to post intervention by 3.5 points, the calculated p value was 0.435 indicating no statistical significant improvement of OHL levels post-intervention. The intervention did not have a statistical significant effect on self-efficacy among study participants. A significant negative association was noted between change in HeLD total score and age ( $R_s = -0.292$ ,  $p = 0.033$ ) indicating the positive change in HeLD score decreased with increased age; linear regression indicated younger participants tended to increase their HeLD total score more than older participants. Test parameters (i.e., established time limits for module delivery) were met concerning the practicality and acceptability of the intervention's delivery model. The teach-back data was scored according to the learning outcome rubric and tracking log. A dichotomous measure of whether the participants met the learning objective was assessed. Subjects meeting the learning objective were to be compared to those who did not, to determine whether age may influence meeting the learning objective; however, 100% of all post study time point participants met pre-established learning objectives at posttest analysis.

**Conclusion:** While OHL levels in adults who participated in the intervention did not increase, the second objective of this study was met. The use of tailored provider-patient

communication and the constructs of the teach-back method for oral health instruction were well received by participants and education assessment results indicated the method can enhance the receiver's oral health practices. Likewise, tailored provider-patient communication via this method can be delivered consistently and practically in the clinical setting.

### Assessing Emerging Pediatric Dental Workforce Preparedness to Improve Oral Health Outcomes for Infants and Young Children in Hawai'i

Melinda Lau, RDH, BSDH, MEd\*

Deborah J. Mattheus PhD, MSN, CPNP, ARNP

Kristine Osada, RDH, BSDH, MEd

Katherine Y.M. Burke, MPH

Maureen Shannon, PhD

School of Nursing and Dental Hygiene,

University of Hawaii at Manoa, Honolulu, HI, USA

**Problem:** Children 0-5 years of age in Hawaii experience the worst childhood oral health outcomes nationally: 7 out of 10 3rd graders experience tooth decay, 7% need urgent dental care and 60% lack dental sealants. Workforce data indicates 80% of local dentists practice in general dentistry, less than 4% serve the pediatric population and only 36% of dentists participate in Medicaid. In addition, the only BS Dental Hygiene Program in Hawai'i currently offers students <1% of their clinical experiences with children. To improve pediatric outcomes, DH students must be better prepared to meet the oral health needs of 143,075 children on Medicaid.

**Purpose:** The aim of this study was to understand current employment settings, practice type and percent of pediatric patients served by recent BS DH graduates. Secondly, the survey assessed comfort in providing pediatric oral health care services such as dental sealants, fluoride varnish and oral health education to parents as well as gauge interest in a post-bachelors pediatric expanded function dental hygiene certificate program.

**Methods:** The sample for this cohort study consisted of the last three BS DH classes (2014-2016). Convenience sampling was used with survey distribution to sixty DH graduates using Google Forms. Survey questions asked for demographic information, pediatric experiences, practice patterns post-graduation and interest in a future pediatric DH program.

**Results:** The survey results from (N=29, 49% response rate), using descriptive statistics, revealed that only 10% of the graduates worked in a pediatric practice and overall, 10% of patients seen were 0-5 years of age and 11-25% were 5-18

years of age. Graduates described comfort with providing pediatric dental care as developing but not proficient. In addition, 97% of graduates would consider obtaining a post-BS pediatric expanded function DH certificate.

**Conclusion:** Limited pediatric didactic and clinical educational experiences for BS dental hygiene students may affect the choices of dental practice settings following graduation, as well as the graduates' comfort level in providing pediatric care. Curriculum changes should be considered in order to improve the comfort and skill level of future BS students in the area of pediatric dental care.

### Does Dental Hygiene Student Engagement While Enrolled in the Dental Hygiene Program Influence Academic Achievement?

Susan M. Leiken, RDH, MSPH, PhD\*

Lorain County Community College,  
North Elyria, OH, USA

**Problem:** Dental Hygiene Programs are concerned with dental hygiene student success. Expansion of the scope of dental hygiene responsibilities, reflected in Dental Hygiene Practice Acts, has led programs to intensify curriculum with more robust and demanding dental health instruction. Therefore, concern over students' abilities to progress and graduate has prompted dental hygiene programs to investigate ways to improve student success.

**Purpose:** Utilizing Alexander Astin's, Student Involvement: A Developmental Theory for Higher Education, this study investigated national trends of dental hygiene student engagement, both in the dental hygiene program, and in student chapters of the American Dental Hygienists' Association (ADHA). The study investigated dental hygiene student involvement and its association with student success, as measured by cumulative GPA. The intent of this study was to present results that provide dental hygiene educators with a better understanding of how dental hygiene student involvement impacts academic achievement.

**Methods:** The ADHA electronically distributed the researcher's originally prepared 40-item questionnaire to 12,000 dental hygiene students in accredited US dental hygiene programs. The response rate was 22% and a completion rate of 94%. The research design was quantitative non-experimental and adapted Astin's I-E-O model as a data analysis framework. Student demographics represented inputs (I), dental hygiene student-interactions represented environments (E), and cumulative grade point average (GPA) represented the output (O). The goal for this procedure was to control and adjust for student input variable

effects, to determine their influence on the student's GPA. The survey data were analyzed using causal analytical modeling via blocked regression analysis (CAMBRA). Regression analysis was used to investigate if any correlations existed between the independent variables and the dependent variable.

**Results:** Three positive predictors were found to influence student success. The statistically significant predictor variable describe the quality of interactions with faculty (0.087\*\* P-value < 0.01), indicated the higher students rated the quality of interactions with dental hygiene faculty, the higher their GPA. Holding a higher education degree ( $\beta= 0.063^{**}$ ,  $p < 0.001$ ) was found to be a significant predictor. Thirdly, self-report of quality of interactions with program director ( $\beta= 0.017$ ), indicated the higher students rated the quality of interactions with program directors, the higher their GPA.

**Conclusions:** There is little research on dental hygiene student engagement in dental hygiene programs, or in student chapters of the ADHA. This study's data may promote future educational program policy changes to enhance dental hygiene student engagement activities, leading to improved student success.

### Enhancing the Public Health Education of Dental Hygienists through an Interprofessional BSDH/ MPH Degree Program

Marion C. Manski, RDH, MS<sup>1\*</sup>

Diane Marie St. George, PhD<sup>2</sup>

Sheryl E. Syme, RDH, MS<sup>1</sup>

<sup>1</sup>University of Maryland School of Dentistry,  
Baltimore, MD, USA

<sup>2</sup>University of MD School of Medicine,  
Baltimore, MD, USA

**Problem:** Public health is inherently an interdisciplinary field. The achievement of the goal of *Health for All* requires the intellectual and creative contributions of professionals from a multitude of fields. Students in the dental hygiene profession, a discipline with prevention at its core, will be faced with multiple opportunities to engage in public health during their careers. The American Dental Hygienists' Association defines five professional roles for a dental hygienist. As such, whether a hygienist chooses a career in clinical practice, education, administration, research and/or advocacy, public health will be at the core and focus of their role. The purpose of the accelerated program is to provide a dental hygiene student the ability to begin graduate coursework while still a baccalaureate degree student, and enhance the role of a dental hygienist with a graduate degree in public health.

**Significance:** Advanced educational programs that enable dental hygienists to assume public health leadership roles, support the need to prepare a diverse healthcare workforce tasked with solving unmet oral and general health problems. These programs facilitate interprofessional education as students from many disciplines on campus (medical, nursing, social work, dental, pharmacy, law) take public health graduate courses. This collaboration between baccalaureate dental hygiene and graduate public health programs sharing a similar emphasis on health promotion and disease prevention, monitoring of population health status and needs, and strategic efforts to plan evidence-based, effective and efficient, comprehensive, equitable and sustainable healthcare initiatives, provides an innovative approach to empowering healthy individuals and communities. We have developed an accelerated program for undergraduate dental hygiene students desiring a graduate degree.

Currently there are 21 masters in dental hygiene programs in the United States. Dental hygiene baccalaureate programs lacking a masters degree in dental hygiene can collaborate with other graduate programs on campus enhancing a dental hygienist's graduate experience beyond dental hygiene—creating a collaborative provider, be it clinical, research, administrative, leadership or education. The creation of an accelerated BSDH to graduate program can “jump start” an undergraduate's path to graduate school. Students can choose in the spring of their first year in dental hygiene if they would like to pursue an MPH through our innovative accelerated BSDH-MPH program. If so, they apply and can be “conditionally accepted” by the MPH graduate program and allowed to take 2 graduate courses (one in the fall and one in the spring of their senior year), in lieu of 2 undergraduate dental hygiene courses. These courses count for the BSDH and the MPH degrees. In the winter/spring of their senior year they formally apply to the MPH program. After BSDH graduation in May, they are fully enrolled graduate students. While starting out small (2 students are currently graduate students from the DHYG graduating class of 2017), this program has been innovative and exciting to potential dental hygiene students and proved to be a great fit to the professional objectives of expanding the dental hygiene knowledge base. This presentation describes the program, identifies challenges faced in implementation and how they were addressed and shares outcomes of the inaugural class.

**Key features:** At the University of Maryland, Baltimore, we have developed a pipeline program for undergraduate dental hygiene students who are interested in careers in public health. Key features are a formal MOU collaboration between School of Dentistry (SOD) and the School of Medicine (SOM)

Master of Public Health program. Upon BS graduation and fulfillment of contingent admissions criteria for the MPH program, DH graduates matriculate seamlessly into the MPH graduate program having completed 2 core MPH courses. This accelerated program increases the cadre of public health educated RDH-BS, MPH graduates; expands the capacity of dental hygienists to address public health issues and serve local, national and global communities.

**Evaluation plan:** The academic calendar provided challenges for coursework. The calendars of the MPH and the BSDH differ; the MPH program had to move a summer course to the fall so that the tuition of the undergraduate student would be in effect. Otherwise our BSDH student would be charged graduate credit fees. Furthermore, the dental hygiene program created a one credit “Special Topics” course so that required learning objectives were achieved to meet the dental hygiene program competencies. The Special Topics course provided dental hygiene program-specific content needed for completion of the BS degree that was not present in the 2 MPH graduate courses.

Successful BS to MPH matriculation and retention and graduation rates of BS to MPH students will be used to evaluate effectiveness of the accelerated BS to MPH program. Currently there are 2 students that applied and successfully entered the program and are currently in graduate school for the MPH. These inaugural students will complete their first year of graduate school this year. They were successful taking the graduate coursework while in our undergraduate program and the MPH Director stated that they brought in a dental perspective to an interprofessional cadre of MPH graduate students. Evaluation will monitor the successful transition of further students in the future into this accelerated program and the completion of our inaugural two students.

### Promoting Discussion and Peer-Learning with Student Response System

Anna Matthews, RDH MS\*

New York City College of Technology / CUNY,  
New York, NY, USA

**Problem:** Formative assessment, including low-stakes quizzing, is essential to monitor student progress. Quizzes can be conducted using student response systems (SRS), otherwise known as ‘clickers’. Demonstrated advantages of SRS include increased student participation, interactivity, promotion of class discussion, instant availability of results, and immediate instructor feedback. SRS can be also used in peer-learning activities. However, faculty may hesitate to incorporate SRS

due to perceived difficulty in learning and using the system by their students.

**Purpose:** This study (CUNY IRB approval #2015-0464) evaluated the students' perceptions about incorporating SRS and peer-learning activities using clickers in the first-semester dental hygiene course Oral Anatomy (DEN1112).

**Methods:** Two hundred forty-two students (n=84, 2015; n=76, 2016; n=82, 2017) participated in the primary longitudinal cohort study by completing an anonymous paper-based survey about their experiences with clickers in DEN1112 and their views about SRS as an assessment tool for quizzes. All students in DEN1112 were eligible to participate and survey response rates were 96.6%, 96.2%, and 100% in 2015, 2016, and 2017, respectively. The SRS (ELMO, New York, USA) has been used for weekly quizzes in DEN1112 since fall 2015. In fall 2016, peer-learning activities were introduced in quizzes using clickers. Peer-learning method allowed the students to discuss selected quiz questions in small groups after submitting their initial answers and then answer the question again with only their second answer recorded for grading. Following the introduction of peer-learning activities in fall 2016, the students were also asked about their opinions about the peer-learning method. Results were analyzed by descriptive statistics.

**Results:** Although the majority (73.97%, n=179) of all respondents were not familiar with clickers before DEN1112, at the completion of the course 56.42% of them felt 'very comfortable' and 33.52% were 'somewhat comfortable' using SRS. Overwhelming majority of all students felt that weekly quizzes were helpful in motivating them to study for each session and students valued the interactivity, user-friendliness, and immediate feedback and discussion provided by the SRS. Since the introduction of the peer-learning activities in Fall 2016, majority of respondents (85.44%, n=135) found peer-learning small group activities using clickers 'very helpful' and fifty students explained in the optional comments how peer-learning was beneficial to them. Most respondents (92.86%, n=143) estimated that they changed their initial answer 50% of times or less following small-group discussions.

**Conclusion:** The majority of students easily adapted to clickers and embraced the interactivity, discussion, and feedback enhanced by the SRS. Students appreciated the small-group interactions during clicker-based quizzes and noted the benefits of peer-learning.

## Student Perceptions of Adaptive Quizzing

Kristin Minihan-Anderson, RDH, MSDH\*

Sandra Stramoski, RDH, MSDH\*

Karen Sue Williams, RDH, MS

Deirdre Cloonan, RDH, MSDH

University of Bridgeport, Fones School of Dental Hygiene, Bridgeport, CN, USA

**Problem:** Dental hygiene education programs are faced with challenges such as student retention, ensuring students' competence to provide care to diverse patient populations and successful completion of standardized examinations required for licensure. Many the Fones School of Dental Hygiene students require educational support due to culturally and linguistically diverse backgrounds and financial constraints leading to employment demands. Student perception and use of adaptive quizzing which was integrated into courses to assess knowledge, develop test-taking skills, and provide educational support, was evaluated via an anonymous survey to determine its impact on confidence and content preparedness for coursework and taking the National Board Dental Hygiene Exam (NBDHE).

**Purpose:** The purpose of this study was to determine student utilization and perceptions of Elsevier Adaptive Quizzing (EAQ), and focused modular testing, within dental hygiene courses during the 2016-2017 academic year. Additionally, modular content testing related to the three major NBDHE areas as well as an exit exam were conducted with the class of 2017. The descriptive survey assisted with program evaluation of the value of this resource to students' reported academic confidence and success.

**Methods:** An electronic link to a descriptive survey, created in SurveyMonkey®, was provided to 82 potential participants, with a response sample of 61 students (74%). Participants (N=61) from the classes of 2017 (n=28) and 2018 (n=33) utilized adaptive quizzing for required classwork, assigned quizzes and academic remediation. Additionally, students could self-initiate quizzing, exam preparation, evaluate reading comprehension and pre/post lecture review of content. Survey accessed by all participants consisted of 21 EAQ-based questions. Participants from the Class of 2017 were provided four additional questions related to Health Education Systems Incorporated (HESI) Modular Exams. This testing evaluates student content competency at predetermined intervals throughout the program. Descriptive statistics were used for calculating and reporting results.

**Results:** Twenty participants (33%) identified English as a second language, 74% (n=45) used EAQ for self-quizzing and

56% (n=34) used it for test prep. Participant's strongly agreed/agreed adaptive quizzing improved knowledge of course content (57%), improved confidence with material (54%) and identified weaknesses during exam preparation (61%). Class of 2017 participants (n=28) strongly agreed/agreed modular testing improved confidence with question formatting (57%) and was beneficial in board exam preparation (53.5%).

**Conclusion:** Adaptive quizzing and NBDHE modular content testing are viewed by a majority of students as beneficial component to the educational process. Further study of the outcomes of these resources is needed.

### Attitudes and Access Patterns of Michigan Veterans not Eligible for Veterans' Affairs Oral Health Care: A Cross-Sectional Study

Valerie Nieto, RDH, BSDH\*

Danielle Furgeson, RDH, MS, DHSc

University of Michigan School of Dentistry,  
Ann Arbor, MI, USA

**Problem:** One dental visit annually is a key oral health objective of Healthy People 2020 to reduce oral health disparities. The veteran population is at increased risk of oral health disparities due to chronic health conditions, mental health disorders, unique social/cultural contexts, and significant socioeconomic challenges. While veterans qualify for health care through the Veteran Affairs (VA) system, oral health care is not included, leaving millions of socioeconomically challenged veterans without access to oral health care.

**Purpose:** The purpose of this study was to assess Michigan veteran's attitudes toward oral health care, access to oral health care services, and how they pay for those services.

**Methods:** A 24-question survey was developed and pilot tested. A paper survey was disseminated to a convenience sample of 300 veterans from Michigan affiliated with various veteran organizations including VFW and American Legion Posts, and student veteran organizations. Frequency distributions, means, and standard deviations were analyzed to provide an overview of the data. The Pearson chi-square test was used to investigate the association of having a service connected disability and VA medical and oral health care, dental benefits, and challenges of receiving oral health care. Significance was set at  $p < 0.05$ .

**Results:** A total of 193 surveys were completed for a response rate of 64%. Forty-five percent of respondents reported a service-connected disability qualifying them for VA health care. While 77% reported not being eligible for VA dental

care, respondents rated the importance of dental health as extremely important (4.56,  $\pm 0.806$ ). One-third of respondents reported not having a dental home, with 35% reporting no dental care in the last 12 months. More than half of respondents reported cost as the greatest challenge to accessing care. Pearson chi-square test found statistical significance of a service-related disability and receiving medical care at the VA hospital (.000), qualifying for dental care at the VA hospital (.006), receiving dental care at the VA hospital (.006) and having dental insurance benefits (.032).

**Conclusion:** Veterans in Michigan value the importance of oral health care, yet are subject to disparities in access to care. Cost, ineligibility for VA oral health care, and lack of dental insurance are the greatest barriers to veterans accessing oral health care. Further studies should focus on the unique cultural and social contexts of veterans that impact oral health disparities in the veteran population.

### Expanding the Pediatric Dental Workforce to Improve Oral Health Outcomes for Infants and Young Children in Hawai'i

Kristine Osada, RDH, BSDH, MEd\*

Deborah J. Mattheus, PhD, MSN, CPNP, ARNP

Melinda Lau RDH, BSDH, MEd

Maureen Shannon, PhD, CNM, FNP

School of Nursing and Dental Hygiene,  
University of Hawaii at Manoa, Honolulu, HI, USA

**Purpose:** The goal of this program is to increase access to dental services for children between 0 and 5 years of age residing in underserved areas of Hawai'i by enhancing the University of Hawaii at Manoa Bachelor in Science Dental Hygiene (DH) curriculum and implementing an Expanded Function Dental Hygiene (EFDH) certificate program.

**Significance:** Children in Hawaii experience the worst oral health outcomes nationally: 7 out of 10 third graders experience tooth decay, 7% need urgent dental care and 60% lack dental sealants. Currently, 80% of dentists are in general practice, less than 4% serve the pediatric population and only 36% participate in Medicaid. In addition, there is only one Bachelor (BS) Dental Hygiene (DH) Program available in Hawai'i which currently offers DH students <1% clinical experiences with children. The University of Hawaii at Manoa (UHM) School of DH will revise the current DH BS curriculum and develop an EFDH certificate program to prepare graduates to meet statewide oral health needs of 143,075 children on Medicaid.

**Key features:** Year 1, the BS curriculum will be revised and an EFDH program curriculum will be developed and Year 2, the curriculum will be implemented, community-based mobile clinical training sites will be identified and pediatric dental residents will be engaged. In Years 3-5 of the grant the program will further increase enrollment to the EFDH program, track the progress of both EFDH and BS students, in addition to increasing the number of sites located in designated underserved rural community to improve dental access for children.

**Evaluation plan:** The EFDH program and revisions to the BS DH curriculum, which includes increasing pediatric didactic and clinical experiences, will be evaluated utilizing a clinical tracking tool (Typhon), student evaluations, in addition to feedback obtained from key stakeholders in the community. Typhon will measure key indicators of the program's success including the number of children 0-5 year seen for dental assessments by BS/EFDH students; number of community based sites engaging in (mobile) oral health care by DH students; the number of DH students enrolled in the BS and/or EFDH from neighbor islands; in addition to the number children 0-5 years accessing dental homes. An annual DH graduate survey will also measure practice patterns and comfort in providing pediatric care upon completion of the program. Formal and informal presentations to community members and health care providers will be used to disseminate results and to gain further insight on the ongoing community's oral health needs.

### The Role of Dental Hygienists in Teaching Pre-doctoral Dental Students\*\*

Yanira Owens, RDH, BS, MHA<sup>1\*</sup>

Amy DeStaffany, RDH, BS<sup>1</sup>

Meghan Crow RDH, BS<sup>1</sup>

Lonnie Johnson, DDS, PhD<sup>1</sup>

Terri Tilliss RDH, PhD<sup>1</sup>

Rachel L. Johnson, BA<sup>2</sup>

Brian McNair, MS<sup>2</sup>

<sup>1</sup>University of Colorado School of Dentistry,  
Denver, CO, USA

<sup>2</sup>Center for Innovative Design and Analysis.  
University of Colorado, Denver, CO, USA

**Problem:** Cross-professional educators are an example of interprofessional education. Non-dentist basic science academicians have traditionally taught in the dental curriculum. Dental hygienists also instruct dental students; the extent of this pedagogy is unknown.

**Purpose:** The purpose of this research was to investigate the parameters of didactic, preclinical, and clinical instruction to pre-doctoral dental students by dental hygienist educators.

**Methods:** There were two components to this study. The first was a primary, quantitative cohort study comprised of a seven-question survey sent electronically to all deans of clinical or academic affairs of the 76 North American, ADEA-affiliated dental schools. The study was exempted by the university IRB. If respondents indicated that dental hygienists teach dental students, they were asked to complete an additional eight questions regarding the titles, roles, educational degrees, and content taught by the dental hygienists. Data was collected with REDCap electronic data capture tools. For the second component, 102 graduating dental students, in a curriculum with a history of dental hygienists educating dental students, completed a questionnaire evaluating the impact of dental hygienist educators. Categorical variables were summarized with frequencies and percentages. Continuous variables were analyzed with means and standard deviations.

**Results:** Dental hygienists instruct pre-doctoral students in 76% of responding schools. In most schools, the minimum degree required to teach didactically is a master's degree, while a bachelor's degree is required at the preclinical/clinical level. Common content taught by dental hygienists was periodontal instrumentation. Other concepts frequently taught by dental hygienists were instrument sharpening, oral hygiene education/motivation, infection control and electronic health records. Research design and ethics were taught least often by dental hygienist educators. In 17% of responding schools, dental hygienists also instruct graduate level residents. There was not a significant association between dental hygienists instructing pre-doctoral students and the school offering a dental hygiene educational program. In the dental student questionnaire, 87% of respondents found dental hygienists to be very effective educators in the components assessed. There were no significant differences in responses between the traditional and international dental students.

**Conclusion:** Dental hygienists educate predoctoral dental students, providing curricular content beyond periodontics. Their educational role is highly valued by dental students.

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## The Effects of Fenugreek Toothpaste on Patients with Gingivitis: A double-blind, randomized, placebo-controlled clinical trial

Marie Paulis, RDH, MSDH\*

Mark Kacerik, RDH, MS

University of New Haven, New Haven, CT, USA

**Problem:** Gingivitis is a common form of periodontal disease that causes redness, inflammation and bleeding of the gingiva, the part of the gum that surrounds the teeth. Fenugreek or *trigonella foenum-gaucum* L., leguminosae is an herb that has been used as a spice and for its medicinal properties for thousands of years. The toothpaste utilized in the study utilizes fenugreek extract, which is obtained through a patented process.

**Purpose:** The purpose of this clinical trial was to study the efficacy of toothpaste containing fenugreek extract (*Trigonella foenum-graecum* L.) on patients with gingival inflammation.

**Methods:** This was a double-blind, randomized, placebo-controlled, clinical trial. Fifty-six patients with gingival inflammation were randomly assigned to either the study group or the control group by an investigator not involved in the clinical examinations. This investigator kept the group assignments in a sealed envelope in a locked cabinet until the statistical analysis was completed. Toothpaste tubes were placed in bags labeled 1- 56 by the same investigator who assigned participants to their study groups. The allocation ratio of control to study group was 1:1. The control group consisted of 28 patients who used generic fluoridated toothpaste not containing fenugreek and the study group consisted of 28 patients who used toothpaste containing fenugreek extract. Fenugreek or *trigonella foenum-gaucum* L., leguminosae, belongs to the plant family *fabacaceae*. It has been used in many countries, including Asia, Europe, India, Iran, and the United States as a spice, an anti-inflammatory, an antibacterial, and to treat numerous illnesses. Most commonly, its medicinal uses include lowering blood sugar; increasing milk supply in lactating women, and as a skin-soothing agent to heal burns.

Patients were followed weekly for 4 weeks, at which times bleeding, inflammation and plaque indices were recorded by utilizing the Papillary Index of Muhlemann, Gingival Index of Loe and Silness, and the simplified Oral Hygiene Index (OHI-S), respectively. Statistical analyses were performed using SPSS statistical analysis software to identify differences between the control group and the study group. Descriptive statistics and repeated measure ANCOVA were used to analyze the data. IRB approval was obtained from the University of New Haven.

**Results:** Bleeding upon probing decreased by a mean of 1.0 in the study group who used the fenugreek toothpaste, whereas, it decreased less significantly (0.852) in the placebo group. In week 1 of the study, almost half (48%) of the participants were described as having red gingiva, with the remaining (52%) described as having pink gingiva. By week 4, those with pink gingiva in both the study group and control group rose to over 80%, with more improvement observed in the control group (+3.7%) than the study group. Plaque levels decreased in the study group in weeks 2-4 as compared to the group that used the placebo toothpaste, although not enough to be statistically significant ( $p > .05$ ) ( $F = .054$ ). Gingival inflammation, as measured weekly by the Gingival Index of Loe and Silness, showed a consistent decrease weekly in the study group while in the placebo group the inflammation decrease was less significant in weeks 1-3 and inflammation increased in weeks 3-4. Therefore, the final decrease in the mean from weeks 1-4 in the placebo group was 0.48 whereas there was a 0.56 decrease in inflammation after week 4 in participants using the fenugreek toothpaste.

**Conclusion:** The study results demonstrated a decrease in gingival inflammation and bleeding after using the toothpaste containing fenugreek extract. It is recommended that a large-scale study be conducted.

\*\*Funding for this project was provided by Dr. Marc Benhuri, DMD and the University of New Haven

## Dental Hygiene Student Perceptions of Interprofessional Relationships and Learning

Mary Kay Scaramucci, RDH, MS\*

Ruth Anne Van Loon, PhD

Sarah Cummins-Sebree, PhD

University of Cincinnati Blue Ash College,  
Blue Ash, OH, USA

**Problem:** With practice act changes, emerging societal needs, and new technology, the future of dental hygiene is evolving. As healthcare programs develop and implement new curricula, student attitudes need to be measured in order to assess Interprofessional Education (IPE) curricular effectiveness.

**Purpose:** This research study assessed dental hygiene students' attitudes toward IPE to determine its value and effectiveness in the curriculum.

**Methods:** This IRB approved study consisted of a convenience sample of 43 first and second year dental hygiene students. A two-level, within-subjects, quasi-experimental design was used to determine change in attitudes toward interpersonal

cooperation through participation in Open School. Two cohorts of dental hygiene students took the Readiness for Interprofessional Learning Scale (RIPLS) prior to and after participating in Open School. The RIPLS is a 19-item questionnaire that measures attitudes toward interprofessional cooperation on four subscales: Teamwork and Collaboration, Negative Professional Identity, Positive Professional Identity and Roles and Responsibilities. A Likert rating of 1-5, with one being strongly disagree to 5 being strongly agree was used. Descriptive statistics and dependent t-tests with alpha set at .05 compared pre- and post- survey data to look for changes in interpersonal cooperation attitudes.

**Results:** Data from the first cohort (N=29) confirmed fourteen students who completed both surveys based on ID numbers. All 19 survey items had high means in both pre and post surveys. Students had similar positive opinions with statements prior to and after Open School. Significant change was evident from pre to posttest in 7 of the 19 survey items. Students gave more positive responses at the end of the event with statements regarding shared learning, communication skills with other health professionals and working in small groups. Conversely, students gave more negative responses at the end of the event with the statement of not knowing their professional role; thus being more confident in what their professional role will be.

**Conclusions:** Although less than half of the statements showed significant improvement in responses, students responded strongly on both pre and post surveys. Students were confident with many of the statements prior to the Open School event. Additionally, students became more confident in knowing what their role would be in an interprofessional environment as well as communicating with other healthcare professionals and patients. They also expressed greater ability in becoming a team worker upon graduation. Favorable attitudes are impacting the collaborative educational opportunities provided to the dental hygiene students with the Open School event.

### Clinical Teaching Behaviors as a Predictor of a Dental Hygiene Instructor's Emotional Intelligence

Dianne L. Smallidge, RDH, EdD\*  
Kathleen J. Patenaude, EdD, RN, CNE  
Nancy Puglisi, PhD  
Linda D. Boyd, EdD, RDH, RD  
Jared Vineyard, PhD  
MCPHS University, Boston, MA, USA

**Problem:** The development of strong interpersonal relationships between clinical instructors and students has been

found to contribute to effective clinical teaching. Research also suggests individuals who possess a high level of emotional intelligence (EI) are more successful in building strong interpersonal relationships. Yet, the evaluation of clinical instructors' EI and its link to clinical teaching effectiveness (CTE) has not been extensively examined.

**Purpose:** The purpose of this study was to measure the CTE and EI of dental hygiene (DH) clinical instructors, and to identify any statistically significant correlations found between the CTE and EI assessment outcomes.

**Methods:** A cross-sectional quantitative study was conducted to assess the level of emotional intelligence, and the clinical teaching effectiveness, of DH clinical instructors. A purposive, convenience sampling technique was used to recruit participants from 43 dental hygiene programs across the US. Two online assessments, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) and a modified version of the Nursing Clinical Teaching Effectiveness Inventory (NCTEI), were used to measure EI and CTE. Demographic data collected from participants was also included in the exploratory data analysis, which used both regression analysis and Spearman's ranked correlation coefficient to analyze the data.

**Results:** Forty-two clinical instructors, from DH programs representing nineteen states, completed both the MSCEIT and the modified NCTEI. Strong correlations were found between negative clinical teaching behaviors and MSCEIT outcomes. The NCTEI variable regarding an instructor's promotion of student dependence was negatively correlated to their MSCEIT overall ability score of emotional intelligence ( $r_s = -.356$ ,  $Q = .021$ ). The NCTEI variable regarding instructors' unrealistic expectations of students had a negative correlation to two subset MSCEIT scores, i.e., using emotion (demonstrating empathy) ( $r_s = -.313$ ,  $Q = .044$ ) and managing emotion ( $r_s = -.326$ ,  $Q = .035$ ), and a strong negative correlation to overall EI ability ( $r_s = -.431$ ,  $Q = .004$ ). These correlations were significant, as the adjusted R<sup>2</sup> statistic indicated the model accounted for 36% of the variance in overall EI of the study's participants.

**Conclusion:** Dental hygiene clinical faculty who exhibit negative clinical teaching behaviors, may also possess a low level of emotional intelligence. Raising awareness of the link between CTE and EI, and developing EI skills in instructors, may diminish negative teaching behaviors, and improve the learning experiences of students in DH clinical settings. Future research should also include the participation of DH students when assessing the CTE of dental hygiene instructors.

## Patients' Oral Health Literacy, Motivation and Barriers Regarding Interdental Deplaquing

A. Jackie Smith, RDH, MS<sup>1\*</sup>  
Antonio J. Moretti, DDS, MS<sup>1</sup>  
Jennifer L. Brame, RDH, MS<sup>1</sup>  
Akane Takemura, PhD<sup>2</sup>  
Rebecca S. Wilder, RDH, MS<sup>1</sup>

<sup>1</sup>University of North Carolina, School of Dentistry,  
Chapel Hill, NC, USA

<sup>2</sup>Sunstar Americas, Inc., Schaumburg, IL, USA

**Problem:** Periodontal disease has been linked to systemic effects and is mostly preventable through proper oral hygiene care. Despite this knowledge, patient compliance with interdental deplaquing remains a concern.

**Purpose:** The aim of this mixed methods study was to assess patients' oral health literacy, motivation level, and barriers regarding interdental deplaquing.

**Methods:** In a larger study comparing two interdental home care devices, forty-nine participants completed daily diaries and 2 questionnaires regarding motivation, tiredness, confidence and satisfaction for their deplaquing method. Mantel-Haenszel chi-square tests analyzed these results. All participants were invited to focus group discussions about their oral health behaviors, literacy, motivators and barriers regarding interdental deplaquing. Discussions were digitally recorded, transcribed, and imported into ATLAS.ti 7.5.15 to apply codes and identify themes.

**Results:** Analysis revealed no statistically significant differences between the two groups in age, sex or ethnicity. There was a statistically significant higher agreement among the floss group about ability to remove food/debris interdentally ( $p=.01$ ), cleaning thoroughly interdentally ( $p=.02$ ), fitting easily interproximally ( $p<.001$ ), and clean feeling of the mouth ( $p=.01$ ). There was statistically significant higher agreement among the Soft-Pick<sup>®</sup> group about ease and efficiency of use ( $p=.01$ ), convenience ( $p=.003$ ), easy to hold ( $p=.0001$ ), and easy use away from home ( $p=.008$ ). Daily diary revealed higher motivation and compliance rates in the Soft-Pick<sup>®</sup> group. Some focus group participants reported not feeling clean unless they deplaqued interdentally, however, most reported lacking motivation due to time constraints, lack of immediate or tangible rewards, lack of knowledge on proper use of interdental devices, or benefits of using them.

**Conclusion:** This study showed that barriers to interdental deplaquing may hinder patients' motivation to perform this function daily. Interdental deplaquing behavior may be largely

affected by poor levels of literacy and motivation in patients. Future investigations should focus on methods to increase patient motivation and consistency of use with interdental devices.

## Arresting and Preventing Early Childhood Caries through a Silver Diamine Fluoride and Fluoride Varnish program

Jennifer Stane, RDH, BSDH  
Melissa Efurud, RDH, EdD\*

University of Arkansas for Medical Sciences,  
Little Rock, AK, USA

**Purpose:** Children in the United States miss over 51 million hours of school every year due to dental pain and dental visits. In 2008, 4 out of 5 children in Arkansas had evidence of past caries or were currently experiencing caries. As of 2015, 1,884 children below the age of 5 were living below poverty level in Pulaski County. It is well known that income has a direct effect on one's ability to afford medical or dental care, especially in a county where over 11% of its residents do not have health insurance.

**Significance:** The significance of this project lies in increasing access to dental care by providing dental screenings during childcare hours and by providing treatment sessions after work hours. The program is intended to reduce the current caries rate among children who attend University of Arkansas for Medical Sciences (UAMS) Head Start or live in the 12<sup>th</sup> Street neighborhood.

**Key features:** Children enrolled at the UAMS Head Start facilities, or who are residents of the 12<sup>th</sup> Street neighborhood were screened for dental decay, and received fluoride varnish application in October and November, 2017. Children with need for treatment of carious lesions were treated at a scheduled "kid's nights" at 12<sup>th</sup> Street Health and Wellness Center (12<sup>th</sup> St. HWC). Those children with urgent non-symptomatic decay received application of Silver Diamine Fluoride (SDF) in November and those with non-urgent decay received SDF treatment in February, March, and April, 2018. Parent education was completed by dental hygiene students as part of a community dentistry course.

**Evaluation:** Screenings, and fluoride varnish was provided for 181 (20%) of the children ages 2-5 enrolled at UAMS Head Start facilities. Screenings consisted of decayed, missing and filled teeth (dmft). SDF treatment was provided for the 6 (3%) children with non-symptomatic decay. Parents were educated on proper oral hygiene methods and benefits and drawbacks of SDF application. The overall savings with the

use of SDF in comparison to traditional preventive and restorative measures was \$4873.00<sup>5</sup>.

**Conclusion:** This program has helped parents whose children attend UAMS Head Start locations in Pulaski County by providing dental screenings and dental treatment during school hours or after work hours. This program has the potential to screen over 800 children yearly. As parents realize they no longer need to miss work to fulfill the screening required to attend UAMS Head Start more participants are anticipated. As screenings increase, SDF treatment will likely increase.

### Utilizing an Oral Care Specialist and Teledentistry within Title I Schools to Improve Access to Care

Staci Stout RDH, BSDH\*

Salt Lake Community College, Salt Lake City, UT, USA

**Purpose:** Dental hygienists practicing within a school setting as an oral health specialist are helping many children to receive preventive dental care and oral health education. Collaborative practice between the dental hygienist and a dentist utilizing teledentistry allows dental concerns to be identified and addressed early. This ground-breaking practice is new to the state of Utah and is designed to address access to care while demonstrating to stakeholders the viability of place-based care.

**Significance:** Oral health pilot programs have been created in two schools that have a large number of students below the poverty level. Most of these children face barriers to receiving regular oral healthcare and a significant number are from refugee families who have never experienced a dental visit of any kind. The onsite dental hygiene clinic offers preventive dental hygiene care and oral health education to students enrolled in the program and all students receive oral health education within the classroom. Comprehensive dental hygiene care is enhanced by utilizing a teledentistry exam by a collaborating dentist. Data is collected on demographics, screening outcomes, preventive services provided, and referral for dental needs.

**Key features:** The programs have a dental hygienist onsite up to two times per week to provide students with oral health education, examination/assessment, x-rays, prophylaxis, sealants, fluoride varnish and silver diamine fluoride application. This provides an oral health resource to the school that can immediately address dental needs. Dental hygiene students are utilized to assist the program in the data collection, teledentistry exams, and oral health education. The experience may increase the likelihood a dental hygiene graduate will

seek future opportunities to provide place-based care. A daily tooth-brushing program for first grade students is used in one of the school programs to further improve oral health outcomes.

**Evaluation plan:** The pilot programs use the Child-Level Data Collection form adapted from Sealant Efficacy Assessment for Locals and States (SEALS) from the Center for Disease Control. Data is collected to evaluate demographics, screening outcomes, and services provided. Preliminary results show that only half of students see a dentist regularly. Thirty percent of the students have either never seen a dentist, or only see a dentist for emergencies, even though more than seventy percent of the children have some form of dental coverage. Follow-up data will be compared as the program continues. ADHA IOH has provided funding for these pilot programs.

### Student Providers' Blood Pressure Recording Practices: Device matters

Julie Sutton, RDH, MS\*

University of Missouri Kansas City, Kansas City, MO, USA

**Purpose:** This study's purpose was to compare three different types of blood pressure (BP) recording devices (an automated arm cuff, an automated wrist cuff, and a manual cuff/stethoscope combination) for accuracy, patient comfort, and convenience.

**Methods:** During this cross-sectional study, three types of sphygmomanometers were tested on a convenience sample of 150 study participants. Participants were obtained from the patients presenting for dental hygiene services at a Midwestern urban dental school. Systolic and diastolic measures were collected for all three devices, as well as two 5-point Likert scales: clinician evaluated convenience (with a rating of one being "very inconvenient" and five being "very convenient") and patient evaluated comfort (with a rating of one being "very uncomfortable" and five being "very comfortable"). Descriptive statistics were calculated for all variables of interest by cuff type. Repeated measures ANOVA using the Greenhouse-Geisser adjustment and ETA-squared statistics were used to test for differences in means in BP and rating measure by cuff type. Post-hoc comparisons using Tukey's procedure were calculated to determine pair-wise differences. An association between the cuff type and convenience rating was evaluated using the Chi-square test, and between cuff type and convenience rating using Fisher's exact test.

**Results:** There was a significant difference in systolic BP by cuff type ( $p < 0.001$ ). The automatic wrist cuff recorded an average of 11.30 and 8.76 mmHG higher systolic BP than the standard cuff and the automatic arm cuff respectively

( $p < 0.001$  for both). There was not a significant difference in systolic BP between the standard and automatic arm cuff ( $p = 0.226$ ) nor was there a significant difference in diastolic BP by cuff type ( $p = 0.137$ ). There was a significant difference in patient comfort rating by cuff type ( $p < 0.001$ ). The comfort rating averaged 0.68 and 0.62 higher (more comfortable) in the standard and automatic wrist cuff (respectively) on the 5-point Likert scale than in the automatic arm cuff ( $p < 0.001$  for both). There was also a significant difference in clinician convenience rating by cuff type ( $p = 0.005$ ). Hygiene students rated the automatic arm and wrist cuff higher (more convenient) than the standard cuff by an average of 0.35 and 0.31 respectively ( $p = 0.005$  and  $0.019$  respectively) on the 5-point Likert convenience scale.

**Conclusion:** Blood pressure cuff readings with traditional sphygmomanometer and stethoscope or an automated brachial cuff are comparable while the wrist cuff reading deviated significantly. For the measurement of consistent blood pressure, the three cuff types are not interchangeable.

### Dental Hygiene Diagnosis: A Qualitative Case Study of Dental Hygienists

Darlene J. Swigart, RDH, BS<sup>1\*</sup>

JoAnn R. Gurenlian, RDH, PhD<sup>2</sup>

Ellen Rogo, RDH, PhD<sup>2</sup>

<sup>1</sup>Oregon Institute of Technology, Klamath Falls, OR, USA

<sup>2</sup>Idaho State University, Pocatello, ID, USA

**Problem:** Problem Statement: Diagnosis refers to identifying a disease based on signs and symptoms. Healthcare professionals in all fields utilize diagnosis as a means to identify and discuss diagnosis with patients and formulate a plan for treatment. Dental hygienists incorporate the dental hygiene diagnosis (DHDx) into clinical practice to assist in the prevention and management of oral diseases. A DHDx is the second of six components of the dental hygiene process of care. Nevertheless, very little is documented regarding how and why practicing dental hygienists incorporate a DHDx in the clinical setting, and how dental hygienists identify patient oral disease and formulate dental hygiene care plans that address patient education, disease prevention strategies, and treatment modalities.

**Purpose:** The purpose of this qualitative study was to explore the DHDx to gain an in-depth understanding of how dental hygienists experience this phenomenon while providing dental hygiene care.

**Methods:** A qualitative case study research design was employed with purposive and snowball sampling methods. Data were collected from semi-structured interviews with dental hygienists actively practicing in California, Oregon, or Colorado ( $n = 10$ ). The interviews were audio-recorded, transcribed verbatim and verified for accuracy. Data analysis included open and axial coding to determine themes regarding DHDx. Member checks and peer examination established validity of the data analysis. The study design underwent full IRB review from Idaho State University's Human Subjects Committee and received approval (IRB-FY2017-252).

**Results:** Data analysis of participant interviews revealed four themes. The first theme validated the DHDx as a necessary component in the dental hygiene process of care that facilitates patient-centered care. Second, foundational learning of the DHDx begins in dental hygiene education; confidence and full value in the use of the DHDx was gained through clinical experiences. Third, dental hygienists create the dental hygiene care plan and include a holistic approach to care as they advocate for inter- and intra-professional referrals. The fourth theme confirmed that providing a DHDx helped improve patient outcomes through disease identification, dental hygiene interventions, and increased communication.

**Conclusion:** Dental hygienists use a systematic, patient-centered, holistic approach to dental hygiene care which authenticates the DHDx as a necessary and valuable component in the dental hygiene process of care. DHDx is an important factor for improving patient outcomes.

### Incivil Classroom Behaviors in Dental Hygiene Education

Lynn Tolle, RDH, MS\*

Ann Bruhn, RDH, MS

Gayle McCombs, RDH, MS

Tara Newcomb, RDH, MS

Old Dominion University, Norfolk, VA, USA

**Problem:** Dental hygiene faculty strive to maintain a classroom that maximizes teaching and learning. Fostering healthy student faculty relationships through awareness of uncivil behaviors is critical to an optimal teaching and learning environment. Minimal data has been collected on the perspective of the dental hygiene student and incivil behaviors in the classroom.

**Purpose:** The purpose of this study was to determine dental hygiene student perspectives on classroom behaviors that are disruptive to the teaching/learning process.

**Methods:** Following IRB approval, an online survey was sent to a convenience sample of 75 dental hygiene students (36 junior) and (39 senior) with a 100% response rate. Two demographic items, one open ended question and two quantitative questions comprised the survey. Participants used a four point Likert scale to determine the degree to which twelve behaviors were considered disruptive in the classroom and their frequency of occurrence over the past 12 months. Primary descriptive statistics were used for calculating and reporting results along with the Mann Whitney U test with a .05 level of significance to determine significant differences between junior and senior students.

**Results:** Seventy nine percent of respondents agreed that making sarcastic remarks in the classroom was disruptive. Similar results were found with cheating and talking in class with 76% of respondents agreeing these were disruptive behaviors. Seventy three percent of participants agreed that challenging authority was disruptive and almost three quarters (72%) found classroom sleeping disruptive. Less agreement was found with leaving class early as only 51% agreed this behavior was disruptive. Most students (79%) disagreed that eating in class was disruptive. Sixty-two percent of students agreed that using personal technology to engage with social media during class was in, which was also reported as the most frequent observed disruptive behavior with over 50% of students reporting this occurring at least 7 times over the past 12 months. Thirty three percent of students reported observing cheating at least one time over the past 12 months with 9% observing cheating over 7 times. When comparing overall scores of both student groups a Mann Whitney U Test revealed no significant differences ( $p > .05$ ) between junior and senior students' opinions of disruptive behaviors in the classroom setting.

**Conclusion:** Effectively managing disruptive classroom behavior is a challenge even for the most seasoned educator. Results from this study provide educators with insight into what behaviors students find disruptive in dental hygiene education.

## Dental Hygienists' Attitudes on and Confidence in Providing Nutrition and Exercise Counseling for Weight Management: A National Study

Jacqueline M. Wenger, RDH, MS\*

New York University, College of Dentistry,  
New York, NY, USA

**Problem:** The obesity epidemic in the US is of grave health and economic concern. Evidence suggests that consistent messaging should be taken by all health professionals to help patients improve their dietary and exercise habits. Dental hygienists (DH) historically have taken on the preventive role in the dental team. Therefore, they are well placed to take part in the interprofessional promotion of healthy nutrition and exercise habits for their patients.

**Purpose:** The aim of this study was to examine the attitudes and confidence of US dental hygienists in providing nutrition and exercise counseling, and to determine what factors are associated with confidence in providing such counseling. A secondary aim was to compare the results from a national sample of DH with those from a previously published study conducted in North Carolina.

**Methods:** A cross-sectional design was used. The 54-question survey, previously used in the NC study and obtained with permission, was emailed by the ADHA to its 13,846 members and data was collected via Survey Monkey software. Descriptive statistics were calculated for attitudes and barriers, and compared to the NC results. A regression model was used to determine factors associated with confidence. IRB approval was obtained from Columbia University on October 7, 2016.

**Results:** The response rate was 11% ( $n=1575$ ). Almost all respondents felt that DHs have a role in helping patients improve overall nutrition (92%) and health (91%). Positive responses in the Confidence section on providing weight management advice ranged between 17% and 64%. Age ( $p < 0.0001$ ), self-reported obesity ( $p < 0.0271$ ), and dental hygiene school clinic facility ( $p < 0.0012$ ) were predictor variables of confidence. Tests of reliability were conducted. The Cronbach  $\alpha$  of Attitudes section questions = 0.80\* and of Confidence section questions = 0.89. Findings between the US and NC studies were comparable, with the exception of weight stigma, which has decreased.

**Conclusion:** While most US dental hygienists are interested in helping patients with their overall health, they report low to moderate confidence in providing nutrition and exercise counseling for weight management.

## Utilizing Photography and Self-Assessment of Ergonomics Among Dental Students

Bridget Wright, RDH, EFDA, MACPR

The Ohio State University, Columbus, OH, USA

**Problem:** Dental professionals are at high risk for musculoskeletal disorders (MSDs) due to static working positions for extended periods of time. Proper ergonomics are taught didactically in dental schools across the nation and yet musculoskeletal pain has been identified as early as during their entry level dental education.

**Purpose:** The purpose of this study was to determine whether feedback involving photography and self-assessment would improve ergonomic scores and the accuracy of ergonomic self-assessments among dental students.

**Methods:** The study involved a randomized control design of 135 dental students. There were 33-35 dental students per dental class who consented to participation. The participants in each class were randomly assigned to either the control or training group. At weeks one and four, all participants had two photographs (frontal and profile view) taken and at weeks one through four, all participants completed ergonomic self-assessments, using a Modified-Dental Operator Posture Assessment Instrument (M-DOPAI). During weeks two and three, participants in the training group were also photographed and used those photographs to aide in completing the ergonomic self-assessments. All participants' pre-training and post-training photographs were evaluated for ergonomic scores by two faculty raters.

**Results:** A mixed-design ANOVA of ergonomic scores as determined by the faculty raters revealed that ergonomic scores improved for all students who received the ergonomics training by using their photographs to aide in completing the ergonomic self-assessments ( $F(1,254)=17.41, p<0.001$ ). In addition, a mixed-design ANOVA of Kappa coefficient values between participant self-assessment scores and rater scores revealed that the accuracy of self-assessment scores improved for all participants who received the ergonomics training ( $F(1,127)=6.33, p<0.05$ ).

**Conclusion:** Ergonomic training incorporating self-assessment and photography resulted in improved ergonomic scores from pre-test to post-test and increased accuracy of ergonomic self-assessment among dental students. The use of photographs and self-assessment provides dental and dental hygiene educators with a pragmatic method to improve students' self-assessment skills, increase students' awareness of any postural deviations from ideal, which may improve musculoskeletal health long-term.