

2020 ADHA Virtual Conference Poster Presentation Abstracts

The following research poster abstracts were submitted to the Annual Conference of the American Dental Hygienists' Association, held virtually, June 26 – 28, 2020.

Creating Awareness for the Social Determinants of Health: Dental hygiene and nursing student interprofessional service-learning experiences

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Problem: While benefiting the community, service-learning experiences can provide students with opportunities for interprofessional collaboration and growth. Written reflection can be an effective way to assess student perceptions and learning regarding IPEC sub-competencies. In addition to measuring the level of interprofessional learning, themes can be identified from written reflections.

Purpose: The purpose of this study was to evaluate whether a service-learning interprofessional education (IPE) experience with dental hygiene (DH) students and undergraduate nursing students could reinforce learning related to Interprofessional Education Collaborative (IPEC) sub-competencies.

Methods: The DH students were divided into groups of six or seven and were assigned one of five dates for a four-hour health screening session at a designated school with nursing students. Before the activity, DH students were provided with an IPE experience document to help guide group discussion and written reflection. On site, DH students were responsible for conducting oral exams and providing oral hygiene instruction while nursing students were responsible for taking blood pressure, calculating body mass index, and classifying risk for obesity. The DH students completed individual written reflection assignments one week following the activity and the narrative responses were independently analyzed for themes related to the IPEC sub-competencies and for learning beyond the targeted sub-competencies.

Results: Thirty-one senior DH students (n=31) participated in one of the five screening sessions at four local public schools and completed a guided written reflection assignment focused on the following IPEC sub-competencies: 1. Communicate roles and responsibilities clearly to the patient, family, and other health professionals (RR1), 2. Explain the roles and responsibilities of other providers and how the team works

together to provide care, promote health, and prevent disease (RR4), and 3. Describe how professionals in health and other fields can collaborate and integrate clinical care and public health interventions to optimize population health (RR10). Student reflection assignments confirmed that the IPEC sub-competencies were met. Themes from the written reflections indicated that students recognized social barriers related to health and the need for multiple professions to promote health. Several comments reflected the potential formation of negative bias. DH students commented on the difficulty children may have eating healthy foods based on what is served in the school cafeteria; children not being educated about health outside of what is presented in school; children not being active at home due to lack of parenting skills; and children being at risk for obesity related diseases because of lack of finances and/or unstable homes.

Conclusion: Service-learning activities enhance IPE and learning outcomes on the topic of social determinants of health. Group discussion and individual reflection are essential components to consider when designing a service-learning IPE experience. Individual reflection can assist educators in gaining insight to student learning while uncovering other educational concepts to focus on.

Interprofessional Education Self-Efficacy of Dental Hygiene Students: A longitudinal study

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Problem: Dental hygienists are integral members of the interprofessional team, having expertise in oral health. Interprofessional education (IPE) events allow dental hygiene (DH) students to participate as an interprofessional team member. Few studies have been reported regarding DH students' perceived self-efficacy in regard to interprofessional competency after multiple exposures to IPE events.

Purpose: The purpose of this study was to measure DH students as well as other health profession students' confidence in their ability to work collaboratively to provide effective care for patients. This preliminary report is from the first of three surveys that will be administered over two years during their professional programs. This initial survey compared baseline data between students of five different health care disciplines.

Methods: The study was approved by the university's IRB (#4514). Students from five different disciplines participated: DH, physician assistant, medical laboratory science, physical therapy, and communication sciences and disorders (n=157). The 27-item Interprofessional Educational Collaborative Competency Self Efficacy Tool was used to gather baseline information on four competencies defined by the Interprofessional Education Collaborative. A 100-point slider bar scale allowed for a continuous rating of each statement. Each statement is evaluated individually. Students were surveyed within the first 2 weeks of entry into their professional program. One-way analysis of variance was used to evaluate differences in statement scores by student program. SPSS V-25 were used to analyze the data. The alpha level was set at 0.05, with the use of Bonferroni's correction as needed.

Results: DH students comprised 15.6% of the group (n=24). They were the youngest (mean age 21.42 (+/-1.6 years). No significant differences in scores were found between DH students and students from other professions. DH students rated themselves lowest in ability to forge independent relationships with other professionals to improve care (73.2 +/- 25.6%). They rated themselves highest in demonstrating high standards of ethical conduct (87.0 +/- 13.2%).

Conclusion: No differences were found for student perceptions of self-efficacy based on program type at the beginning of their professional programs. Two more rounds will be administered at the beginning and end of students' second year. Analysis of change as the students proceed through their programs should allow DH faculty to discover which, if any, IPE competencies should be strengthened or revised to improve student self-efficacy.

Preliminary evaluation of dental hygiene curriculum: Assessment and management of peri-implant conditions and diseases

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Problem: There is currently no available research on curricula focusing on peri-implant diseases and conditions within DH education programs. Preliminary data is needed to provide a baseline on a national level to identify what is taught in dental hygiene didactic and clinical curricula for the assessment and management of peri-implant conditions and diseases and whether students are adequately prepared to care for implants upon graduation. The data from this study may inform future curricular development.

Purpose: The purpose of this study was to investigate dental hygiene educational programs' didactic and clinical curriculum in the management of peri-implant diseases and conditions. The study had two specific aims 1) assess if evidence-based content for peri-implant diseases and conditions are currently included in didactic and clinical dental hygiene curriculum and 2) determine if dental hygiene education programs are currently preparing students at a level of clinical competency for the assessment and management of peri-implant diseases and conditions.

Methods: A cross-sectional study of dental hygiene faculty member(s) from 331 United States entry-level programs responsible for didactic and clinical curriculum for peri-implant diseases and conditions were surveyed. The survey was disseminated electronically via Qualtricsxm August 2019. There were 90 respondents who initiated the survey from 87 institutions for a response rate of 26%. Data analysis was performed using R version 3.5.2. Fisher's exact test was used to evaluate categorical data. In addition, open response questions were themed by category.

Results: The results showed didactic courses taught dental hygiene students the etiology of peri-mucositis and peri-implantitis (98%), clinical characteristics (98%), and risk factors contributing to these implant diseases (96%). Evaluation methods to determine student level of competency in a didactic setting included quizzes/examinations (98%), case-based examinations (63%), and written essays (6%). Eighty-five percent reported dental hygiene students are not required in

a clinical setting to provide care for patients with peri-implant diseases and conditions.

Conclusions: Study results suggest dental hygiene education programs may need to revise didactic and clinical curriculum to ensure students graduate at a level of clinical competency of peri-implant conditions and diseases. Dental hygiene educational programs should consider requiring clinical patient experiences for the assessment and management of peri-mucositis and peri-implantitis to prepare students for their professional role.

Student Wellness: Stress in Dental Hygiene Programs

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Problem: In professional training, regardless of age, institution or degree, students are precipitously introduced into a new environment with immense challenges. Very little data is available on stress in dental hygiene training.

Purpose: The aim of this study was to gain further understanding of stress in the undergraduate dental hygiene learning environment.

Methods: This study was considered exempt by the University of North Carolina at Chapel Hill Institutional Review Board (IRB19-2646). Inclusion criteria were enrollment in the first or second year of the undergraduate program of dental hygiene (DH) at the Adams School of Dentistry (UNC ASoD) or at one local North Carolina community college (NCCC). Students were provided an anonymous survey through a Qualtrics link during a predetermined classroom time to maximize the opportunity for students to participate in the this voluntary study. The survey included demographic queries, screening for depression (PHQ-9), anxiety (GAD-7) and a modified version of the Medical Outcomes Study Social Support Survey. Clinical cutpoints were used to categorize anxiety and depression as moderately severe to severe or none to moderate. Chi-square and Mantel Haenszel row mean score statistics, depending on the scale of measurement, were used to assess the effect of educational setting on the outcomes. Multivariate logistic regression was used to assess the effect of educational setting, demographics, and social support on the categorized levels of anxiety and depression. Significance level was set at 0.05.

Results: Of the 136 eligible respondents, 100% (n=69) of UNC ASoD students and 90% (n=54) of NCCC students responded.

There were no statistically significant differences between the two educational settings in respect to demographics or personal lifestyles (all $p>0.05$). There was a statistically significant difference between the two settings in the proportion of students reporting moderately-severe or severe anxiety ($p = 0.007$) with 56% of NCCC and 34.8% at UNC ASoD indicating high anxiety. There was no statistically significant difference in depression ($p=0.07$). However, 42.6% of all students reported moderately-severe or severe depression. Of all respondents 7.8% reported suicidal ideation in the last 12 months. In the logistic regression, only the educational setting was marginally significantly associated the likelihood of moderately severe/severe anxiety ($p=0.053$). With an adjusted odds ratio 2:1, students at NCCC were 2 times more likely to report moderately severe/severe anxiety than those at UNC.

Conclusions: The proportion of dental hygiene students enrolled in these programs had substantially higher mental/emotional issues than anticipated.

Active Shooter Preparedness: A Survey of dental hygiene students

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Problem: Active shooter incident rates have risen over the past three decades, with some studies showing that annual rates have doubled. Federal Bureau of Investigation reports show that between 2000 and 2017 there were 250 active shooter incidents—including 15 on college campuses. Current literature is devoid regarding educational institution preparation of dental hygiene students for active shooter incidents.

Purpose: The objective of this pilot project was to examine perceived preparedness, confidence, and awareness of dental hygiene students to handle and respond to active shooter incidents.

Methods: A descriptive survey was electronically distributed to entry-level dental hygiene students (n=68) at one institution. The survey consisted of 23 items to measure preparedness, confidence, and awareness of institutional policies regarding active shooter incidents. Descriptive statistics and Pearson correlations were used for data analysis.

Results: Fifty-seven dental hygiene students completed the survey for a response rate of 84%. Almost half of the participants felt slightly prepared (n=26, 45.6%) to respond appropriately to active shooter incidents in the classroom, and

fifteen participants (26.3%) felt not prepared at all. Nearly half of the participants were slightly confident ($n=26$, 45.6%) in helping to control the classroom during an active shooter incident and fifteen participants (26.3%) felt not confident at all. More than half of the participants ($n=32$, 56.1%) were not certain if their institution provided active shooter trainings, and 25 participants (43.8%) were not certain if their institution conducted active shooter drills. Perceived preparedness to appropriately respond to an active shooter in the classroom was significantly, positively correlated with confidence in helping to control classrooms during an active shooter incident ($r(56) = .616, p = .000$). Participants' perceived preparedness to appropriately respond to an active shooter in the lab or clinic setting was also significantly, positively correlated with the assumption that active shooter incidents are taken seriously at their institution ($r(56) = .375, p = .004$).

Conclusions: A general lack of preparedness and a false sense of confidence for active shooter incidents may exist among dental hygiene students. Educational institutions should implement best practices for preparing dental hygiene students for possible active shooter incidents.

Dental Hygienists Knowledge, Attitudes and Practices of Menopause Affecting Oral Health

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Problem: Women transitioning through menopause often have a multitude of physical and psychological changes. Dental hygienists may not have the knowledge of dental implications of the hormonal changes during menopause. The attitudes of dental hygienists in discussing hormonal changes during menopause is not known, and the practices of dental hygienists providing oral health education specific to menopause and oral disease and conditions is also unknown.

Purpose: The purpose of this study was to explore the current knowledge, attitudes, and clinical practices among registered dental hygienists in relation to menopause and oral health.

Methods: A cross-sectional research design with a national convenience sample of dental hygienists ($n=290$) were recruited through dental hygiene social media sites. The data collection instrument was developed following a KAP model, then validated using a content validity index. The expert panel consisted of medical and dental professionals with knowledge

about menopause and or oral health. The validated survey consisted of 35 questions including the following sections: demographics along with knowledge, attitudes, and clinical practices regarding oral health and menopause. Chi-square tests of independence were used to assess the relationship between demographic variables and survey responses.

Results: A participation rate of 68% ($n=290$) was calculated based on completed surveys. Dental hygienists who attended an entry-level dental hygiene program with curriculum addressing menopause and oral health and who also agreed they received enough education were less likely to state they never offered this specific education to patients ($p < 0.001$). Attending a CEU course was related to a higher percentage who stated they always offered education ($p < 0.001$). Seventy-seven percent reported their entry-level dental hygiene program did not provide enough education on menopause and oral health to allow them to educate their patients.

Conclusions: Education on the changes during menopause and post-menopause which can affect oral health is lacking in dental hygiene curriculum. Dental hygienists who stated they received education within curriculum were more likely to offer specific education on how menopause can affect oral health. More importantly, dental hygienists who attended a CEU course on menopause affecting oral health stated they always offered patient education on the subject.

Effects of Oral Health Training on Caregivers of Individuals with Developmental Disabilities

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Problem: Caregivers have the unique opportunity to provide oral hygiene care to individuals with developmental disabilities (DD), yet receive limited training in this area.

Purpose: The purpose of this study was to explore the impact of an oral health care training program on caregivers' knowledge of the oral-systemic link and confidence in the provision of oral health care for individuals with DD.

Methods: This study utilized a one-group (previously validated) pre-test/post-test design measuring the impact of an oral health training on licensed caregivers' knowledge, behaviors and confidence in the provision of care to individuals with DD. A

convenience sample comprised of 11 (n=11) licensed caregivers of DD in Wenatchee, Washington participated in a four-hour continuing education (CE) training on oral health care/oral-systemic-link. Eleven (n = 11) participants participated in the training and 24 question pretest. Ten(n =10) completed a 27 question post-test. Quantitative measures using descriptive and inferential statistics to describe demographic data and to analyze pre-test/post-test data was utilized. Although a t-test was run for this study, due to the small size of the sample, reporting the frequency is more meaningful for this study. Data from a Likert scale and open ended questions measured confidence using content analysis to identify common themes. Qualitative data was also collected to assess caregivers' concerns of their client's oral health and assess knowledge of how to report oral health concerns as well as how the training would change their own oral health habits.

Results: A significant improvement was identified in post-test scores compared to pre-test scores measuring confidence, ($p=.025$) (Level of significance $p<.05$). Ninety percent of participants, 10 (n =10) indicated they would take a more active role in providing oral health care to their client and were very confident in evaluating their client's oral health.

Conclusions: This study demonstrated that an educational training program can be an effective strategy for caregivers of individuals with DD to increase knowledge on the oral-systemic-link while also increasing confidence in providing daily oral health care. Thus, demonstrating that oral health services can be provided on a daily basis to individuals with DD and could improve their oral and systemic health.

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Health Care Programs: An approach to improving health outcomes through interprofessional education and practice

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Problem: The oral-systemic link is at the forefront of health-care practices. Professional organizations are recommending modifications to incorporate a collaborative healthcare team approach. The American Dental Hygienists' Association and the Commission on Dental Accreditation have set recommendations for interprofessional collaboration (IPE/IPP) to be an emphasis within dental and dental hygiene educational settings.

A recently released report on this topic stated that "In order to provide quality and cost-effective care, health professionals must be better prepared to lead and collaborate in interprofessional teams."

Purpose: The objective of the study was to understand students' perceptions and attitudes working with other healthcare team members in an IPE/IPP collaborative practice environment. The purpose of the study is to determine if students who participate in IPE/IPP clinical activities have an increase in attitudes and perceptions, communicating, and collaborating with a variety of individuals on the healthcare team.

Methods: A convenience sample of dental hygiene and speech language pathology students (n=99) was used, and a qualitative survey tool was adapted from two validated surveys using a Likert scale. The electronic survey measured student attitudes and perceptions of their profession and understanding of other health discipline roles. An application was submitted to the university's Institutional Review Board to survey the students (IRB# 19873)

Results: Analysis of the IPE/IPP experience showed, 92% (n= 91) of the students strongly agreed that patients would benefit if health sciences students worked together to solve patient problems. Additionally, 86% (n=85) of the students strongly agreed that they respected the unique cultures, values, roles and responsibilities, and expertise of other health professions.

When pre-tested DH students had a lower perception than the SLP student of working closely with individuals in other professions ($p<.001$). Post-test results showed DH student perceptions increased but there was no significant difference between the disciplines. There was a statistical significance between pre-test and post-test in attitudes of students working closely with individuals in other professions ($p<.001$), and attitudes of having good relations with people in other professions ($p<.001$).

Conclusions: Incorporating IPE activities improves understanding and encourages students to embrace collaborative patient care, as well as increase positive overall attitudes and perceptions of interprofessional collaborations. More research is needed looking at patient health outcomes when treated in a collaborative practice environment, including dental hygienists as part of the healthcare team.

State Licensing Board Requirements for Entry into the Dental Hygiene Profession

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Perceived Barriers and Challenges of American Indian/Alaska Native Women Obtaining Dental Care During Pregnancy

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Problem: In 2018, the American Dental Hygienists' Association proposed the Commission on Dental Accreditation (CODA) implement changes to the entry-level degree for dental hygiene education, replacing the associate degree with the baccalaureate degree. CODA requested justification for this change and five areas to be addressed. One of these areas included information from state boards regarding current entry into the profession.

Purpose: The purpose of this study was to identify current requirements for licensure and entry into the dental hygiene profession across state licensing boards in the United States.

Methods: A non-experimental study design was used to study dental and dental hygiene board licensing requirements in the United States, District of Columbia, and the Virgin Islands. The website for each regulatory board was searched for licensure by examination to ensure data was collected, specific for entry into the dental hygiene profession by the PI and verified by the co-investigators. Requirements were noted on an Excel spreadsheet. In most cases, the practice act was reviewed to gather further information and verify accuracy. Twenty regulatory boards were also contacted to verify that the information obtained was complete and accurate when website information was unclear. Descriptive statistics were used to analyze data.

Results: Information from a total of 52 dental boards was examined for this study. Almost all boards (n=51, 98.1%), with the exception of Alabama, required completion of entry-level education from a CODA accredited program and successful completion of the National Dental Hygiene Board Examination. Most states (n=51, 98.1%), except Delaware, also required a regional clinical board examination. Application fees ranged from \$47.70 to \$600. States varied considerably in terms of requirements for background checks, age, military status, and infection control training.

Conclusions: Although the majority of regulatory boards require completion of dental hygiene entry-level education from a CODA accredited program and successful completion of national and regional clinical examinations, there is considerable variation in other requirements for licensure among the boards.

Problem: Pregnancy is a unique time in a woman's life, it is also a time when women are at higher risk of oral disease. In addition, women are also at risk of transferring harmful oral bacteria to young children. A direct, inverse relationship between maternal prenatal access to dental care and the development of early childhood caries (ECC) in American Indian/Alaska Native (AI/AN) communities has been identified. Maternal access to dental care in AI/AN communities has consistently been low; over the past 4 years on average, only 2.8% of AI/AN accessed oral care compared to 49.0% of U.S. pregnant women.

Purpose: The purpose of this study was to explore the perceived barriers and challenges related to maternal oral health in a convenience sample of American Indian/Alaska Native (AI/AN) pregnant women in two Northern Plains Native American communities.

Methods: An interpretive qualitative research design was used to understand, illustrate, and analyze the perceptions and experiences of AI/AN women obtaining dental care during pregnancy. The social ecological model was used as a theoretical framework to understand the complex mix between individual, interpersonal, community, and societal levels that influence one another when navigating health issues. The study consisted of a convenience sample of 32 adult AI/AN pregnant women. A semi-structured interview guide was used in face-to-face interviews. These interviews were recorded, transcribed, and coded with a priori and emergent codes that became themes, where themes ultimately became the story or narrative addressing the purpose of the study. IRB approval was obtained from A.T. Still University and the Indian Health Service Great Plains IRB Board.

Results: Most participants (71.4%) reported time as the most influential barrier to obtaining dental care during pregnancy. Time was followed by fear (25%), lack of pain (6%), misinformation (6%), not a priority (3%), and service (3%). The study revealed there is oral health knowledge, positive maternal oral health attitudes and beliefs, positive influences surrounding maternal oral health, positive OBGYN support in seeking dental care during pregnancy, and an acknowledgement of oral-systemic connections. Additionally, a lack of support or advice from primary care providers regarding maternal oral health was revealed. An overarching theme of low health literacy was also found in this study.

Conclusions: Despite knowledge regarding oral health, oral health behaviors, and oral-systemic connections, behavior choices did not match this knowledge. Future research should further explore closing the gap between low health literacy and behavior choices. Future research should also include exploring and analyzing underlying assumptions or beliefs that might form semantic content regarding a deeper meaning of time.

Effectiveness of an Educational Workshop on Dental Hygiene Students' Competence and Comfort in Treating Transgender Patients

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Problem: Transgender individuals face barriers to health care such as harassment, violence, and the refusal of care. Current literature shows a lack of instruction about caring for sexual minority patients in dental and allied dental education programs, which contributes to the barriers to care for this population.

Purpose: The purpose of this quasi-experimental study was to determine the effectiveness of an educational workshop on dental hygiene student competence and comfort levels in treating transgender patients.

Methods: Dental hygiene students' competence and comfort levels in treating transgender individuals were evaluated using an adapted version of the Assessing Medical Attitudes Toward Transgender Care survey. Primary data was collected from a convenience sample of 45 dental hygiene students who attended an educational workshop about caring for transgender individuals. Data were collected at Week 1 (baseline) and Week 6 (post-workshop).

Results: The Wilcoxon signed-rank test was used to analyze the data. The results showed a statistically significant increase from pretest to posttest in competence (1.6667-3.0000; $z=5.373$) and comfort (3.0000-3.8000; $z=4.799$) scores after attending the educational workshop, $p<.05$.

Conclusions: The findings of this study provide evidence suggesting that education about transgender health care increases competence and comfort levels among dental hygiene students. Educators should consider including this content in dental and allied dental education curricula. When creating and revising dental hygiene curricula, educators and policymakers should ensure this content is included in sufficient scope and depth to prepare graduates to care for this population.

Attitudes, Expectations, Knowledge, and Intentions Regarding Oral Health: Perceptions of Older Adults

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Problem: The advantages of fluoridated water, dental insurance, greater awareness of preventive oral healthcare, and more restorative dental services, have allowed many adults in today's aging cohort to maintain their teeth into their advanced years. The demand for oral healthcare services will be greater and more complex than that of previous generations. Adults transitioning out of the workforce face numerous barriers related to attaining oral care services. Understanding the attitudes, expectations, intentions, and current level of oral and overall health knowledge from the perspective of older adults is vital to helping these individuals transition into increasing levels of dependency with a high level of overall quality of life.

Purpose: The aim of this study was to assess health literacy and access to care, including attitudes and intentions related to dental care utilization, from the perspective of older adults living independently.

Methods: A qualitative thematic analysis guided by behavioral constructs of the Reasoned Action Approach was utilized to develop and conduct semi-structured interviews of a purposeful sample of adults age 65 and older living independently. A demographic questionnaire, followed by one-on-one interviews was conducted by the primary investigator from August of 2018, through January of 2019. Three investigators analyzed the data using coding procedures characteristic of grounded theory.

Results: Participant data ($n=26$) revealed five themes: difficulties accessing dental care; stoic independence; taking care of your mouth as part of overall health; relationships affecting oral health related quality of life; and supporting roles. Overall, the intention to attain dental care was affected by the need to prioritize many health issues over oral care. The findings demonstrate a need to increase oral health literacy in the older adult population with attention to reducing modifiable risk factors associated with dental diseases. An overarching expectation to have affordable basic services available pervaded. Notably, older adults experienced difficulties understanding a complex healthcare system.

Conclusions: The perceptions of participants reflected socioeconomic disparities that could be decreased through interprofessional efforts, health literacy education, dental

professional curriculum focused on better understanding the complexities of the healthcare system, and a reevaluation of policies that limit the ability of dental hygienists to work to the full extent of their scope of practice.

Associations Between Wisconsin Dentists' Use of Silver Diamine Fluoride (SDF) and the Theory of Planned Behavior (TPB)

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Problem: Silver Diamine Fluoride (SDF) is a promising alternative treatment for caries, particularly among low income children, elderly adults, and patients with special needs that interfere with the placement of traditional restorative treatment. However, adoption of SDF into standard dental practice has been slow in the United States and little is known about dentists' perception of SDF in caries management.

Purpose: The purpose of this study was to identify the association, if any, between SDF use among Wisconsin dentists and the Theory of Planned Behavior (TPB) constructs of attitudes, subjective norms, and perceived behavioral control.

Methods: This mixed-methods, cross sectional study used convenience sampling. An electronic survey was sent to 816 active licensed Wisconsin dentists with valid email addresses provided email by the WI Department of Safety & Professional Services. Since no existing studies investigate SDF within the framework of the Theory of Planned Behavior, a TPB index was created to quantify the three constructs, with higher scores indicating greater positivity toward SDF. While the index has not yet been validated, Cronbach's alpha coefficient of 0.83 indicated good internal consistency. Chi-square tests were used to analyze categorical data, and 2-sample t-tests were used to compare means. Alpha level was established at $p < 0.05$. Qualitative comments were independently coded by two researchers as representative of attitudes, subjective norms, or perceived behavioral control. Comments were also coded as positive, negative, or neutral in regard to SDF. Data triangulation was accomplished by categorizing each code by the respondent's TPB index score and sub scores.

Results: The response rate for the study was 10% ($n=80$) with 55% reporting SDF use. SDF users had statistically significantly higher mean TPB index scores compared to those of non-users ($p < 0.001$). These findings were consistent for all three TPB constructs as SDF users had higher mean attitude scores ($p < 0.001$), perceived behavioral control scores

($p < 0.001$) and subjective norms scores ($p = 0.003$) than non-users. Most respondents (74%) provided qualitative responses. Triangulation of qualitative and quantitative results strengthened the finding that higher TPB index scores correlated with SDF-use. One additional qualitative code revealed interest in continuing education about SDF among non-users.

Conclusions: More than half of study participants reported SDF use. Both quantitative and qualitative results were consistent with the premises of TPB, since attitudes, perceived behavioral control, and subjective norms were associated with the behavior of SDF use, both individually and cumulatively. Qualitative data also revealed that participating Wisconsin dentists desire further education about exactly when and how to use this product in their practices. Therefore, additional educational efforts are required to ensure consistency in information and to make current, evidence-based practice guidelines easily accessible.

Social Media Usage by Dental Hygiene Educators

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Problem: Contemporary students expect technology to be used in the classroom to enhance educational experiences. The utilization of social media as an educational tool in the dental hygiene classroom is an integral part of the classroom of the future. There may be a disconnect between our millennial learners and our seasoned dental hygiene educators when it comes to social media engagement. In order to implement new technology strategies, it is vital to understand current social media use by dental hygiene educators.

Purpose: The purpose of this study was to describe how dental hygiene faculty engage in social media for personal, professional, and educational use.

Methods: The researchers developed a twenty-five-question survey instrument to investigate the use of social media by dental hygiene educators. The survey included demographic data; the personal, professional and educational use of twelve common social media sites and belief questions about social media. An email with an attached, validated Qualtrics survey was sent to 379 dental hygiene program directors in the United States and Canada with the request to disseminate to their faculty.

Results: A total of 120 responses were analyzed. While Facebook was the most utilized site for personal use (78.3%), LinkedIn was the most frequently accessed site for professional use (57.5%), and YouTube for educational use (68.3%). There was strong agreement that the interactive nature of online technologies create better learning environments (n = 101, 84.1%). There was also strong agreement that social media use in the classroom invites student participation (n=93, 77.5%). Respondents reported that the lack of time was the major barrier to their integration of social media technologies in the classroom (n=63, 52.5%).

Conclusions: A large majority of dental hygiene faculty use social media personally and professionally. Conversely, social media is underutilized in the dental hygiene classroom, if video sharing websites are excluded. This study demonstrates that within the dental hygiene classroom, there is ample opportunity for growth of engagement with social media.

Electronic Nicotine Delivery Systems Education in US Dental Hygiene Programs: Results of a national survey

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Problem: Electronic nicotine delivery systems (ENDS) are rising in popularity and carry considerable health risks. Dental professionals should be competent to assist patients with smoking cessation including ENDS, yet there is no standardized smoking cessation education in US dental hygiene education programs.

Purpose: The study aimed to assess what content is included in US dental hygiene education programs' curricula about the harms and risks of ENDS, the use of ENDS as a smoking cessation aid, how ENDS could serve as a gateway to other tobacco use, the impact of ENDS on systemic and oral health, program directors' attitudes about the importance of ENDS to their programs' curricula, and barriers to incorporating ENDS content.

Methods: A cross-sectional study of all 332 US dental hygiene education program directors obtained from the American Dental Hygienists' Association website was con-

ducted in July 2018. A 25-question survey was developed, reviewed by the University of Michigan Survey Research Center, pilot tested, and distributed electronically. Descriptive statistics and one-way ANOVAs were used to evaluate the extent of inclusion of ENDS in curricula and variations between regions and program types.

Results: A total of 141 surveys that broadly represented US dental hygiene education programs were completed for a response rate of 42%. Eighty-five percent of programs reported including smoking cessation education about ENDS. Directors had variable attitudes about teaching ENDS as a cessation modality. For example, 24% thought it was "extremely" important to teach ENDS for tobacco replacement while 23% thought it "not at all" important. By contrast, 94% thought it was "very" or "extremely" important to teach students about the harmful effects of ENDS and how to assist quit attempts. Despite nearly all agreeing that graduates should have ENDS knowledge, over half of programs cited a lack of faculty knowledge and confidence about teaching ENDS as barriers to incorporating it. To assess students' knowledge, respondents reported utilizing clinical competency testing (41%), objective standardized clinical examination (13%), proficiencies (30%), research papers (19%), standardized patient interviews (30%), and written tests (74%). The amount of time dedicated to smoking cessation education varied from 0 hours to over 30.

Conclusions: The majority of dental hygiene education programs in the US include ENDS content in their smoking cessation education. However, they lack standardized course content and faculty training regarding ENDS. The inclusion of ENDS in educational programs should be carefully evaluated due to the need for additional research on ENDS and its potential smoking cessation benefit versus the harmful effects.

Perceived Pain During the Injections of Maxillary Lateral Incisors Using the Dentapen Electronic Syringe

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Problem: When patients express fear and anxiety about dentistry, one main source involves the administration of local anesthetic. Limited evidence exists regarding whether a Computer-Controlled Local Anesthetic Device-CCLAD (Dentapen, Septodont; Lancaster, PA) can reduce pain associated with dental injections by regulating the depostion rate.

Purpose: The purpose of this study was to evaluate for differences in perceived pain during the administration of local anesthesia of the maxillary lateral incisors using the ramp-up and continuous modes of a CCLAD.

Methods: Upon IRB approval, this study utilized a randomized, controlled, double-blinded, crossover, experimental design. Investigators randomly assigned the order of the teeth (tooth #7 or #10) and the 2 modes (continuous or ramp-up). Participants completed the Corah's dental anxiety scale at each visit and were injected on 2 separate visits at least 2 weeks apart. After each injection, participants rated their perceived pain using a Heft-Parker 180mm visual analogue scale (VAS) at needle insertion, needle placement, and deposition. Repeated-measures ANOVA was used to determine differences in perceived pain between the 2 modes.

Results: Data from 116 participants were analyzed. The perceived pain at deposition with the ramp-up mode ($M=51.98$, $sd=30.04$) was less than the continuous mode ($M=59.98$, $sd=36.28$), although not statistically significant ($F(1,230)=2.569$, $p=.063$). Clinically, the perceived pain with the ramp-up mode was in the mild range (54mm).

Conclusions: Although not significantly significant, the perceived pain with the ramp-up mode was less than the perceived pain with the continuous mode. Further research should evaluate whether the ramp-up mode could be used to reduce the pain perceived with other dental injections.

Dental Hygiene and Nursing Students' Perceptions of Interprofessional Collaboration

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Problem: Research demonstrates the importance of oral care to reduce ventilator-associated pneumonia. This serves as an opportunity to incorporate oral health into interprofessional education (IPE). Focusing on preventive health through oral care in IPE activities may improve patient outcomes, decrease medical costs, and improve the health of the population.

Purpose: The purpose of this study was to evaluate the effect of a simulation activity on dental hygiene and nursing students' attitudes regarding interprofessional collaboration.

Methods: This study used a quasi-experimental survey design. A convenience sample of dental hygiene students ($n=35$) and nursing students ($n=45$) completed a simulation activity. In response to an email soliciting participation, 28 students completed the pre- and post-surveys. The IPEC Competency Self-Assessment Version 3 Tool was used to measure attitudes regarding interprofessional collaboration. The instrument is a 16-item Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale is comprised of two domains: Interprofessional Interaction Domain and Interprofessional

Values Domain. Data were analyzed in SPSS software. Median IPEC survey scores and interquartile ranges for each domain were calculated.

Results: Significance was set at $p<0.05$. A Wilcoxon signed-rank test showed that there was a significant difference ($Z=-3.447$, $p<.001$) between pre- and postsurvey Interprofessional Interaction scores and no significance was shown pre- to postsurvey in the Interprofessional Values Domain ($Z=-2.374$, $p<0.18$). Median scores between the pre-and postsurvey showed improvement. In addition to the post-survey Likert scale questions, students were asked to respond to open-ended questions regarding the simulation activity and shared noteworthy responses.

Conclusion: This study suggests IPE improves students' attitudes regarding collaboration. Attitudes influence behaviors and it is beneficial to gain an understanding of students' perceptions to strengthen the collaborative spirit once they are in practice.

Early Childhood Oral Health Training Program (EChOTrain): Pilot curriculum evaluation – a professional innovation

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Purpose: This program was designed to train prelicensure dental hygiene students to provide preventive and restorative care to children 0-5 years of age.

Significance: Dental caries remains the most common chronic disease of childhood, with 23% of children aged 2-5 years having dental caries in primary teeth and children from poor or minority backgrounds disproportionately impacted. Training prelicensure dental hygiene students in the care of 0-5 year old children has the potential to help address access to care for this vulnerable population. Studies show that lack of exposure to very young children during the educational process results in a reluctance to provide care to this age group. In Washington State prelicensure programs require training in restorative functions. However, a survey of programs in the state revealed that children under 6 years of age are rarely seen for preventive or restorative care.

Key features: Four dental hygiene students from a local community college participated one day/week for 10 weeks in the EChOTrain pilot. Curriculum was delivered at the University of Washington Pediatric Dentistry teaching clinic. A knowledge/experience/comfort level assessment was

administered prior to the program and at the conclusion. Targeted didactic instruction and lab practice prepared students for the clinical care they delivered same-day in a team-based setting: knee-to-knee toothbrush and rubber-cup prophies, behavior and anticipatory guidance, local anesthesia, nitrous oxide, and placement of composite and glass ionomer restorations. Students were introduced to the concept of the social determinants of health in the context of the epidemiology of early childhood caries.

Evaluation: Pre-assessment of students' knowledge/experience/comfort level revealed no knowledge of behavior or anticipatory guidance and no experience with knee-to-knee positioning, restorative procedures on children 5 years of age and younger, or glass ionomer restorative materials. Only 1 of 4 had any experience caring for children with special needs. Post-assessment all four students expressed significantly increased comfort levels (very confident/somewhat confident) in providing knee-to-knee care, anticipatory guidance, and restorative treatment, including local anesthetic administration, for children 5 years of age and under. All felt ready to provide independent care to a child age 0-5 and benefited from observing care of children with autism. The EChOTrain pilot demonstrated effectiveness in increasing student knowledge and comfort in caring for 0-5 year olds through didactic and experiential learning. The number of students and dental hygiene programs offered the training has now been expanded.

Interdental Removal of Simulated Plaque with an Expanding Black Mint Dental Floss Compared to Traditional Floss

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Problem: Studies show dental floss removes up to 80% of plaque from interdental areas, including plaque and food debris left behind by toothbrushing. Efficacy varies among types of floss products. An established ex-vivo model (Lang et al. BMC Oral Health 2014) examined interdental plaque removal efficacy of two floss products, multifilament floss compared to a new expanding textured floss.

Purpose: The purpose of this study was to assess plaque removal of an expanding charcoal-infused floss compared to unwaxed floss, based on a lab model.

Methods: Using simulated organic plaque and computer-assisted planimetric assessment, plaque removal efficacy was evaluated at 12 interdental coronal and root surfaces by BURST Expanding Black Mint Eucalyptus Floss [BEF (BURST, USA)] and by Oral-B® Glide Pro-Health Original Floss [OBGF (Procter & Gamble, USA)]. Typodonts with 10 artificial teeth were dipped into red-disclosed artificial plaque solution. Plaque was allowed to dry; a single technician flossed the teeth in the model, passing three manual strokes per interdental tooth space through the contact point; one straight perpendicular, two angled 25° mesially-distally, representing c-shape standard flossing action. This procedure was performed seven times for each floss product on different typodonts. Percentage of plaque removal was documented and analyzed for mesial and distal coronal tooth surfaces (above and below contact point, at contact point), mesial, distal, buccal and lingual approximal surfaces (scored similar to D-F sites of Rustogi- Modified-Navy Plaque Index), mesial and distal root surfaces just below the cementoenamel junction. Data were analyzed by independent, two-sample t-test of the mean percent plaque removal, $\alpha=0.05$.

Results: Based on planimetric analysis of plaque removal, both floss products performed well in removing plaque from the interdental areas. Compared to OBGF, BEF exhibited the best plaque removal efficacy with up to 85% removal between teeth (contact areas), $p<0.001$; OBGF Glide removed up to 71%. For root surfaces just below the CEJ, BEF reduced plaque up to 58% compared to OBGF which reduced 23% from the same surfaces, $p<0.001$.

Conclusions: This ex-vivo study demonstrated the potential of two floss products to remove plaque from interdental areas that are not reached with toothbrushing. The interdental planimetric plaque control was superior for BURST Expanding Black Mint Eucalyptus Floss compared to Oral-B Glide Pro-Health Original Floss. Results should be confirmed in clinical trials.

SBIRT training in a dental hygiene curriculum: Evaluation of student satisfaction and confidence

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Problem: Dental professionals are a resource for identifying harmful substance use and increasing access to treatment due to the frequent visits made by patients. The extent of screening and referral by dental professionals is not well documented. This study was designed to assess the impact of Screening, Brief Intervention, and Referral to Treatment (SBIRT), a comprehensive public health approach, in the dental hygiene curriculum as a means for providing students training and confidence in initiating substance abuse conversations with patients.

Purpose: The purpose of this study was to evaluate students' satisfaction and confidence in discussing substance abuse following a public health approach using SBIRT by:

- Introducing dental hygiene students to an effective method for discussing substance abuse and early intervention.
- Developing skills in dental hygiene students to improve content knowledge and practice with an evidence-based strategy to screen for substance abuse
- Empowering practicing dental hygienists to apply what they learned in their training to their professional practice.

Methods: A cohort of dental hygiene students (n=43) consented to participate in a study to evaluate the SBIRT training. Training and assessment was conducted over a two year period with first year to second year students. Thirty-two (32) participants completed the surveys through post graduation. The students were all female, and 94% were white and the remaining were equally divided between African American, Asian and Hispanic/Latino. Nearly half (47%) of the students reported no prior substance abuse training, while 53% reported no prior motivational interviewing training. The curriculum included two hour lecture on SBIRT and tobacco use in spring semester of first year, with role playing and one clinical assignment with a reflective writing. Fall semester second year, included another two hour lecture focusing on alcohol and substance abuse. Activities included case studies, screening all patients in clinic and reflective

writings. SBIRT encounter forms and visual aids such as the 'readiness ruler' were developed to aid the students in creating brief intervention discussion points. Five measures were used to assess students knowledge of SBIRT strategies (pre- and post-test) and satisfaction (baseline and 30 day follow-up) and a twelve month survey to learn if students added SBIRT into their professional practice. Descriptive statistics and pre and post paired t-tests were used to assess data.

Results: Thirty two of the dental hygiene students completed the study from pre test to post graduation surveys. There was a statistically significant gain ($p < .05$) in SBIRT training knowledge from pre and post-test. The majority of the students (94%) were either satisfied or very satisfied with the training at post survey. Additionally, satisfaction rates increased more at the 30 day post survey. Usefulness of the training increased significantly ($p < .05$) from baseline of 94% to 30 day follow-up of 97%. Finally, 79% of the students at 12 month follow-up indicated they had performed components of SBIRT with one or more patients in their clinical practice, with only 18% indicating they were employed in a practice that conducts universal screenings.

Conclusions: Results from this study show that dental hygiene students gained new knowledge in screening patients for tobacco/alcohol use and were satisfied with the training received. Participants also showed a commitment to conducting SBIRT beyond the school setting by the evidence of use in clinical practice. Improvements in the curriculum will include additional practice in the classroom and preclinical setting to increase comfort level of students, expanding access of training to clinical faculty, and identify additional resources of pharmacological management to treat withdrawal symptoms.

Attitudes Regarding the Effects of Marijuana and Legalization of Medical and Recreational Marijuana in Illinois

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Problem: Marijuana sales in the state of Illinois have multiplied substantially since its legalization in January of 2020. Understanding adults' perspectives allows for discovery of attitudes between different age groups within the adult population in Illinois. There is very limited research showing adults' perspectives of the use of marijuana and if there is an oral or systemic effect within the body.

Purpose: The purpose of this research is to investigate the attitudes of adults regarding the overall health effects of marijuana and their attitudes regarding the legalization of marijuana for medical and recreational use.

Methods: This quantitative, cross-sectional study evaluated the knowledge of adults age 18 and older and analyzed the differences among males' and females' beliefs of medical and recreational marijuana. Convenience sampling was used to select participants. The pilot test consisted of patients in the advanced periodontics clinic at a dental hygiene school in southern Illinois (n=109). A 28-item electronic survey was developed to compile data collection that consisted of demographic and polar questions. Statistical significance was set at $p < 0.05$. The study was determined exempt by Southern Illinois University Carbondale's Human Subjects Committee, protocol number 19167. All participants provided informed consent as part of the clinic informed consent procedure.

Results: A response rate of 23.39% (466 total patients) was achieved. Demographic data indicated 38% of participants were male (n=42), 55% were female (n=60), and 7% prefer not to answer (n=7). Results for all respondents reported the following: 36% believe marijuana is less harmful than alcohol and 44.86% believe it is less harmful than tobacco products. In relation to marijuana's effect on the oral cavity, males (43.75%) and females (46.15%) agree it has a negative effect by causing cancerous lesions, causing decreased salivary flow and increase in caries.

Both groups agreed with the legalization of marijuana in Illinois, predominately males (n=68). There was much uncertainty among the male population if it is safer than pain medicine (66.67%) or alcohol (66.67%), although females thought it was safer than pain medicine (50%) and alcohol (50%). Overall, less than 1/3 of participants have considered its use for medicinal purposes.

Conclusions: The majority of participants were unaware of marijuana's effects on the oral cavity as well as its safety in relation to other products. Some patients felt that marijuana may be a safer alternative than tobacco and alcohol products. In the future, marijuana could be uniformly accepted as a positive benefit for pain control. More research should be conducted on the effects of marijuana in relation to total wellness. In addition, performing a comparative study to see how other residents of other states would be beneficial to determine if certain trends or attitudes exist.

Utilization of Active Learning Pedagogies Improve Critical Thinking Skills Development for Dental Hygiene Students

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Problem: Professional organizations and governmental agencies report there is a need to prepare dental hygiene students for non-traditional and highly autonomous roles in clinical practice. Students must be able to think critically about patient care overall. Novel pedagogical strategies such as flipped lectures, peer-led learning, and case-based learning are common in predoctoral dental education programs to prepare dental students for autonomous decision-making in clinical practice. The literature lacks evidence for use of these practices in dental hygiene education.

Purpose: This study was designed to address dental hygiene student self-confidence in the clinic towards preparation to non-traditional and autonomous clinical roles. Classroom instruction was modified from a traditional lecture based instructional method towards a student-centered model, where lectures were flipped to be online, and in-class work consisted of case studies led by fellow students. All three student centered pedagogies are common in predoctoral dental education, and it is common to find them integrated together. This study was designed to add to the body of research for innovative student-centered pedagogical methods in dental hygiene education.

Methods: Data from three cycles of senior dental hygiene students (n=53) were compiled and summarized using descriptive statistics. This was a mixed-methods study including both quantitative Likert scale questions, and an open-ended summary question to collect qualitative results. Quantitative data was compared using ANOVA with post hoc pairwise comparisons to determine specific differences among cohorts. All post hoc pairwise comparisons were adjusted for using Tukey's adjustment. Significance level was 0.05.

Results: There was a significant change in agreement for the statements regarding whether the student enjoyed learning in this method (p -value=0.0204), the increased amount of work in this format (p -value=0.0435), the small group discussion allowed more freedom to ask questions (p -value=0.0257), and the case study presentations helping students think critically regarding the impact of systemic

disease on dental treatment p -value=0.0004). There were also marginally significant changes in the flipped-classroom helping the students have greater mastery of the content than lecture alone (p -value=0.0531). These results show that this model of peer-led learning dramatically improved in-class engagement and made case-based learning more interactive. The learning methodology created engaged classroom sessions for dental hygiene students, leading to self-reported increased understanding of their role in treating medically compromised patients in the clinical setting.

Conclusions: Student centered pedagogical methods are common educational strategies in dental, healthcare, and science education. Introducing teaching practices such as peer-led learning, flipped lectures, and case-based education to dental hygiene education has significantly positive outcomes for students' self-confidence in clinical dental practice, towards outcomes of increased patient safety and patient care. Incorporating critical thinking skills development by moving lecture out of the classroom with flipped lectures, and then asking students to prepare and deliver case studies to their peers, can help students become stronger clinicians.

Workplace Bullying: A survey of dental hygienists

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Problem: Workplace bullying is a worldwide problem in healthcare impacting career satisfaction, work productivity and mental and physical health.

Purpose: The purpose of this study was to determine the prevalence of workplace bullying in a convenience sample of dental hygienists and compare years practiced and employment setting to prevalence rates.

Methods: A descriptive survey design was used to determine the extent to which 1200 dental hygienists, sampled from a publishing company subscription list, experienced workplace bullying. The 22-item Negative Acts Questionnaire-Revised (NAQ-R), was used to determine how frequently participants experienced various negative acts that typify bullying. Participants were asked to rate the frequency they experienced each negative behavior using a five-point scale (never, now and then, monthly, weekly or daily) in the workplace within the past six months. Participants were also asked to respond to five demographic questions. Data were collected via three electronic

mailings over six weeks and analyzed for response frequency with descriptive statistics. Two-tailed t -tests were used to determine if significant differences in bullying scores occurred between group or solo practice settings and if years of experience affected results. Significance was set at the .05 level.

Results: An overall response rate of 12.5% ($n=154$) was obtained. Data reveal 28% ($n=44$) of participants met the criteria for being bullied, as defined by the NAQ-R. Of this number, three or more negative acts were experienced by 22% of participants at least weekly and six percent of participants experienced two negative acts. No significant differences were found when comparing bullying scores of participants employed in solo practices versus group dental practices ($p=.11$). Results revealed participants with 11 to 19 years of employment experienced bullying less ($p=.02$) and those with 5 to 10 years of practice employment experienced bullying more ($p=.05$) than all other participants. Most participants (77%) reported no written bullying policy existed in their work setting or they were unaware of such a policy.

Conclusions: Results of this study suggest almost one out of four dental hygiene participants experienced workplace bullying. Findings underscore the need for more research with a larger sample of dental hygienists to evaluate the impact of bullying in the oral care practice setting and what strategies and policies work best to eliminate bullying behaviors.

Investigation into the Cultural Competency of Dental Hygienists in a Large Western State of the United States of America

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Problem: The profession of dental hygiene lacks diversity, a contributing factor to cultural competence (CC), an essential component of optimum patient care. When considering the importance of CC to patient care and the roles of the dental hygienist as prevention and health promotion specialists, while educational standards require graduates be competent in diverse patient care, several circumstances support the need for more information: limited practitioner diversity, limited available evidence of actual practitioner CC, and no universal post-graduation CC continuing education requirements.

Purpose: The purpose of the study was to determine the level of CC of registered dental hygienists (RDHs), licensed in a large western state and explore the relationship with provider education, and time and type of provider experience.

Methods: An online survey using a modified version of the Cultural Competency Assessment (CCA), including 25 Likert scale and 7 demographic questions, was distributed to 3231 licensed RDHs using the state's DOPL email list. Non-respondents were contacted twice over a four-week period. Participants were also recruited in person at a local dental conference. Multiple regression was used to analyze associations between CC and salient participant characteristics. The minimal number of required respondents was determined to be 92 for medium effect size ($f^2=0.15$), alpha 0.05, power 0.80, and 647 with small effect size ($f^2=0.02$), alpha 0.05 and power 0.80.

Results: Complete responses from 673 of 3231 RDHs contacted were analyzed, a 20% response rate. The mean CC score was found to be 10.153 (SD=1.3), indicating moderate CC, unequally distributed between cultural awareness and sensitivity (CSA) and culturally competent behavior (CCB) scores. Possessing a graduate degree, CC education during dental hygiene school, CC continuing education, and type of experience, specifically employment in public health, significantly predicted CC, whereas possessing a bachelor's or associate's degree and length of time of provider experience did not. The regression model was significant $F(8,664)=8.616$, $p<0.0005$ with a low effect size ($R^2=0.094$).

Conclusions: Although participants exhibited moderate overall CC disconnect in translating CSA into CCB was revealed, possibly reinforced by environments lacking diversity, with limited opportunity to exercise such behaviors. Education and type of experience were found to be predictors of CC; however, specific educational interventions, that may increase the different components of CC, were not determined.

Ergonomic and Functional Evaluation of Four Dental Prophylaxis Handpieces

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Problem: There exists a strong impetus to improve the ergonomic properties of dental instruments and devices, which can be associated with repetitive stress injuries and musculoskeletal disorders that are common in dental professionals. However, no comprehensive methods exist for quantifying non-invasively, in vivo and in real time the ergonomics and efficacy of clinical dental instruments.

Purpose: The purpose of this study was to compare ergonomic and coronal polishing performance of 4 prophylaxis handpieces using novel surface Electromyography (sEMG) and image analysis techniques.

Methods: Wireless EMG electrodes (Freeemg™, BTS Engineering) recorded activity in 4 hand and arm muscles during standardized baseline activity and coronal polishing in 10 volunteer dental hygienists. Using typodont models sprayed with artificial biofilm and attached to a dental chair, Subjects polished each quadrant for 15s. Participants were filmed, and photographs documented biofilm removal. Next, additional time needed to complete polishing the entire typodont was recorded. Visual analog scale (VAS) measures of comfort and fatigue in hand, wrist, finger, palm and arm were noted. Participants rested 20 minutes between the 4 study arms, each of which tested a different, masked handpiece: (1) Premier Dental AeroPro™, (2) Dentsply Sirona Nupro Freedom™ cordless without foot pedal, (3) Dentsply Sirona Nupro Freedom™ with foot pedal, (4) Ultradent™ corded. Testing sequence was randomized. VAS evaluations of comfort and fatigue (scale 0-10); polishing efficacy (surface area; ImageJ software) and speed; muscle work (EMG analyzer software™); and postural quantification (scale 0-1; ImageMeasurement software™) measures were compared for each handpiece.

Statistical analysis was performed using analysis of variance with repeated measures. Significant findings were followed up with pairwise comparisons using the Tukey method to adjust for multiple comparisons.

Results: AeroPro™ cleaned significantly more surfaces in 60s than Nupro™ without foot control and Ultradent™ ($p < 0.05$), and it cleaned the entire typodont significantly faster than the other handpieces ($p < 0.05$). Participants reported significantly less fatigue and better comfort after using AeroPro™ than all other handpieces ($p < 0.05$). During the first 60s of polishing, Ultradent™ used significantly less work than the other handpieces for the dorsal interosseous muscle, Nupro™ with foot control used significantly less work for the flexor pollicis longus, and AeroPro™ used less muscle work in the abductor pollicis brevis and extensor digitorum communis (significant for abductor pollicis brevis $p < 0.05$). AeroPro™ used significantly less total muscle work over the entire polishing period ($p < 0.05$). All handpieces performed equally for ergonomic forearm position, but AeroPro™ performed significantly better for back, neck and torso posture ($p < 0.05$).

Conclusions: Using novel sEMG and image analysis techniques in a simulated clinical environment, it was determined that coronal polishing with AeroPro™ was accomplished faster with less operator fatigue, muscle work, and postural discomfort.

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Interprofessional Healthcare Delivery: Perceptions of oral health care Integration in a federally qualified health center

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Problem: Traditionally, medical care and dental care have operated separately within the United States healthcare system; each entity has functioned within their own practice, limiting the patient's options for intercollaborative healthcare. Though interprofessional healthcare collaboration (IPHC) is the recommended model for healthcare delivery, a separation between the delivery of oral healthcare and medical healthcare exists.

Purpose: This qualitative ethnographic case study examined a team of interprofessional healthcare providers' perceptions of how oral healthcare was integrated within a federally qualified health center (FQHC) in Brighton Colorado.

Methods: Data were gathered through one-on-one semi-structured personal interviews, which were recorded and professionally transcribed for evaluation. Purposive sampling included physicians, physician assistants, dentists, and dental hygienists. Descriptive analysis was used to describe sample demographics. An inductive and deductive approach was employed to assess the qualitative data and subsequently develop themes. Validity was established using triangulation, member checks, and peer review of data and themes by co-investigators.

Results: Eight participants ($n=8$) were interviewed. Subjects were between the ages of 31 and 58 and had been practicing between 5 and 30 years with an average of 13.6 years. Participants had been employed by the FQHC an average of 6.8 years. Thematic analysis revealed seven themes which included: interprofessional collaboration supports patient care, immediate consultations lead to improved outcomes for all, shared expertise to optimize care delivery, oral health is health, increased communication through collocation, role clarity does not impede team functioning, and mission driven to provide excellent care. These themes support the domains of patient centred care, communication, and role clarity of the Interprofessional Care Competency Framework and Team Assessment Toolkit (ICCFTAT).

Conclusions: The findings from this study can aid other FQHC's in the implementation of oral healthcare integration. Further research is necessary to understand how interprofessional healthcare collaboration (IPHC) affects the team dynamic.

Sleep apnea screening knowledge, attitudes, and confidence among Ohio dental hygienists

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Problem: Obstructive sleep apnea (OSA) is a common disorder that can increase the risk of systemic and oral complications if left untreated. Dental professionals are in a position to identify symptoms and risk factors of OSA and refer patients for evaluation and treatment of OSA. Not all dental professionals may have the knowledge or confidence to screen patients for OSA.

Purpose: The purpose of this study is to determine the knowledge, attitudes, and confidence levels of Ohio dental hygienists in performing sleep apnea screenings.

Methods: Upon IRB approval, a cross-sectional survey research study was conducted. The sample included all registered dental hygienists in Ohio above 18 years old with an active license with the Ohio State Dental Board. There was a 2.68% response rate ($n=228$). The sleep apnea questions were from the Obstructive Sleep Apnea Knowledge and Attitudes (OSAKA) questionnaire. The survey instrument was composed of 29 questions: 6 demographic and 23 sleep apnea questions. The 23 sleep apnea questions were divided into 3 groups: 18 questions on sleep apnea knowledge, 2 question on sleep apnea attitudes, and 3 questions on sleep apnea confidence levels. The knowledge questions had the following response options: True, False, Don't Know. The attitude and confidence level questions used a Likert scale for the responses. Descriptive statistics and linear regression analysis were used to analyze the data.

Results: Correlational analysis was conducted to identify relationships between OSA knowledge, OSA importance, OSA confidence and demographic characteristics. OSA knowledge was moderately correlated with OSA importance ($r=.405$, $p<.01$) and OSA confidence ($r=.528$, $p<.01$). This indicated that the more knowledge of OSA dental hygienist have, the more important and confident they feel in identifying patients with OSA. OSA importance was moderately correlated with OSA confidence ($r=.390$, $p<.01$). When a dental hygienist recognizes the importance of identifying patients at risk for OSA their confidence levels in identifying these patients is higher. OSA confidence was slightly correlated with age ($r=-.146$, $p<.05$) and years in practice ($r=-.167$, $p<.05$). This demonstrates that confidence levels decreased with an increase in age and years in practice. Significant multiple linear regression equations to predict OSA knowledge, importance, and confidence were found using the other qualifiers and demographic variables.

Conclusions: As age and number of years practicing as a dental hygienist increases, confidence levels of identifying patients with risk factors for OSA decreases. Increasing OSA knowledge increases confidence levels. Although many dental hygienists acknowledge the importance of OSA, there is limited knowledge and confidence in the management of patients with OSA. Continuing education on this topic may help to improve knowledge, importance, and confidence levels of practicing hygienists. Further research is needed to be able to generalize this information to all dental hygienists.