

# Research Poster Abstracts

The following abstracts are from the participants of the 2018 Annual Dentsply Sirona/ADHA Graduate Student Clinician's Research Program. The purpose of the program, generously supported by Dentsply Sirona for the past 11 years, is to promote dental hygiene research at the graduate level. Dental hygiene post-graduate programs may nominate one student to participate in the program and present their research at American Dental Hygienists' Association Annual Conference. The following posters were presented during the ADHA Annual Conference held in Columbus, Ohio, June 21-25, 2018.

\* Indicates poster presenter

+ Indicates award recipient

## The Influence of the Mobile Application, ToothSense, on the Oral Health Practices and Behaviors of the Parents of Preschool Children

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**Purpose:** Many oral health promotion programs are directed at reducing the prevalence of early childhood caries. Mobile applications may be beneficial in oral health promotion. The study purpose was to evaluate the effect of a smartphone application, ToothSense, based on the Theory of Planned Behavior (TPB) on oral health behaviors of the parents of preschoolers.

**Methods:** A two-phase, sequential embedded mixed methods design explored how ToothSense, influenced the attitude, beliefs, perceived behavioral control, and intentions of parents of preschoolers. Phase 1 was a quasi-experimental, one-group pretest-posttest design. Parents (n=26) of Head Start and preschool children participated in the 4-week intervention. Phase 2 consisted of qualitative interviews with a purposive sample of these parents (n=11).

**Results:** Parents' behavioral intentions or oral health behaviors with their preschoolers did not significantly change from pre to post intervention ( $p > .05$ ). Social norms (SN) and perceived behavioral control (PBC) predicted behavioral intentions pre-intervention and behavioral change post-intervention. While quantitative results showed minimal change post-intervention, thematic analysis revealed (1) parents' belief in the importance of establishing oral health habits and (2) ToothSense brushing reminders and videos supported efforts to establish oral health habits.

**Conclusions:** The use of TPB constructs in developing oral health promotions aimed at parents of preschoolers was partially supported. Intention and behavior were not affected post-intervention but SN and PBC emerged as significant predictors of intentions and behavior. ToothSense may aid parents to make good oral health habits part of their preschooler's daily routine.

## Head and Neck Flexion Among Dental Hygiene Students and Clinical Faculty Using Two Types of Magnification Loupes: A Comparative Study

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**Purpose:** The purpose of this study was to compare head/neck flexion angles among senior dental hygiene students and clinical instructors using first generation through-the-lens (TTL) loupes and third generation vertically-adjustable-front-lens-mounted (VAFLM) loupes during simulated dental hygiene scaling (SDHS) procedures on a mannequin.

**Methods:** A nonprobability, purposive sample of second-year dental hygiene students and clinical faculty (N=29) from ISU was recruited for this simulation study. A within-subjects, crossover design was employed to identify head/neck flexion angles under two lens conditions, TTL and VAFLM loupes, during SDHS procedures. Three lens conditions (TTL, VAFLM loupes and safety lenses) were compared in a subset of participants (n=10). Static photographs were taken at three, time points during SDHS procedures using each lens condition. Kinovea software was used to calculate head/neck flexion angles from images. Data were analyzed using measures of central tendency and repeated measures ANOVA.

**Results:** Across-the-board, mean head/neck flexion angles were significantly lower for the VAFLM loupes compared to the TTL condition during SDHS procedures in both the

mandibular and maxillary arches ( $p = 0.000$ ). Additionally, the VAFLM loupe condition showed a significant decrease in forward head posture over the safety lens and TTL conditions in maxillary and mandibular arches ( $p < .0001$ ,  $p = .0002$ , respectively).

**Conclusion:** The VAFLM loupe condition greatly reduced head/neck flexion angles and significantly decreased forward head posture over the TTL condition. The magnitude of effect size for VAFLM loupes suggests efficacy for these third-generation magnification lenses to positively impact poor work posture as a risk factor in the development of work-related musculoskeletal disorders.

### Dental Utilization Patterns of Children Age 2-3 Years Covered by Medicaid and Residing in Wayne County, Michigan

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**Background:** Untreated oral disease is prevalent among underserved and vulnerable populations in the United States. These populations include children, specifically those from lower socioeconomic backgrounds.

**Objectives:** To examine dental utilization patterns of Medicaid-enrolled children age 2 residing in Detroit, Michigan compared to their counterparts living in Outer Wayne County, Michigan. A secondary objective was to identify those who had an emergency dental visit during age 2 and determine the type of follow-up through age 3.

**Methods:** This study was a secondary analysis of Medicaid dental administrative claims data for eligible children in Wayne County, Michigan who turned 2 years of age during calendar year 2013. Child-level enrollment and dental utilization data were extracted from the Michigan Department of Health and Human Services Data Warehouse.

**Results:** Children meeting inclusion criteria numbered 7,359. Only 3,671 (50%) children had at least one dental visit between age 24 and 47 months. A total of 7,481 visits occurred during this time. Four-hundred (5%) visits were categorized as an emergency compared to 5,425 (73%) categorized as preventive. Seventy (69%) children from Detroit had an emergency visit during age two compared to

31 (31%) from Outer Wayne County. Fifty-seven (81%) in Detroit received follow-up care post an emergency, compared to 21 (68%) in Outer Wayne County. Equal proportions (23%) of repeat emergency visits were observed in Detroit and Outer Wayne County.

**Conclusions:** Earlier preventive dental care may help reduce emergency visits, be more cost effective, and decrease the need for extensive treatment.

### Using Simulation to Promote Reflection in Dental Hygiene Education

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**Purpose:** This research investigated Kalb's Theory of Experiential Learning as an effective method in measuring reflection during a simulation debriefing exercise. Additionally, this study identified the reflective practices used among dental hygiene students in a standardized patient simulation.

**Methods:** A non-experimental, mixed-methods, sequential explanatory design was used for the study. Utilizing a sample of dental hygiene students enrolled at Eastern Washington University (EWU), a standardized patient simulation was implemented to promote reflection among participants. Results were determined by the debriefing reflection rubric based upon Kalb's Theory of Experiential Learning.

**Results:** Descriptive statistical data revealed that this tool is successful in determining the level of reflection in these dental hygiene students. Additional results showed dental hygiene students demonstrated reflective observations and concrete experiences; however, dental hygiene students demonstrated limited responses to abstract conceptualism and connecting their experience to future endeavors.

**Conclusions:** The debriefing reflections rubric was found to be an efficient tool in determining reflection among the dental hygiene students and suggests that the debriefing reflection rubric used could be implemented in simulation practice. Dental hygiene students demonstrate competent skills in reflective observations; however the students' ability to identify conceptual connections and further connect it to future action was limited indicating the need for further research in this area.

## Use of Technology to Facilitate Patient Motivation for Improving Oral Health

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**Purpose:** To examine the effects of a smartphone application associated with a powered toothbrush on patient motivation and subsequent compliance with oral hygiene care.

**Methods:** This pilot study utilized a randomized controlled parallel arm design. Patient reported brushing, Dental Self-Efficacy Scale (DSES) and the Treatments Self-Regulation Questionnaire (TSRQ) were collected from surveys given at baseline, completion (30 days) and follow-up (90 days). Adults identified as needing oral hygiene improvement at a routine dental cleaning were recruited to participate. Subjects were randomly assigned to the intervention (utilized smartphone application) or the control (did not utilize smartphone application) groups.

**Results:** After all data collection, no statistical significance was found between the intervention and control groups for any outcomes compared to baseline data. At baseline, the control had a significantly higher autonomous motivation score than the intervention group (0.54 vs 5.80) ( $p=0.019$ ). Over time, the autonomous motivation appears to stay the same in the control group, while increasing in the intervention group. All subjects reported more confidence in their toothbrushing abilities (16.16-17.11) versus their interproximal cleaning abilities (11.92-13.52).

**Conclusion:** This study shows the oscillating powered toothbrush with Bluetooth and associated smartphone application has the potential to support patient motivation and confidence in performing homecare. The smartphone application's supportive features could play a role in the long-term maintenance of oral hygiene home care. Further research is warranted to continue to understand the impact of technology on patient motivation in regard to oral health improvement.

## Dental Implant Assessment and Maintenance: Attitudes and Practices of Dental

Hygienists in the United States

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**Purpose:** To investigate U.S. dental hygienists' attitudes and practices regarding assessment and maintenance of dental implants.

**Methods:** A 34-item quantitative, web-based survey was developed and distributed nationally to a randomly selected sample of 10,000 dental hygienists from the American Dental Hygienists' Association (ADHA) email database. All survey responses were analyzed and reported using frequency distributions.

**Results:** A total of 2033 dental hygienists (21%) responded. Nearly all the respondents (98%) who practiced dental hygiene also provided care to patients with dental implants. Many routinely assessed for bleeding/exudate, mobility, plaque/calculus, and tissue color around implants, however 34% rarely/never checked for cement around implants, 31% rarely/never probed, and 54% rarely/never checked the occlusion. Many respondents (44%) reported they were unable to remove plaque as well from implants as compared to teeth. A majority (60%) reported using plastic/resin scalers, however only 7% felt they were effective. While 5% reported using subgingival air-polishers, 71% felt they were effective. The most commonly recommended hygiene aid for patients with implants was an oral irrigator by 75% of the respondents. A majority (91%) reported continuing education courses as the primary source of implant-related knowledge.

**Conclusion:** While a majority of dental hygienists reported providing care to patients with dental implants, there was variability in attitudes and practices among respondents regarding the assessment and maintenance care of implants. Curricula and continuing education focused on evidence-based implant care recommendations are needed.

## The Functional Status and Oral Health Quality of Life for Seniors in Residential Facilities who Have Direct Access to Care as Compared to Those Without Access

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**Introduction:** Residents of senior residential facilities face obstacles to good oral health, as most are medically compromised and cannot provide adequate self-care. Consequently, the oral health status of the population is generally poor and has a negative impact on quality of life.

**Purpose:** The purpose of this study was to test whether there is a perceived difference in oral health and comfort when residents in long term care facility received periodontal debridement and prophylaxis compared to facility who provide only brushing and flossing assistance.

**Methods:** The study design was quasi-experimental with hypothesis testing and descriptive statistics used to summarize the data. The study took place in two residential facilities in Sheridan, Wyoming. Fifteen residents from each facility comprised the study sample (n=30). The treatment group received periodontal debridement and prophylaxis and oral hygiene education and the control group received brushing, flossing and oral hygiene education. A pre/post test was conducted using the 5 question Oral Health Impact Profile, shortened version.

**Results:** Results demonstrated there was a significant difference in pre/post OHIP-5 scores in the treatment group (p=0.0222). The control group had improved scores but it was not significant (p=0.5331). A significant univariate association was found between caries and OHIP-5 scores (p=0.0082).

**Conclusions:** This study revealed that residents of long-term care facility perceived their oral health quality of life improved as a result of receiving preventive dental services where they reside.

## Representation of Diversity on Entry-Level Dental Hygiene Program Websites

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**Purpose:** The purpose of this study was to investigate current entry-level dental hygiene program websites across the United States and evaluate how ethnic and racial diversity is portrayed. The aims of this study were to examine the images and videos used on websites of current entry-level dental hygiene programs and describe the frequency that minorities are represented and the role in which they are characterized.

**Methods:** A content analysis was used to evaluate a random sample of entry-level dental hygiene program webpages from the American Dental Hygienists' Association (ADHA) list. The 37 entry-level dental hygiene webpages were assessed for diversity. The representation of diversity was evaluated by examining images and videos found on the webpages and then coding the findings by demographics and the roles in which the individuals appearing in pictures or videos were portrayed.

**Results:** Thirty-seven of the 50 randomly selected entry-level programs met the inclusion criteria. Of these, 32 were associate degree programs and 5 were baccalaureate degree programs. A total of 690 images on the websites of these 37 programs were analyzed. The overall findings reflected Whites being predominately represented in 78.8% of the images followed by Asian (5.2%), Black or African American (4.3%), while American Indian Alaska Native and Native Hawaiian/ Other Pacific Islander were least represented at 0.3% and 0.1% respectively. Race was undetermined in 8.4% of the sample. The Chi-square test of independence showed that there was a statistically significant difference (p=0.004) between associate and baccalaureate degree programs. Associate programs had less representation of underrepresented minorities images on entry-level dental hygiene webpages.

**Conclusion:** The study evaluated the representation of racial and ethnic diversity on entry-level dental hygiene program webpages. The findings revealed that the entry-level dental hygiene program websites predominately reflected White female as the majority in the images and videos on the webpages. This data was reflective of the profession and the student population; White females outnumbered

underrepresented minorities. There was a statistically significant difference between how associate and baccalaureate programs represented underrepresented minorities on their webpages.

### Current Radiation Safety Practices of United States Dental Hygienists

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**Purpose:** The purpose of this study was to determine licensed dental hygienists' current radiation safety practices.

**Methods:** Data was collected with a 22 item, IRB exempt online survey administered to a sample of 1,500 U.S. dental hygienists who were subscribers of a professional journal. Questions focused on respondents' use of ADA selection criteria guidelines, policies implemented by their dental practices, and hand-held portable x-ray device use and training. A response rate of 38% (N=566) was obtained. Cross tabulations were obtained using logistic regression and general linear models for significance at a 0.05 level.

**Results:** A majority of respondents had an associate's degree (62%), participated in a radiology course for two semesters or less (84%), and were aged 55 and above (41%) with 31 or more years of experience (38%). Dental hygienists were significantly more likely to select the appropriate criteria for determining radiographic need with more years of experience ( $p=0.0340$ ;  $SE=0.1093$ ). Dental hygienists with a bachelor's degree or higher were significantly more likely to use radiographic techniques that reduce radiation exposure than those with an associate's degree ( $p=0.0080$ ;  $SE=0.0169$ ). Respondents were significantly more likely to wear a clinician lead apron when using a hand-held device if they had recently taken dental radiation safety continuing education (CE) courses ( $p=0.0093$ ;  $M=1.571$ ;  $SD=1.222$ ).

**Conclusion:** Dental hygienists with more years of experience, a higher level of education, and recent CE course work were more likely to follow the ADA selection criteria guidelines and use the appropriate technique to reduce exposure to ionizing radiation.

### Where Do We Go from Here? Extent and Perceptions of Elder Abuse Training In Dental Hygiene Curricula

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**Problem:** Previous research revealed insufficient elder abuse training in dental hygiene curricula. Dental hygiene graduates must be prepared to confidently recognize and respond to situations of elder abuse.

**Purpose:** The purpose of this investigation was to determine the current extent of elder abuse training in dental hygiene curricula and explore educator's perspectives on the topic.

**Methods:** A twenty-five item online survey was distributed to 361 program directors, coordinators and/or department chairs of Commission on Dental Accreditation (CODA) accredited dental hygiene programs via email invitation in August 2017. Qualtrics® survey platform and SPSS were utilized for survey administration, data collection, and descriptive statistical analysis.

**Results:** A response rate of 27.15% (98) was achieved. Although 83.33% of the respondents reported inclusion of elder abuse training, the majority of Associate (84.61%), Entry-level BSDH (93.75%), and BSDH completion and MSDH (100%) programs reported less than three hours of instruction on the topic. Various barriers to inclusion were identified. Graduates were perceived as appropriately competent in identification of oral neglect (63.51%), general neglect (48.65%), and documentation of potential signs (43.84%). Less than one-third (32.43%) considered graduates to be appropriately competent at reporting suspected elder abuse and (18.06%) perceived graduates to be appropriately competent at communication with the patient, caregiver, and dentist about possible abuse.

**Conclusions:** A deficiency in elder abuse training is still evident despite rising awareness and increased incorporation in dental hygiene curricula. To prepare graduates to confidently recognize and respond to elder abuse, educators must be willing to overcome barriers, modify instruction, and embrace interprofessional collaboration.

## Oral HPV Cancer Awareness among College Students: A Pilot Study

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**Problem:** College students can be considered among the highest populations at risk for Human Papillomavirus (HPV) infection and related oropharyngeal cancers (OPC). Yet, studies have shown a low level of perceived susceptibility of HPV infection exists among this group. The level of awareness on HPV-related OPC can be a predictor of interest and intent to pursue health promotional and preventive activities. The focus of this study was to investigate the current knowledge and attitude pertaining to HPV-related oropharyngeal cancer (OPC), HPV vaccine acceptance and linkage to health promotional behaviors of college students.

**Methods:** Participants were randomly recruited through list-serves of enrolled university college students pursuing non-health related degrees (n=86). A 16-item cross-sectional survey was constructed to identify factors affecting the following: perceived HPV risk, HPV vaccination benefits, HPV-related OPC awareness, and motivation levels to change health promotional behaviors. Data were exported from Qualtrics to Microsoft Excel with additional analysis using SPSS.

**Results:** Responding participants (n=86) were able to identify factors improving their perception on the severity of HPV (91%), infection susceptibility (71%), and vaccination benefits (81%). Increased awareness led to increased intent to obtain both a HPV vaccination (71%) and an oral cancer examination (93%).

**Conclusion:** Identifying factors improved awareness on HPV-related OPC and vaccine benefits and contributed as a predictor for participants' intent to pursue health preventive behaviors.

## Trends and Determinants of Drinking Water Practices: A Mixed-Methods Study

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**Problem:** Despite the well-known benefits of fluoridated community water (CW), bottled water (BW) consumption is on the rise. CW avoidance is common in Latino communities, which also experience a disproportionate burden of dental caries. These increasing BW consumption trends imply that vulnerable children may not be receiving the caries-preventive benefits of CW fluoridation.

**Purpose:** The purpose of this study was to investigate the determinants of BW vs. CW consumption and understand the Latino community's beliefs, experiences and practices regarding drinking water.

**Methods:** Electronic health record data (demographics, insurance, primary drinking water source) were obtained for all first-time, routine-care UNC-Chapel Hill Pediatric Dentistry patients age 0-16 in 2002-2016. Analyses relied on descriptive and bivariate methods and multivariable log-binomial regression. Second, phone interviews were conducted with Latino parents of young children and key community informants (n=15); transcripts were analyzed qualitatively using Atlas.ti.8 software.

**Results:** BW consumption increased from 17% in 2004 to 42% in 2016 (n=2,920, P<0.05). Medicaid-enrolled children [prevalence ratio (PR)=2.1; 95% confidence interval (CI)=1.8-2.4] and those living in rural areas (PR=1.3, 95% CI=1.1-1.5) were more likely to consume BW versus CW. Major themes emerging from the interviews included 'ingrained upbringing that devalued CW consumption' and 'lack of knowledge about CW fluoridation and safety.' Participants suggested that Spanish-speaking health professionals are a promising avenue to promote CW consumption.

**Conclusions:** BW consumption is sharply increasing and most prevalent among low-income families and those living in rural areas. Successful promotion of CW consumption in NC Latino communities requires engagement of both community stakeholders and health professionals.