

# ADHA ANNUAL CONFERENCE RESEARCH POSTERS

The American Dental Hygienists' Association (ADHA) Annual Conference Research Poster Session provides clinician researchers and educators an opportunity to present their work and exchange information and effective strategies for teaching and mentoring research with their colleagues and other oral health care professionals. The following abstracts were part of the Research Poster Session presented at ADHA's 2016 Annual conference in Pittsburgh, PA.

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## **A Survey of Massachusetts Dental Hygienists: Practice Settings, Interest in Educational Advancement, and Career Satisfaction in All Settings.**

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**Problem:** Registered dental hygienists have an obligation to themselves and the community to deliver the highest quality of oral health care. Dental hygienists seek employment in private practice, education, corporations, community health centers, and alternative settings such as nursing homes and schools. Nationally the employment of dental hygienists is projected to grow 19 percent from 2014 to 2024. With increased numbers of dental hygienists entering the workforce, the American Dental Hygienists' Association-Massachusetts seeks to identify demographics, practice settings, interest in professional advancement, and career satisfaction. Survey data obtained can be used to improve the workplace of dental hygienists so they may continue to serve the public.

**Objectives:** The purpose of this study is to investigate the current landscape including practice settings, interest in educational advancement, and level of job satisfaction of dental hygienists in Massachusetts.

**Methodology:** This study used a quantitative survey research design with probability sampling. Data was collected using a convenience sample of 50 dental hygienists practicing in Massachusetts. The instrument used in the study contained questions regarding demographics, education levels, years of practice, employment status and settings, office location, hourly wages, benefits, membership in the American Dental Hygienists' Association (ADHA), interest in advancing as a midlevel provider, and career satisfaction of dental hygienists. Survey information was obtained through the use of SurveyMonkey®, and all responses remained confidential. Data was analyzed using descriptive statistics. Statistical analyses were performed using STATA statistical analysis software. IRB approval was obtained from MCPHS University.

**Results:** Results indicate the majority of dental hygienists who participated in the survey were Caucasian (90%) females (100%) ages 41 to 65 (72%) who are members of the ADHA (70%). Participants initially earned an Associate Degree in Dental Hygiene (86%). Those who pursued higher education (44%) were attracted to personal growth (82%). Less than half of the participants indicated an interest in pursuing a degree to be a mid-level provider (41%). A majority of participants are paid on an hourly basis (80%), treat 8 to 10 patients a day (57%), and earn over \$35 an hour (78%). The most prevalent response to all 5-point Likert scale questions regarding personal satisfaction, satisfaction for patient care, and confidence in providing adequate care to patients was "Strongly Agree" (range 45% - 60%).

**Conclusions:** Results indicate dental hygienists expressed a high level of career satisfaction, an interest in personal and professional growth, and plan for continued employment in the field of dental hygiene. Further research is warranted.

## Students' Perspectives Regarding the Health Education Systems, Inc. (HESI) for Dental Hygiene as an Effective Method to Prepare for the NDHBE

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**Problem:** First time success on the National Dental Hygiene Board Examination (NDHBE) is the goal for every dental hygiene student. Achieving this goal could pose challenges for some students if not thoroughly prepared. Nursing disciplines have been utilizing the Health Education Systems, Inc. (HESI) to benchmark nursing student's first time success taking the National Council Licensure Examination for Registered Nurses (NCLEX-RN). Dental hygiene students do not comprehend the level of preparation required to achieve first time success on the NDHBE. In an effort to prepare dental hygiene students for first time success, a widely used nursing instrument, Health Education Systems, Inc. (HESI) has been introduced for dental hygiene. This testing instrument is affording students a medium to assure preparedness for first time success.

**Objectives:** The purpose of this study was to retrospectively evaluate student's perceptions and satisfaction with HESI examinations, administered during the final semester of their dental hygiene program, as a method of preparation for the NDHBE.

**Methodology:** This was a mixed methods research design. A survey instrument was developed based on the literature and contained 19 pre questions and 7 post questions relating to the following areas: demographic characteristics, student perceptions of sense of preparedness and level satisfaction with the HESI preparation materials. The survey was administered to a purposive sample of dental hygiene students (n=29). The pre-survey was disseminated after participants completed four HESI examinations which included: Exit Exam 1 and three specific topic exams. The post-survey was disseminated after completion of the NDHBE. IRB approval was obtained from MCPHS University.

**Results:** Qualitative and quantitative data was collected utilizing SurveyMonkey®. Qualitative data was collected from the open-ended survey questions, analyzed and coded by researchers to capture common themes. Thematic analysis revealed an overarching theme which noted respondents were satisfied with the HESI as a method to identify content areas the participants did not know and as a review for content previously learned. However the majority believe the

HESI needs improvement with content and remediation to be a more useful tool to prepare students for their NDHBE. Additionally, 36% of participants agreed or strongly agreed the HESI examination aided in their preparation for the NDHBE while 48% were either dissatisfied or strongly dissatisfied with the HESI as a board preparation instrument.

**Conclusion:** Literature regarding HESI Examinations for Dental Hygiene and use within dental hygiene programs is limited. Findings from this study show students are somewhat satisfied however they would supplement with additional study materials. Further research is recommended to determine need for improvements to the HESI to improve student satisfaction and preparedness.

## Predictors of Receipt of Dental Procedures by Senior Adults Continuously-Enrolled in Medicaid During Their Transition from Community-Dwelling to Nursing Facility Residences

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**Problem:** Senior adults in nursing facilities (NF) who access professional dental care might have fewer dental and medical complications than those who do not access dental care. There is limited data available that measured the dental care provided when a senior adult moves from community-dwelling to a NF. It would be valuable to have this data to inform decisions makers and future policy aimed at improving the health of Iowa's NF population.

**Objective:** To evaluate the predictors of professional dental care utilization when senior adults transition from community-dwelling to nursing facilities.

**Methodology:** A retrospective longitudinal analysis of Iowa Medicaid claims data was performed. These data were limited to Iowans 68 years or older who entered an Iowa NF and had been continuously enrolled (eligible 58 out of 60 months) in Medicaid for at least three years prior and two years after admission (n=874). A Chi-Square and simple logistic regression was performed. Claims data were used to identify subject level variables including demographics, prescriptions written, chronic conditions diagnosed and dental procedures received. Dental procedures were categorized as  $\geq 1$  Hygienist Probable Procedure (HPP), Examinations (Exam), HPP and Exam (PDP), or Other procedure per year. Geographic variables were determined by the NF location.

**Results:** Most subjects did not receive dental care (HPP 76%, Exam 53%, Other 50%) over the 5 year study. Fewer subjects received HPP after NF entry compared to before ( $p < 0.001$ ), unlike Exams or Other procedures which increased ( $p < 0.001$  each). The

percentage of subjects who received Exams nearly doubled after NF entry (5.3% versus 13.4%); HPP remained at under 0.5% in the same periods.

Controlling for covariates, the odds of receipt of  $\geq 1$  dental procedure after NF entry were 4.71 times greater for PDP (CI 95% 3.40-6.50) and 3.48 times greater for Other procedures (CI 95% 2.55-4.74) when compared with the odds of those who did not receive the respective dental procedures before NF entry. Controlling for covariates, subjects who resided in an urban NF had 2.00 times greater odds (CI 95% 1.33-3.00) of receiving  $\geq 1$  PDP and 1.92 times greater odds (CI 95% 1.28- 2.87) of receiving  $\geq 1$  Other procedures compared to the subjects who resided in a rural NF.

**Conclusions:** In Iowa, most continuously-enrolled Medicaid senior adults did not receive dental care during the five year study period. More subjects received  $\geq 1$  dental procedure after NF entry compared to before. Subjects were more likely to receive  $\geq 1$  dental procedure after NF entry if the subject had  $\geq 1$  dental procedure before. Subjects were more likely to receive  $\geq 1$  dental procedure after NF entry if the nursing facility was located in an urban area.

### Interprofessional Educational Training Improves Pharmacists' Ability to Counsel Older Adults

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**Problem:** Pharmacist-based educational interventions provide an opportunity to improve oral health-related knowledge and behaviors for older adults; however, pharmacists may not have received sufficient training to provide appropriate advice.

**Objective:** The purpose of this study was to evaluate the impact of a training program on practicing pharmacists' (1) knowledge of oral health conditions among older adults, (2) knowledge about interventions to manage oral problems, (3) confidence with ability to locate resources related to oral health, and (4) level of perceived preparedness to counsel older adults about oral health.

**Methodology:** A convenience sample of practicing pharmacists (n=120) serving older adults was recruited to attend a training program about oral health, and 65 chose to participate. Prior to the

program, sixty-two pharmacists ((95%) agreed to complete 2 original, validated surveys: one assessing experiences and training related to oral health, and the other a pre-test to measure knowledge (true/false), ability and level of preparedness with counseling older adults about oral health. A dental hygienist delivered the training program using a combination lecture and small group discussion format. Immediately afterwards, 62 participants completed the validated matching post-test. Responses were anonymous to protect confidentiality. Data were analyzed using SPSS 22 (IBM Corp. Armonk, NY). Responses to the first survey were reported using descriptive statistics. Pre-test and post-test data were compared using the McNemar test and Wilcoxon signed-rank test.

**Results:** Forty-two percent of pharmacists received some formal training about oral health in school (n=26). An exact McNemar's test determined that there was a statistically significant difference on 5 of the 12 knowledge measures ( $p = 0.000$ ) after the training intervention. A Wilcoxon signed-rank test showed that participation in the training program produced a statistically significant change in pharmacists' confidence in ability to locate oral health information ( $Z = -5.197$ ,  $p = 0.000$ ) and available area dental resources ( $Z = -5.202$ ,  $p = 0.000$ ); and level of preparedness to counsel older adults about the importance of oral health to overall general systemic health ( $Z = -5.847$ ,  $p = 0.000$ ) and about interventions to address oral health needs ( $Z = -6.026$ ,  $p = 0.000$ ).

**Conclusions:** Older adults seek advice from pharmacists about oral health and oral care products. Participation in an interprofessional training program improved pharmacists' knowledge, confidence in ability to locate resources, and level of preparedness to counsel older adults about oral health. A.T. Still University IRB approval #2015-068. Funding source: Dental Trade Alliance Foundation

### The Effect of Magnification Loupes on Posture During Instrumentation by Dental Hygienists

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**Problem:** The physical stress of clinical practice is an occupational risk factor for developing musculoskeletal disorders (MSD) in dental hygienists. The utilization of dental magnification loupes shows a great deal of promise in decreasing neck flexion and improving posture.

**Objectives:** The purpose of this study was to determine the effects of dental magnification loupes on posture during instrumentation.

**Methodology:** A convenience sample of twenty-seven right-handed dental hygienists with no history of injuries or disabilities of the head, neck, and trunk regions was enrolled. Baseline posture calibration was taken. Accelerometers were placed on four locations of the head and trunk (head, cervical vertebrae: C5, thoracic vertebrae: T5, lumbar vertebrae: L1) to measure changes in posture. Accelerations in three axes were recorded (anterior/posterior (AP), medial/lateral (ML), vertical (VT)). Mean accelerations of these axes were used to compute average forward tilt (APangle) and sideways tilt (MLangle) of each sensor. For each axis, root mean square (rms) was calculated to determine magnitude of tremor fluctuations (APrms, MLrms and VTrms). Paired sample t-tests were performed to assess differences in the dependent variables (APangle, MLangle, APRms, MLrms, VTrms). Chair mounted typodonts with artificial calculus represented a simulated oral environment. Subjects were randomly assigned to wear loupes during the first or second half of the experiment and instructed to explore all areas of the mouth with an ODU 11/12 instrument. Chi-square was used to analyze survey questions.

**Results:** Twenty seven participants (26 female and 1 male) completed the study. Results revealed no statistically significant differences between loupes and no loupes in the tilt angle of each sensor location in the AP or ML planes. In contrast, a statistically significant difference in mean fluctuations while wearing loupes ( $M=.215152$ ,  $SD=.0741530$ ) (rms) in AP at C5;  $t(24)=2.63$ ,  $p=.015$ , compared to not wearing loupes ( $M=.261028$ ,  $SD=.1379292$ ) indicated posture fluctuations decreased while wearing loupes. APRms was only significant at C5; for ML and VT axes and sensor positions (head, C5, T5, L1) there were no statistically significant differences in mean fluctuations (rms) between wearing loupes and not. Overall, 74% of participants strongly agreed magnification loupes made instrumentation easier and 67% of participants strongly agreed magnification loupes improved their posture.

**Conclusions:** While participants perceived that magnification loupes enhanced their posture, the study provided little evidence that wearing loupes leads to changes in body orientation; only to reduced postural tremors at C5 in the AP axis.

### Factors that influence purchasing decisions by clinical dental hygienists – Product testing, purchasing, and ergonomic considerations

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**Problem:** Post-graduation product purchasing decisions are not well documented. Little is known about how hygienists gain information about new products, what factors influence testing a product or encouraging a product purchase and whether ergonomic awareness and education plays a role in purchasing.

**Objectives:** To examine post-graduation purchasing practices:

- Determine how hygienists learn about new products
- Learn what encourages hygienists test new products
- Understand the factors that motivate product purchasing
- Explore if ergonomic awareness and education impact purchasing decisions.

**Methodology:** Hygienists were invited, via multiple social media sites, to participate in the voluntary, convenience poll. Data was collected using an online, internet-based convenience sample over a three-week period in November 2012. The survey instrument contained 23 close-ended, pilot-tested questions including: basic demographics, academic training about WRMSD, new product information sources, factors influencing product testing and purchasing. Responses were confidential. Data was analyzed using descriptive statistics.

**Results:** A total of 1,217 licensed dental hygienists representing 47 states and 6 Canadian provinces responded. The top learning resources were magazine articles (78%), CE course content (77%) and professional recommendations (70%).

Seventy-two to 88% of those practicing for more than one year learned about new products through CE courses, in contrast to 48% of new graduates. Hygienists practicing more than one year used a wider range of learning opportunities than recent graduates ( $p<0.01$ ). Platforms included magazine articles, clinician recommendations, advertising, CE courses, exhibit halls, online manufacturer communication, and company programs.

Testing new products is driven by free samples (81%), evidence-based research (65%), and clinician recommendations (53%). New graduates were most likely to absolutely consider evidence-based research (74%). Purchasing decisions were driven by quality/durability (84%), saving time (79%), infection control ease (70%), and ergonomic benefits (69%).

Hygienists with <1-10 years of practice were more likely to make purchasing decisions based on ergonomic benefits than other cohorts, with 76% reporting ergonomics absolutely influenced purchasing decisions ( $p < 0.05$ ). Seventy percent of those practicing 31 plus years considered ergonomic benefits an absolute motivator. Ninety-two percent of those in the <1 year cohort who learned about ergonomics in school reported ergonomic benefits absolutely motivated their purchasing decisions, versus 42% for who did not learn about ergonomics in school.

**Conclusions:** Despite varying practice lengths, dental hygienists appear to have consistent behaviors regarding how they learn about, test and purchase new products. Ergonomic benefits were most important to early-career clinicians and those practicing three decades or more. Further research should focus understanding how hygienists incorporate product purchases in their professional careers.

### **Dietary Habits during Pregnancy: A Self-reported Evaluation of the Intake of Sweets and the Role of Dental Hygienists in the Prevention of Oral Health with Pregnant Women**

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**Problem:** Proper oral healthcare during pregnancy is essential for the promotion of both oral and systemic health of mothers and newborns; nutritional requirement of pregnant women requires optimal intake of carbohydrates to prevent diabetes and dental diseases. Mothers often receive poor preventive guidance about nutrition and oral health care.

**Objectives:** With the aim to find any potential relationships, this study analyzed the intake of sweet foods during pregnancy, smoking and alcohol habits, oral hygiene tendencies, the frequency of dental visits and oral health status in a cohort of postpartum women.

**Methodology:** A cohort of 410 consecutive postpartum women were surveyed at the obstetrics/gynecology clinic of the University of Milan. Trained dental hygienists interviewed with a customized questionnaire and examined the patients at bedside

within 5 days from delivery, performing a full oral examination. The informed consent was signed before the examination. Data collection included the socioeconomical status, daily diet characteristics and sweets intake, smoking, oral hygiene habits, oral symptoms during pregnancy; dental (DMFT) and periodontal clinical indexes were recorded. Descriptive statistics and relevant associations were analyzed with JMP 9.01 software performing ANOVA and nonparametrical tests.

**Results:** The women were aged from 19 to 47 years (mean 32.9, IQR 30-36); 31.5% reported graduate education, 66.8% high school education and 7% primary school education. 62.4% of the subjects never smoked while 37.6% were former or current smokers. 71.1% of the subjects reported an intake of sweets at least once a day. 53.6% of women brushed their teeth twice a day after meals. 34.8% reported that they see the dentist only for emergencies and 65.2% had a professional prophylaxis at least yearly. 79.7% of the women had at least one oral/dental symptoms during pregnancy: gingival bleeding, tooth mobility, bad breath. Mean bleeding on probing (BOP) index was 9.7 (14.5 st.d.; 0.9-12.5 IQR). Mean DMFT was 7.6 (4.1 st.d.; 5-10 IQR). The statistical analysis highlighted the following main associations: oral pregnancy symptoms were slightly higher in smokers: BOP was higher in smokers ( $p = 0.03$ ); mean DMFT was slightly higher with a daily intake of sweets with low statistical significance ( $p = 0.08$ ).

**Conclusions:** The study demonstrated the existing associations between these risk factors and oral diseases during pregnancy and how the dental hygienists may play a crucial role in prevention and advocacy.

### **Cultural Adaptability of Dental Hygiene Program Directors in the United States**

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**Problem:** Diversity of the workforce is increasing in oral healthcare as well as the patients that are served. As diversity increases, dental hygiene programs must support and promote diversity initiatives that will drive programs and policy that ensure all individuals are equally and effectively supported within their work environment. Dental hygiene program directors need to be aware of their own cultural adaptability to be able to support, nurture, and lead a culturally competent workforce.

**Objectives:** This study utilizes institutional theory to build the basis of the study to evaluate the cross-cultural adaptability of U.S. Dental Hygiene program directors. By identifying factors of cross-cultural adaptability among dental hygiene leaders,

future theoretical models can be examined that will strengthen leadership capability for development of leadership models and leadership competencies in the dental hygiene profession.

**Methodology:** The Cross-Cultural Adaptability Inventory™ (CCAI) and a survey questionnaire were administered to a randomly stratified sample of dental hygiene program directors in the U.S via USPS (N=250) with a 38% response rate (n=94). The CCAI evaluated measures of cross-cultural adaptability including emotional resilience, flexibility/openness, perceptual acuity, and personal autonomy. The directors were also surveyed on their years of service as a program director, extent of diversity training, and to what extent their organization identifies diversity as part of its strategic goal. Data were analyzed utilizing frequencies, percentages, means, and logistic regression.

**Results:** Results of the regression analysis revealed that there was no significant relationship between the years of experience as a dental hygiene program administrator as it relates to emotional resilience,  $F(1, 91) = .94, p = .34 > .05$ , flexibility/openness,  $F(1, 91) = .22, p = 0.64 > .05$ , perceptual acuity,  $F(1, 91) = .00, p = 0.41 > .05$ , and personal autonomy  $F(1, 91) = .00, p = 0.98 > .05$ . Independent t-test analysis for differences determined there was no significant relationship between institutional strategic planning as it relates to emotional resilience,  $t(89) = -1.48; p = 0.14 > .05$ , flexibility/openness,  $t(89) = -0.6; p = 0.95 > .05$ , perceptual acuity,  $t(89) = -0.62; p = 0.54 > .05$ , and personal autonomy,  $t(89) = -0.26; p = 0.80 > .05$ . Regression analysis determined a statistically significant relationship of diversity training among program directors and the areas of emotional resilience,  $F(1, 91) = 6.94, p = .01 < .05$ , flexibility/openness,  $F(1, 91) = 7.32, p = .01 < .05$ , and perceptual acuity,  $F(1, 91) = 5.3, p = .02 < .05$  and rejected the relationship in the area of personal autonomy,  $F(1, 91) = 1.33, p = 0.25 > .05$ .

**Conclusion:** The study confirms that dental hygiene program directors adapt well and demonstrate tolerance cross-culturally. The study also proved that the majority of colleges and universities support diversity through their strategic plans, which may influence the cross-cultural competence of dental hygiene program directors. This study illuminated an understudied aspect of dental hygiene academia, which is that of the largely female gendered profession, its effect on personal autonomy of dental hygiene educators, and its influence on the development of leadership within the dental hygiene profession.

## Implementing Training in Screening and Brief Intervention for Alcohol, Tobacco, and Other Drug Use (ATOD) to Facilitate Interaction and Improve Patient Care Outcomes

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**Problem:** The dental hygiene care setting presents a unique opportunity to implement screening and brief intervention for alcohol, tobacco and other drug use as part of a dental health screening. Teaching these skills to dental hygiene students presents an opportunity to provide enhanced safe, effective and comprehensive care.

**Objectives:** The objective of this project was to educate dental hygiene students on how to screen and intervene with patients who present with alcohol, tobacco, or other drug use. This model expanded the familiar concept of tobacco screening and education to include alcohol and other drug use.

**Methodology:** Dental hygiene students (n=85) participated in an educational and practice session, to learn the model and apply the skills with standardized patient scenarios. Students completed the Alcohol and Alcohol Problems Perceptions Questionnaire (AAPPQ) and Drug and Drug Problems Perception Questionnaire (DDPPQ) at three time points. Dependent variables were Role Security, defined by acceptance of the appropriateness of screening and intervening with patients, and Therapeutic Commitment, defined by motivation and likelihood of changing behavior. Data were analyzed using within-subjects, repeated measures ANOVA. Students' SBIRT skills were rated by faculty and peers using a Competency Rating Scale during the practice session. This project was determined as exempt by the University of Pittsburgh Institutional Review Board.

**Results:** For both AAPPQ and DDPPQ, the overall F-value for the Role Security subscale was significant. For AAPPQ,  $F(2,44)=16.48$ ,  $p<0.01$ , and for DDPPQ,  $F(2,46)=7.42$ ,  $p<0.01$ . Overall Therapeutic Commitment scores did not increase significantly across the three time points on either the AAPPQ or DDPPQ. Increases in Role Security were accounted for by pre-education to post-education differences. For AAPPQ,  $F(1,22)=24.16$ ,  $p<0.01$ , and for DDPPQ,  $F(1,23)=6.96$ ,  $p=0.01$ . For Therapeutic Commitment, while the overall time effect was not significant, an increase was observed between the education and practice sessions. For AAPPQ,  $F(1,23)=8.22$ ,  $p<0.01$ , and for DDPPQ,  $F(1,24)=7.38$ ,  $p=0.01$ . Simulation competency ratings showed that students learned and applied SBIRT skills with standardized patients.

**Conclusions:** These results indicated that SBIRT education and practice contributed in unique ways to students' perceptions and attitudes about working with patients with alcohol and other drug issues. The educational session was associated with increased Role Security while the practice session was associated with increased Therapeutic Commitment. Students can now integrate the SBIRT model during the assessment phase of their dental hygiene care appointments.

### Laser Education in Dental Hygiene Baccalaureate Programs

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**Problem:** Lasers are being used in many states by dental hygienists; but, uncertainties concerning laser usage and educational requirements may be deterring their use.

**Objective:** Dental lasers are increasingly utilized by dental hygienists as an adjunct to periodontal therapy to eliminate pathogens remaining in a gingival pocket following scaling and root planing. The primary objective of this study was to examine the inclusion of dental laser curriculum in baccalaureate dental hygiene programs. The secondary objective was to assess the inclusion of lasers in dental state practice acts across the nation.

**Methodology:** An electronic survey was sent to all baccalaureate dental hygiene program directors (N=55) across the U.S. to assess inclusion of dental lasers in their State practice act, as well as the didactic and clinical curriculum offered at their perspective institutions. This study was approved by the Institutional Review Board of the University of Maryland, Baltimore.

Information was obtained anonymously, and voluntary completion of the questionnaire was taken as informed consent to participate in the study. The survey was sent December 2014 and again in March 2015 to increase subject participation. The instrument included eight questions, and descriptive statistics were used to analyze the data collected.

**Results:** Surveys were completed by twenty-nine of the fifty-five program directors, for a response rate of 52.7%. Analysis of the survey instrument indicates nearly half 48% of those who responded do not have laws governing "lasers" in their State practice acts. While 38% of respondents include a didactic overview of lasers in their entry-level programs the majority (90%) do not include a certification or hands-on course. Hours of study varied from 1 to 15 hours. Only two schools responded that they offer a laser course to degree completion students.

**Conclusion:** Suitable laser education may assure a better understanding of proper usage and safety in clinical applications. The dental hygiene profession is constantly advancing; clarity of language in state practice acts to include "laser," with standardized guidelines and requirements may increase utilization of dental lasers by registered dental hygienists leading to improved patient care and outcomes. The current laser education curriculum may defer due to state practice acts not evolving as rapidly.

### Oral Health Status of Independent Older Adults in Texas: An Observational Study of the Urban/Rural Areas of Central Texas

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**Problem:** Currently, there is no data on the oral health needs of the older adult population in Central Texas. This assessment of the oral health conditions of seniors participating in congregate meal centers throughout the Austin-metro area will provide information about the oral health needs of the older population.

**Objectives:** To determine the oral health needs of the community-dwelling older adults participating in congregate meal centers and evaluates differences in oral health needs between the urban and rural communities.

**Methodology:** This observational, cross-sectional study evaluated subjects from 3 urban and 3 rural congregate meal centers around Austin, Texas. Participants were a convenience sample of community dwelling older adults 65 years and older participating in meal congregate services (n=78). A self-report, modified survey questionnaire was completed by the participants followed by oral health screening performed by two calibrated examiners utilizing the Association of State and Territorial Dental Directors Basic Screening Survey for Older Adults. Descriptive statistics were used to describe the differences between the demographic characteristics and oral health conditions of the participants. A chi-squared test of independence was utilized to analyze the questionnaire data and oral health assessment data to explore relationships between the variables.

**Results:** When comparing urban and rural community participant report of pain in the last year, there were no significant differences in oral health condition between the urban and rural communities (p=0.788). Fifty percent of participants had incomes below \$15,000 and reported no dental insurance coverage to pay for all or a portion of dental care (n=64.9% urban; n=56.1% rural; p=0.58). Eighty-seven percent reported tooth loss due to dental caries, untreated dental caries (48.6% to 56.1%; p=0.824), 35% (p=0.269) required periodontal care, and 37% to 43% (p=0.908) reported painful aching in their mouth in the last year either very often or occasionally.

**Conclusions:** Oral health prevention is an emergent need for the older adult population residing in urban and rural communities to address untreated dental disease. Analysis revealed the majority of the populations in both urban and rural areas of Central Texas have financial and socioeconomic barriers to access preventive and restorative dental care services.

### Use of Concurrent Online Courses to Socialize Students to Research and Scientific Writing

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**Problem:** Scholarly inquiry and research is a core competency for dental hygiene graduate education. However, integrating research concepts in scholarly writing is a common challenge for graduate students in the online learning environment.

**Purpose:** The purpose of this study was to assess a cohort of first year dental hygiene graduate students' perceptions on a new curricular model using concurrent online course sequencing to socialize students research and scholarly writing.

**Methods:** This pilot study design assessed two graduate online courses taught concurrently with content developed to provide students with a global rather than linear approach to the research process and thesis development. Graduate dental hygiene students (N=6) in their first year were enrolled in a traditional Research Methodologies and Scholarly Writing course with weekly topics in line with elements of thesis prospectus development, Annotated Bibliography and Literature Review. Concurrently, an Introduction to Thesis course provided these students with content on use of electronic citation management software, personal appointments with the course director to brainstorm thesis topics, assignments in prospectus development, orientation to the Internal Review Board (IRB) process, Collaborative Institutional Training Initiative (CITI) Certification, and APA formatting resulting in students selecting graduate thesis committee members, developing a thesis learning agreement, an approved prospectus, and a formatted first draft of thesis.

**Results:** Descriptive statistics analyzed individual score items as well as the total scores. Using a 5-point Likert-type scale (0 = strongly disagree to 5 = strongly agree), participants (n=3) rated their level of agreement on a 9-item questionnaire.

A response rate was 50 percent (n=3). A mean score of 4 (somewhat agree) was reported on 7 of the 9 items. These items were related to concurrent course delivery in developing the prospectus, coordination of assignments, sequencing topics; applying concepts and engaging in the thesis process, finding direction in research, and facilitating learning. Of the respondents, 33 percent (n=1) stated completing the Research Methods course prior to enrolling in the Introduction to Thesis course best facilitates learning. Overall, respondents agreed completing the Research Methods and the Introduction to Thesis courses concurrently best facilitates learning (n=2; 66%).

**Conclusions:** The use of concurrent courses in online course delivery demonstrates an effective curricular model in socializing graduate dental hygiene students to research and scholarly writing.

## Service Learning and Cultural Awareness in Belize

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**Problem:** The purpose of this program was to provide preventive oral health services to underserved people in Belize. Program goals were to treat people who do not have regular access to oral health care, to provide students the opportunity to participate in a culturally diverse outreach program, and to increase student's competency in providing oral health services.

**Significance:** Integrating service-learning with a culturally diverse population into dental hygiene curricula fosters graduates who are better prepared to work effectively among diverse populations and have the opportunity to learn beyond what could be achieved in the classroom.

**Key features:** Dental hygiene faculty at Minnesota State University, Mankato collaborated with dentists in Belize to establish a service-learning rotation in San Pedro, Belize, located on the island of Ambergris Caye. During their final semester in the program, senior dental hygiene students participated in this optional, seven-day study abroad experience. Prior to departure, the students acquired knowledge concerning the culture of Belize, healthcare standards and protocols, and what the anticipated experience providing oral health care in Belize would involve. Fourteen students, four dental hygiene faculty, and three dentists volunteered at two clinics in San Pedro to provide oral health care for adults and children. Treatment included amalgam and composite restorations, prophylaxes, radiographs, sealants, fluoride varnishes, and oral hygiene instructions. Dental hygiene students also visited elementary schools, applying fluoride varnish to over 500 children, along with providing oral hygiene instructions. While in Belize, students were immersed in the Belizean culture as they explored the island and traveled to the mainland of Belize to experience various geographic areas of the country.

**Results:** Students wrote daily reflection papers to evaluate their accomplishments, reflect on their experiences providing oral health care, and document their cultural experiences during travel. Reflections were positive, indicating greater confidence in dental hygiene skills, awareness of cultural diversity, and a desire to be involved in outreach projects as they begin their professional careers. Service learning in cultural diverse populations enhances dental hygiene education and can be an integral part of the curriculum.

## Registered Dental Hygienists' Interest on Entry into the Field of Dental Hygiene Therapy in the State of Maine

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**Problem:** In the spring of 2014, the Maine state legislature enacted a new law, LD1230, establishing a midlevel oral health care provider, the Dental Hygiene Therapist (DHT). The DHT was created to address the state's access to oral health care issue, with the scope of practice for the Maine DHT including preventive oral health care services, routine restorative treatment and simple extractions. Despite state legislative efforts to bring this licensed dental provider into reality, no dental therapy academic programs currently exist in New England. Additionally, the level of knowledge among Maine registered dental hygienists (RDHs) regarding the DHT and interest in enrolling in a DHT program was unknown.

**Objectives:** This study was conducted to assess the awareness of Maine RDHs regarding this new oral healthcare role, and to gather information regarding their degree of interest in enrolling in a DHT program.

**Methodology:** The study used a quantitative cross-sectional design with a non-probability purposive sampling of RDHs in Maine. The state licenses approximately 1,420 RDHs, and of these 1,284 were contacted via e-mail and invited to participate in the survey. The study was approved by the university's Institutional Review Board. Web-based survey software was used to collect data over a three week period with a questionnaire consisting of nineteen survey items, including eight demographic questions, Likert-type scale questions, multiple choice questions, and optional open-ended questions. Descriptive statistics were used to analyze the data collected.

**Results:** Two hundred sixty-eight of the Maine RDHs invited to participate responded and completed the electronic questionnaire. The response rate for the survey was 21%. Ninety-eight percent of those who responded were female, and the majority of participants were Caucasian (95%). Two hundred and thirty-two (87%) of the participants were aware of the law enacting the DHT as a provider in Maine, while 175 (66%) expressed interest in enrolling in a DHT program; 107 (61%) of respondents stated willingness to enroll in a DHT program within the coming year.

Responses to the open-ended questions revealed the majority of RDHs saw a need for this new provider role with statements such as, "I believe it would be a great idea to implement this program to provide dental care to places that are underserved."

**Conclusions:** The study outcomes indicate interest exists among Maine RDHs regarding entry into the DHT provider role and enrollment in a DHT program. Although no DHT programs exist in the New England states, this study suggests student enrollment would be sufficient to support the establishment of a DHT program.

### Perception of Dentists, Dental Hygienists and Patients towards the Dental Hygiene Profession in Delhi, India

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**Problem:** Dental hygienists are licensed auxiliary dental professionals. With existing population and oral health conditions there continues to be a shortage of active dental hygienists in India. The scope of dental hygienists' practice is also ambiguous in India. It is unclear to what extent is the role of dental hygienists in oral care and whether they are shared by hygienists and dentists. Role play of the profession in dominant hygiene model of care confined within dental practice in India is a grey area.

**Objectives:** To know the perception of dentist's and dental hygienists in Delhi, India about the role, responsibilities, barriers and work environment of dental hygienists in Delhi as well as to know the awareness of patients about dental hygienists.

**Methods:** This cross sectional study was conducted on a purposive sample of 80 dentists and 40 dental hygienists among all (n=4) dental Institutions in Delhi. Convenience sample of 100 patients visiting the dental institute were interviewed regarding awareness of dental hygienists by using 10 questions. A format along with self administered questionnaire was designed consisting of both open and closed ended questions. There were a total of 32 questions for dental professionals and 39 for dental hygienists under the domains: socio-demographic profile, knowledge of dental hygienist role and responsibilities, attitude and barriers. The questionnaires were subjected to expert's validation and 10% of the sample in each category was used for reliability analysis. The data was analyzed in SPSS and subjected to descriptive analysis and chisquare test.

**Results:** 89.6% of patients were not aware of dental hygienists and their roles. 62% of dentist's and 32% of dental hygienists response was "yes" for the role of dental hygienist limited to oral prophylaxis ( $p=0.03,S$ ). 40% of dentists and 83.5% of dental hygienists were not aware of the concept "four handed dentistry" ( $P=0.001,S$ ). Majority of dentists (73.7%) rated working environment as "good" for dental hygienists when compared to dental hygienists (82%) who rated "low" ( $p=0.002,S$ ). Financial barrier was high among dentists where as it was the Legislation and dentists acceptance for dental hygienists.

**Conclusions:** In conclusion our study showed that there is disparity between dentists' and dental hygienists' perception of dental hygienists' roles, responsibilities and working conditions. The dental team approach concept is lacking India as per the views of both the professions. Patients should be made aware of this profession and asked for preference of treatment.

### Patient Attitudes Regarding Salivary Genetic Biomarker and Periodontal Pathogen Testing

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**Problem:** Specific periodontal pathogens present in the oral microbiota, such as *P. gingivalis*, *T. forsythia*, and *P. intermedia*, are found to be indicative of susceptibility to periodontal destruction. According to a recent study on patient stratification and preventive care in dentistry, a personalized approach combining genetic biomarkers and conventional risk factors provides better outcomes for patients. There is currently no literature describing patient attitudes towards such salivary diagnostic testing for risk assessment and management of periodontal disease.

**Objectives:** The purpose of this study was to determine patient attitudes regarding salivary diagnostics to identify both genetic and pathogenic risks for periodontal disease. The aims of this study were to assess (a) patient attitudes towards salivary testing for periodontal risk factors via genetic biomarkers and periodontal pathogens, (b) patient attitudes toward paying for such risk assessment testing, and (c) whether or not patients felt positive results would impact their overall oral health care and treatment compliance.

**Methods:** An 18-question, paper survey was developed, and piloted. The survey was determined to be exempt by the University of Michigan (UM)

Institutional Review Board HUM00094305. A convenience sample of adult patients aged 18 and over at the UM School of Dentistry were recruited for participation. Descriptive statistics were computed to provide an overview of the responses.

**Results:** A total of 192 surveys were collected. While one quarter of respondents would only undergo testing if insurance covered the cost, one third of respondents indicated they would be willing to pay up to \$100 out of pocket for testing, while another 8% were willing to pay up to \$200. Additionally, 78% of patients said they would change their oral health care based on positive results, and 81% felt they would be more compliant with treatment, recall and home care recommendations. There were no significant correlations between education or income, and patient willingness to undergo testing, pay out of pocket for the testing, or changing compliance behavior.

**Conclusions:** This study indicates that patients were interested in undergoing salivary diagnostics for periodontal risk assessment and management. Out-of-pocket cost does not appear to outweigh the benefit of specific, personalized risk assessment. The personal specificity salivary diagnostics offer may be a potentially influential risk management tool to improve patient outcomes. Future studies should include a wider assessment of patient attitudes towards the use of salivary diagnostics for periodontal risk management.

### **Hookah Smoking: Assessing College Students' Behaviors, Attitudes, and Knowledge**

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**Problem:** Hookahs are waterpipes in which tobacco is heated, passed through water, and then smoked through a hose and mouthpiece. Hookah smoking among high school and college students has become a popular trend in recent years. Many students find hookah smoking to be socially acceptable, however, they have little knowledge on the overall impact to their general and oral health.

**Objectives:** The objective of this study was to assess college students' behaviors, attitudes, and knowledge regarding hookah smoking.

**Methodology:** This study was conducted at a Midwest university and used a convenience sample of 204 students from various majors. Respondents were asked about their past, current, and future hookah smoking behaviors. Likert-scale questions were used to assess attitudes regarding hookah smoking. Last,

they were asked ten questions regarding the history and health effects of hookah smoking. A knowledge score was calculated based on the number of questions answered correctly. Survey data was analyzed using independent sample t-tests and a one way ANOVA test at a significance level of  $p < 0.05$ .

**Results:** Sixty-eight percent of respondents have participated in hookah smoking in their lifetime with first time use ranging from 14 to 21 years of age. In the last thirty days, 31.8% have participated in hookah smoking. The majority (68%) stated that they will no longer be participating in hookah smoking in five years. Over half of the respondents reported that it is socially acceptable to participate in hookah smoking and 43% reported that hookah smoking has relaxation benefits. The overall mean knowledge score was 4.4 questions correct out of 10. There was a significant difference ( $p = .044$ ) in the mean knowledge scores between the age group of under 19 (3.3) and the age group 20 to 21 (4.68). When comparing allied health and nursing majors to all other majors, the allied health and nursing group scored significantly higher ( $p = .017$ ) than the non-allied health and nursing majors with means of 4.7 and 3.8. Forty percent of the respondents were unaware that hookah tobacco and smoke can cause oral cancer.

**Conclusions:** Based on the low knowledge scores, this research supports that more education about hookah smoking and its health consequences is needed. Improved awareness and knowledge of hookah smoking for dental hygienists could be achieved through continuing education and integration into dental hygiene program curriculum.

### **Exploring Student Satisfaction Among Students Enrolled In A Dental Hygiene Program Utilizing Synchronous Distance Education**

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**Problem:** Distance education has been used by many educational institutions for years, but the use of synchronous distance education (SDE) is still new to many. Though approximately 66% of institutions have realized an increase in the demand for distance learning offerings, research related to SDE is limited. The problem is that educators can find a substantial amount of information and statistics referencing the broad topic of DE, but very little data is available to them in regard to SDE and student satisfaction.

**Objective:** This research aimed to evaluate student satisfaction among SDE classes on two separate campus sites in order to add to existing literature referencing SDE.

**Methodology:** This longitudinal case study took place from June 2014 through September 2015. Participants included a convenience sample of SDE dental hygiene (DH) students (n=122) with a response rate of 95%. MCPHS University IRB approval was obtained in May of 2014. Student perceptions of SDE versus traditional classroom experiences and characteristics related to SDE were measured using validated pre-and post-program surveys. The 40-question surveys were distributed using a web-based tool and participant identities remained confidential. Data were analyzed using parametric univariate and multivariate regression methods

**Results:** Univariate linear regression showed no difference in student perceptions of SDE pre-course vs post-course, nor did multivariate linear regression controlling for student cohort. Regression results showed the fall cohort had a more positive perception of SDE than the summer cohort ( $p < 0.001$ ), furthermore, the multivariate linear regression reporting on characteristics related to SDE were overall positive in magnitude ( $p = 0.347$ ), with the fall cohort reporting significantly more positively than the summer cohort ( $p < 0.001$ ). Results indicate, at an alpha threshold of 0.05, there is a significantly higher level of satisfaction with SDE overall for the fall 2014 cohort than the summer 2014 cohort ( $p < 0.001$ ).

**Conclusions:** The results support previous research indicating that students acclimate to different means of course delivery; however, it also shows that institutional support as well as student and faculty familiarity with SDE technology are significant influences on student satisfaction. Results are intended to aid educators in recognizing these influences which impact student satisfaction and help to bridge the gap in the literature referencing SDE. More research needs to be done comparing SDE to face to face instruction and use of class moderators.

## Dental Consumer's Perceptions of Dental Hygienists with Visible Tattoos

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**Problem:** One in five United States adults have a tattoo and negative stereotyping of individuals displaying tattoos is a well-documented cultural norm. The growing trend of body art is regarded as the right of self-expression, with 4 out of 10 young people having a tattoo, yet the conflict between self-expression and professionalism in health care and dentistry exists.

**Objective:** The purpose of this study was to survey dental patients in the United States to assess their perceptions of dental hygienists with visible tattoos.

**Methodology:** An 11 item investigator-designed survey was administered online via a commercial web based software company (www.surveymonkey.com) to adult members of Amazon's Mechanical Turk (MTurk) (<https://www.mturk.com/mturk>). The survey was made available to United States MTurk members based on three qualifiers: English speaking, at least 18 years of age, and have visited a dentist within the last 60 months. Respondents received a nominal fee to complete the survey (50 cents). Two hundred and three acceptable electronic surveys were completed and returned by dental consumers in two hours. Surveys were randomized according to respondents' birth month. Participants viewed one of three photographs of the same dental hygiene model wearing short sleeved scrubs without a tattoo, a small tattoo on the hand or a large sleeve tattoo on the arm. Participants scored each photograph on a 5-point Likert scale regarding how ethical, responsible, hygienic, competent and professional the individual in the photograph appeared. Completed surveys were analyzed for response frequency. One way analysis of variance (ANOVA) was used to compare the means for each of the tattoo conditions. If significant interactions occurred, Tukey's post hoc test were used to locate significant differences. Independent Samples T Test were also used to compare differences by age and gender. Significance was set at the .05 level.

**Results:** Most respondents (88%) in the no tattoo group rated the model as professional, although, only 49% of respondents rated the model with the sleeve tattoo as professional. Overall results reveal respondents rated all five attributes higher for the dental hygienist with no tattoos ( $M = 4.28$ ), and lowest for the sleeve tattoo ( $M = 3.55$ ) model. When comparing the three groups, respondents are less likely to use a

dental office where the dental hygienist has a sleeve tattoo ( $p = .000$ ) and are more likely to refer others to a dental office where the dental hygienist has no tattoos ( $p = .000$ ). Whether a participant has a tattoo had no significant effect on overall attribute mean scores. The sleeve tattoo model was scored significantly lower in the over forty age group ( $p = .019$ ). Gender had minimal effects on results, although females respondents are more likely to refer others to a dental office if the dental hygienist has a small tattoo ( $p = .029$ ).

**Conclusions:** Results suggest small tattoos are perceived by dental consumer as acceptable in the clinical setting; however, the larger sleeve tattoos are less accepted by dental consumers. These findings provide evidenced based information on visible tattoos that educators can use when making decisions about appearance and dress code policies, and provide insight for educators preparing individuals to enter the workforce as they contemplate decisions about obtaining body art.

### **Framing Young Children's Oral Health: A Participatory Action Research Project**

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**Problem:** Despite the widespread acknowledgment of the importance of childhood oral health, little progress has been made in preventing early childhood caries, an important public health problem. Survey-based studies have reported factors such as parental education, dental neglect and lack of access to care as barriers for the adoption of optimal child oral health related behaviors. However, our knowledge is limited regarding specific daily-life and community-related factors that impede optimal oral hygiene, diet, care, and ultimately oral health for children.

**Objective:** We sought to address this knowledge gap by gaining insight into what parents of young children themselves consider as important, potentially modifiable factors and resources influencing their children's oral health, within the contexts of the family and the community.

**Methodology:** This qualitative study employed Photovoice, a community-participatory action methodology. Participants were a convenience sample of 10 English-speaking parents of infants and toddlers, residents of Durham County in NC and clients of the

federal Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). The primary research question posed to participants was: "What do you consider as important behaviors, as well as family and community resources to prevent cavities among young children?" Five group sessions involving discussion of participants' photos, community maps and emerging themes were conducted. Sessions were recorded, transcribed verbatim and analyzed using qualitative research methodology. Inductive analyses were based on analytical summaries, double-coding, and summary matrices and were done using Atlas.ti.7.5.9 software.

**Results:** Good oral health was associated with avoidance of problems or restorations for the participants. Financial constraints reportedly affected healthy food and beverage choices, as well as access to oral health care. Time constraints and occasional frustration related to children's oral hygiene emerged as additional barriers. Establishment of rules/routines and commitment to them was a successful strategy to promote their children's oral health, as well as modeling of older siblings, cooperation among caregivers and support by friends, family and the social circle. Community programs and organizations, social hubs including playgrounds, grocery stores and social media emerged as promising avenues for gaining support and sharing resources.

**Conclusion:** Low-income parents of young children are faced with daily life struggles that interfere with oral health and care. Financial constraints are pervasive, but parents identified several strategies involving home care and community agents that can be helpful. Future interventions aimed to improve children's oral health must take into consideration the role of families and the communities they live in.

### **An Investigation of Underrepresented Minority Students in the Dental Hygiene Profession**

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**Problem:** There is a lack of ethnic and racial diversity in the dental hygiene profession across the United States. Recruitment efforts have been ineffective in increasing the number of underrepresented minorities (URM) in the profession. There is a lack of empirical evidence in the literature that examines the experiences and opinions of URM in the dental hygiene profession using qualitative methodology.

**Objectives:** This study explored what factors motivate URM individuals to enter the profession of dental hygiene and their experiences in the profession. Understanding the reasons for choosing dental hygiene and the career experiences of URM is imperative to improving recruitment efforts. This study sample included URM dental hygienists in Ohio and Pennsylvania.

**Methodology:** This descriptive mixed method study included two phases of data collection. Phase one included the use of an electronic questionnaire distributed to registered dental hygienists. In January, 2016, the questionnaire was sent electronically to 1,289 dental hygienists with a response rate of 22%. The survey asked participants for basic demographic information, and then asked them both selected response and open-ended questions specifically about what motivated them to go into dental hygiene and what experiences they have had in school and since graduating, and their recommendations regarding recruitment. Data from the survey responses were evaluated in an effort to establish potential questions for follow-up in-depth interviews. The second phase of the study included confidential, personal, in-depth interviews with 17 registered dental hygienists who identify as URM dental hygienists. The transcripts from the in-depth personal interviews were analyzed manually using a coding technique to identify common themes and subthemes that emerged from the transcribed responses. IRB approval was obtained from Youngstown State University.

**Results:** Responses from the dental hygiene questionnaire report that the most common reason for choosing the profession of dental hygiene was referral from a dental professional or prior dental assisting experience (52.03%). The most highly recommended recruitment efforts to expose URM students to the dental hygiene profession included; increasing the public's image about the profession (7.41%) and targeting high school students (18.52%). Analysis of the in-depth interviews with URM dental hygienists revealed that visiting high schools for career day, using social media to market to millennials, and utilizing alternative admission criteria were suggested as recruitment strategies to target URM students. Results include feedback about employment prospects and job experiences that provide insights to the success and challenges experienced by the URM dental hygienists.

**Conclusions:** Results indicate that referrals by individuals in the dental profession impacted many of the respondents' motivation to enter the dental hygiene field. Some respondents indicate that there have been challenges with securing employment in areas with low minority populations. Lastly, recommendations for recruitment included going to high schools and efforts towards changing the image of the profession.

## Dental Hygienists' Perspectives on Four Periodontal Instrument Handle Designs

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**Problem:** Developing new instrument designs to address the ergonomics of instrumentation and to decrease repetitive strain injuries in the dental hygienist is an ongoing area of development. Changing the weight and diameter of instrument handles has been suggested to reduce risk for trauma in the practitioner but minimal research has been conducted to determine design preferences of practicing dental hygienists.

**Objective:** The purpose of this study was to assess dental hygienists opinions on the weight, diameter, balance and maneuverability of four different instrument handles.

**Methodology:** After IRB approval, a convenience sample of 27 practicing dental hygienists from Virginia participated in the study. Four typodonts were set up for each participant with a different instrument randomly assigned for use on each. Subjects scaled first molars coated with artificial calculus using a Columbia 13/14 curet with four commercially available handle designs that varied in weight and diameter: A) 16 grams and 12.7 mm diameter; B) 23 grams and 11.1 mm diameter; C) 21 grams and 7.9 mm diameter and D) 18 grams, and 6.35 mm diameter. Following scaling participants used a 6 item survey to rate their comfort level on a 5-point scale ranging from 1 (very comfortable) to 5 (uncomfortable) with regard to balance, weight, diameter, maneuverability and overall preference. A Friedman test determined significant differences between participants' perceptions. A Wilcoxon signed rank test followed if differences were found.

**Results:** Handle designs had significant effects on dental hygienists' instrument preferences while performing simulated scaling. Results revealed significant differences for participants' preferences concerning diameter ( $\chi^2(3)=50.584, p=0.000$ ), weight ( $\chi^2(3)=24.650, p=0.000$ ), balance ( $\chi^2(3)=69.504, p=0.000$ ) and maneuverability ( $\chi^2(3)=67.728, p=0.000$ ). When comparing comfort based on diameter grip, results reveal instrument D was least comfortable compared to A, B and C ( $p=0.000, p=0.000, p=0.000$ ). Instrument A was most comfortable in weight when compared to all other instruments ( $p=0.008, p=0.000, p=0.000$ ). In regards to balance significant differences were found between instrument A when compared to both C and

D ( $p=0.000$ ,  $p=0.000$ ), with instrument A having the highest mean score ( $x=4.7$ ). Finally, instrument A was rated most comfortable for maneuverability ( $p=0.003$ ,  $p=0.000$ ,  $p=0.000$ ). Sixty-three percent of participants preferred instrument A, 26% instrument B, 11% instrument C and none preferred D.

**Conclusion:** When performing simulated scaling, results indicate most participants preferred using a lighter weight, larger diameter instrument handle. Diameter affected preference more than weight. The smallest diameter handle was always ranked the lowest with regards to balance, weight, diameter and maneuverability although it was not the heaviest.

**“An Interprofessional Collaboration to Implement and Evaluate an Adult Diabetes Screening Program in a Dental/Dental Hygiene School Clinic”**

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**Purpose:** The purpose of this project was to collaborate with the School of Nursing and School of Dentistry to determine the feasibility of screening patients for diabetes/prediabetes during their hygiene appointments at the UM dental school clinic.

**Significance:** Diabetes is an epidemic in the United States and is associated with significant morbidity and mortality. Currently, about 18.8 million Americans have diabetes and of those about one third are undiagnosed. 86 million have prediabetes and 90% are unaware. The U.S. Preventative Task Force recommends screening adults who have risk factors for diabetes. Most adults with periodontal disease have at least one risk factor for diabetes. The literature revealed there is a bidirectional relationship between diabetes and periodontal disease. Of, people who are at risk for diabetes, 50% have seen a dentist in the last year. This makes the dental clinic an ideal site for diabetes screening. Dental visit screening enhances the role dental providers' play in the overall health of their patients. Specifically screening in a dental hygiene clinic and at a dental hygiene appointment appear to be a perfect fit between medicine and dental interventions. Interprofessional collaboration among dental hygiene, dental and nurse practitioner faculty toward integrating diabetes screening procedures during dental hygiene care, will be a seamless routinization toward care.

**Key features:** The University of Maryland IRB determined the project was exempted. The dental

hygiene clinic was chosen for the screening program. An orientation session was initially provided to the faculty and students by the Dental School and Nursing School faculty and diabetes risk factors were reviewed. During the clinic session those patients with risk factors were offered screening testing with a glucometer. All patients with risk factors were offered written materials about diabetes prevention and the students provided lifestyle recommendations. From those patients who consented to the screening a fingerstick blood glucose sample was obtained. Patients with a fasting result  $> 100$  mg/dL or random result  $> 140$  mg/dL were referred to their primary care provider. If the patient did not have a primary care provider the patient was referred to the academic center's outpatient diabetes clinic.

Currently in Maryland, dental hygienists are NOT allowed to do this screening, thus a dentist within the Dental School faculty along with a Nurse Practitioner, tested the patients.

**Evaluation Plan / Results:** Descriptive statistics were utilized to evaluate the data. A total of 67 patients were seen, 4 were excluded for age; they were under 19 years old. The remaining 63 patients were screened for diabetes risk factors. They ranged in age from 21 to 89 the mean age was 55. Of these 63 patients, 49 (73.1%) had at least one risk factor for diabetes, and 14 (20.9%) did not have any identifiable risk factors. The remaining 45 people were offered a blood glucose evaluation for diabetes with glucometer. Over 50% of the patients (24/55%) agreed to the glucometer evaluation. Of the patients who were screened, 1 patient had an abnormal screen and was referred to the University outpatient diabetes clinic. The remaining 23 screened within normal limits.

**Conclusion:** The screening process flowed easily as part of the dental appointment as many components were already in place. Medical history review was already part of the existing dental hygiene appointment and the dental hygiene students routinely provide health promotion education, as part of the clinic visit. The diabetes screening was well received by faculty, students, and patients. More than half of the patients who with risk factors agreed to be screened. Of those who declined screening, most reported they had been screened elsewhere. However, the numbers were small, thus the next step is to expand the diabetes screening to all of the dental hygiene clinics, and to have the dental hygiene faculty maintain the glucometers and perform the glucometer reading. Ultimately, diabetes screening should be part of the assessment conducted by dental professionals during the medical history/dental assessment visit. The study showed that it was innovative, easily implemented and patients were very open to being tested.

## Effect of Oral Environmental Conditions on Adhesion of Conventional Denture Adhesives

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**Purpose:** Current denture adhesives often dissolve in the mouth after eating and drinking. It is important for manufacturer to figure out the mechanism of adhesive failure.

**Objective:** Evaluating the effects of changes in oral environment conditions such as pH, temperature and salivation on the adhesion of denture adhesive product

**Methods:** This experimental study was evaluating the effect of different pHs (2,7,10), temperatures (0, 37, 60 °C) and moisture levels (hyposalivation, normal and hypersalivation) on adhesion strength. To determine the adhesion strength, tensile bond and lap shear tests were carried out according to International Standards Organization (ISO 10873) and American Society for Testing and Materials (ASTM F2255). To prepare the sample, 0.2 g of commercial denture adhesive soaked in artificial saliva which made based on Fusayama Meyer formula for 10 minutes. At least ten samples of each three conditions (pH, temperature and moisture level) were tested and the mean and standard deviations were calculated.

**Results:** The results indicated that the environmental conditions had a significant impact on the adhesion force of the material. In particular, the adhesion force showed a reverse relationship with temperature and, while salivation improved the adhesion force. The adhesion strength at 37 °C was approximately 3996 Pa compared to 4302 Pa at 0°C and 3177 Pa at 60 °C. The

pH 10 showed significantly less adhesion in comparison to other pHs ( $p=0.02$  between pH7 and 10,  $p=0.0005$  between pH 2,10). The tensile strength in acidic environment (6096 Pa) was almost twice of the value at pH 7 (3996 Pa). The hyposalivation group showed the least adhesion among all groups (2684 Pa). There was significant difference between hyposalivation, hypersalivation in comparison with the control group ( $p=0.001$  and  $p=0.002$  in order).

**Conclusion:** Among different oral conditions, hyposalivation had the greatest effect on adhesion. Thus, it is expected that the adhesion strength of denture adhesives to be lower in patients with hyposalivation and higher pHs. The denture adhesive showed the highest strength in acidic condition and lowest temperature.