

Abstracts: Poster Presentations

Education

Formative and Summative Clinical Assessment: The Student Perspective

Linda D. Boyd, RDH, RD, EdD; Kristeen R. Perry, RDH, MSDH

Problem Statement: Identifying clinical assessment models that ensure successful application of knowledge and competency is a challenge for clinical educators. Current literature suggests that clinical teaching methods place stress on students which may impact student learning.

Purpose: The purpose of this study was to explore dental hygiene students' perspectives on the method of daily clinical grading versus formative feedback and summative (comprehensive patient case competency) assessment.

Methods: Based on the literature a BSDH program developed a method of formative and summative assessment for clinical curriculum. A survey was developed to gather student perspectives on the change from daily clinical grading to formative/summative assessment. A convenience sample of 48 dental hygiene students were surveyed through an online survey tool at the end of fall and spring semesters.

Results: The response rate was 100%. Responses were as follows: I felt like formative feedback allowed for more collaboration with clinical faculty than the daily grading format, 98% agreed/strongly agreed. Formative feedback encourages me to ask questions to enhance my learning, 98% agreed/strongly agreed. When asked about summative assessment, 98% agreed/strongly agreed; Summative assessment was an appropriate method to evaluate my abilities to provide evidence-based dental hygiene care. The main advantage cited: I feel like formative feedback opened more doors for questions, there was less pressure so it was easier to ask faculty questions regarding patient care and to know what's expected of you before being graded. Overall 83% preferred the formative/summative assessment to daily grading.

Conclusions: Based on student comments daily grading makes them reluctant to ask questions which is a necessary part of learning. Finding a balance between creating a safe environment where students can learn and assessing competence to ensure graduates can provide quality care is challenging, but this small study suggests formative and summative assessment system may facilitate student learning.

A Pilot Study to Determine Impact of Germ Simulation on Standard Precaution Compliance in Dental Hygiene Students

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Problem statement: Compliance with recommended infection control practices is essential to the safe practice of dentistry and often rooted in the educational setting.

Purpose: The purpose of this pilot study was to determine if participation in a germ simulation activity had an impact on standard precaution compliance in first year dental hygiene students.

Methods: This two-group, pretest-posttest design study used a convenience sample of 29 dental hygiene students as subjects. After informed consent was obtained, participants were randomly divided into control (n=15) and experimental (n=14) groups. A 10 item pretest/posttest questionnaire was given to both groups to determine level of compliance with standard precautions prior to the experimental intervention, immediately afterwards and 8 weeks later. Subjects only in the experimental group provided dental hygiene services in a treatment environment where simulated pathogens were placed in the oral cavity of a manikin. Following the activity, under black light conditions participants immediately viewed the spread of simulated pathogens. Before and after treatment photographs were also used for participants to further visualize changes in the treatment unit due to pathogen contamination as simulated by the polyethylene microspheres.

Results: Statistical analysis (ANOVA) of the 8 week pre/posttest questionnaire scores revealed no significant differences ($p=0.8207$) in standard precautions compliance in subjects who were exposed to the polyethylene microspheres simulation activity compared to subjects who were not exposed to the simulation activity.

Conclusions: Based on the results of this pilot study exposure to a simulated germ activity did not affect standard precaution practices in first year dental hygiene students. More research is needed involving a larger sample size over a longer period of time to determine the long term impact of germ simulation with polyethylene microsphere on compliance with standard precautions.

An Analysis of Faculty Perceptions on Assessment Methods Utilized To Evaluate Student Competency in Dental Hygiene

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Problem Statement: Competency based education (CBE) has become an integral part of dental hygiene education with the adoption of the Commission on Dental Accreditation (CODA) standards in 1997. CODA standards are not meant to be prescriptive to allow for flexibility with methods of assessment. However, this makes it difficult to determine if methods used are effective in measuring student competency.

Purpose: The purpose of this study was to evaluate clinical dental hygiene faculty perceptions regarding assessment methods utilized in determining clinical competency.

Methods: This study was a descriptive, cross sectional survey design. Survey instrument was developed based on the literature and contained 31 questions related to the following areas: demographic characteristics, level of knowledge regarding assessment methods and perceptions of assessment methods. An email to all entry-level dental hygiene programs was sent to request dissemination and participation by program faculty. Data was gathered from a convenience sample of dental hygiene clinical faculty ($n=181$).

Results: Results revealed use of OSCE (objective structured clinical evaluation)/practical

skill exams (83%) was perceived most effective in assessing competency followed by daily clinical grading (63%). Thematic analysis of qualitative data revealed formative assessment with the inclusion of summative assessment rated the highest (44%) as an effective method of evaluation followed by summative assessment (16%). Thematic analysis noted respondents may have a preferred assessment method but feel a blended approach of teaching should be utilized due to student diversity and learning styles.

Conclusions: Findings from this exploratory study show respondents are satisfied with assessments that they are currently practicing but report a variety of methods are needed to evaluate competency. Further research is recommended with a larger sample and more detail on how programs define assessment methods used to assess competency and outcomes to determine what methods are more effective in the evaluation of student competency.

A Survey of Clinical Faculty Calibration in Dental Hygiene Programs

Nichole L. Dicke, RDH, MS; Kathleen O. Hodges, RDH, MS; Ellen J. Rogo, RDH, PhD; Beverly J. Hewett, RN, PhD

Problem Statement: Clinical educators with varying backgrounds unite to develop competent graduates. While the goal is unified, the teaching methods might be conflicted. Calibration exercises that are inadequate could contribute to faculty variance and interfere with student learning, performance, and satisfaction. There was a lack of research studying clinical dental hygiene faculty's perception of calibration.

Purpose: This study investigated the calibration efforts of entry-level dental hygiene programs in the United States. Four aspects were explored: faculty attitudes, satisfaction, and characteristics as well as quality.

Methods: A descriptive comparative survey design was used. Directors of accredited dental hygiene programs ($n=345$) were asked to forward an electronic survey invitation to clinical faculty. Eighty-five directors invited 847 faculty, 45.3% ($n=384$) of who participated. The 17-item survey contained multiple-choice and Likert scale questions and was open for three weeks. Descriptive statistics were used to analyze demographic data and research questions. The Kruskal-Wallis, Spearman Correla-

tion Coefficient, and Mann-Whitney U tests were employed to analyze hypotheses ($p=0.05$).

Results: The demographic profile for participants revealed that most worked for institutions awarding associate entry-level degrees, had 1–10 years' experience, taught clinically and didactically, and held a master's degree. Clinical educators value calibration, believe it reduces variation, want more calibration, and are not offered quality calibration. There was a difference between the entry-level degree awarded and the program's evaluation of clinical skill faculty reliability, as analyzed using the Kruskal-Wallis test ($p=0.008$). Additionally, full-time versus part-time employees reported more observed student frustration with faculty variance, as evaluated using the Mann-Whitney U test ($p=0.001$, $bfp=0.004$).

Conclusions: Faculty members value calibration's benefits and want enhanced calibration efforts. Calibration needs to be improved to include standards for measuring intra- and inter-rater reliability and plans for resolving inconsistencies. More research is needed to determine effective calibration methods and their impact on student learning.

A Faculty Development Program to Enhance Dental Hygiene Distance Education: A Pilot Study

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Problem Statement: Increased use of DE in dental hygiene curricula necessitates faculty members' awareness of pedagogy and methodologies promoting dynamic communication, developing learning communities, and increasing social presence in online courses.

Purpose: This pilot study was designed to assess current practices and perceptions of distance education (DE) dental hygiene faculty and evaluate the impact of a faculty development program to enhance best practices for teaching online dental hygiene courses.

Methods: Following IRB exemption, a purposive sample of distance education (DE) faculty ($N=7$) who taught online courses in DE bachelor's degree completion and master's degree programs listed by the American Dental Hygienists' Association participated in a pretest, distance education faculty development workshop, and posttest. The

Community of Inquiry framework provided the basis for the self-designed, valid, and reliable Distance Education Best Practices Survey instrument that assessed participants' practices and perceptions. Instrument validity was established by five experts in the field of distance education. Seven online faculty members established test-retest reliability of the survey instrument within plus or minus 1 of 97%.

Results: Frequency of use ratings ranged from 4.0 (regularly) to 5.0 (always) on a response scale ranging from 1.0 to 5.0. Results suggested a change in participants' perception of the importance of some factors associated with three essential educational constructs: (a) teaching presence, activities promoting lifelong learning ($p = 0.03$); (b) social presence, faculty communication fostering a SOC ($p = 0.04$), encouraging students' self-introduction ($p = 0.04$); and (c) cognitive presence, encouraging productive dialogue and respecting diverse opinions ($p = 0.04$).

Conclusions: Findings indicate a potential impact of faculty development programs designed to enhance online teaching, community, and satisfaction, even for faculty with high self-ratings regarding best practices. Evaluation of future faculty development programs on the implementation and impact of best practices is recommended.

Using Multiple Mini Interviews to Identify Noncognitive Attributes For Dental Hygiene Admissions

Jacqueline J. Freudenthal, RDH, MHE

Problem Statement: Traditional admissions interviews and selection criteria do not reliably identify non-cognitive attributes desirable for health professionals. The Multiple Mini Interview (MMI) demonstrates the ability to identify non-cognitive characteristics in admissions process but has not been assessed in dental hygiene.

Purpose: To determine if using MMI: 1) identifies desired non-cognitive attributes, 2) differentiates between domains identified as important for professionals and 3) yields admissions information that cannot be obtained by traditional means.

Methods: From 2011-2014, after IRB exemption, applicants ($n=146$) to a baccalaureate dental hygiene program participated in MMI including 5 individualized interviews with faculty. Every seven minutes, applicants moved between stations to

discuss short standardized scenarios, each designed to address an individual domain identified as important: communication, critical thinking, ethics, honesty, and professionalism. The interviewers used a standardized scoring form with six items (clear perception or understanding of the problem, effective communication, critical thinking skills, disambiguation in point of view, clear and focused responses, and overall performance described by a list of traits defined as professionalism) using a 5-point Likert scale to rate candidates. Points were averaged for each station and summed by attribute across the stations. Interviewers had training and written instructions on desired attributes and scoring.

Results: A nested model of generalizability was used to estimate variance component and interaction using a minimum norm quadratic unbiased estimation (MINQUE). A G coefficient of 0.74 compared favorably with the reported range for MMI's of 0.65-0.81. A Cronbach's alpha of 0.58 did not measure desired attributes across all five domains. No correlations were found between MMI and traditional cognitive measures.

Conclusions: Interviewers evaluated the candidates on their responses to domain scenarios rather than evaluating the desired attributes. Attention to all processes in the assessment of the attributes might improve reliability of the MMI in dental hygiene admissions.

Relevance of a Workshop to Prepare For Dental Hygiene Clinical Boards

Marie R. Paulis, RDH, MSDH

Problem Statement: Inadequate preparation for clinical board exams may prevent dental hygiene students from becoming licensed.

Purpose: The purpose of this study is to demonstrate the success of a workshop day to prepare dental hygiene students for their clinical board exam.

Methods: This pre and post survey study utilized a convenience sample of 41 dental hygiene students. The 8-hour workshop consisted of students serving as the voice of a mock board patient and typodonts serving as teeth. The self-designed instruments used were a pre-workshop survey, with 13 closed-ended questions and a post-workshop survey, with 11 closed-ended questions. Anonymous survey responses were collected through pa-

per surveys. Data were entered into an electronic database. Descriptive statistics were used to analyze the data. Since students were surveyed, IRB approval was required and obtained through expedited review from the University of Bridgeport.

Results: A 100% (N=41) response rate was achieved. Prior to the workshop, many students (27%) reported low confidence in identifying "readily detectable" calculus, whereas post-workshop, those "very confident" increased by 10%. The confidence level in completing the required paperwork doubled post-workshop with most (80%) stating they were moderately or very confident about paperwork requirements. The majority of students (70%) were not confident in patient choice but this number decreased by 12% post-workshop. In addition, about 10% of student respondents reported that exam anxiety dropped post-workshop. The majority of the students (66%) thought the workshop helped them realize exam time limits; 63% thought it helped them identify calculus; and 59% thought it helped them improve calculus removal skills.

Conclusions: Most students (80%) stated that they felt more confident in paperwork procedures post-workshop. In addition, the workshop participants perceived significant benefits in the areas of time efficiency, deposit identification, and calculus removal skills. Overall, 95% of students considered the workshop helpful.

A Comparison of Associate and Bachelor Degree-Seeking Students on Self-Perceptions of Senior Dental Hygiene Students as Health Educators

Deborah L. Dotson, RDH, PhD

Problem Statement: Although all dental hygiene programs include a patient education component, it is still unknown whether 4-year programs are more or less demanding as 2-year programs in the development of skills relevant to patient education beyond simple brushing and flossing instruction.

Purpose: The purpose of this cross-sectional study was to determine if dental hygiene students attending a 4-year program of study are more likely to perceive themselves as health educators than are students in a 2-year program.

Methods: Attempts were made to electronically contact all US accredited schools of dental hygiene.

Two hundred eighty-six program directors were successfully contacted and asked to fill out a questionnaire regarding health education in their curricula, and to invite their students to participate in the electronic student survey.

Results: Sixty-five programs (which was a response rate of 22.7%) and 307 students participated (211 in associate programs and 96 bachelor degree students). This was an average student response rate of about 5 students per participating program. Eighty-four percent of each group said their educational experiences have resulted in a positive shift in their views of the patient education role of dental hygienists. However, only 45% of the participating schools report requiring students to show competence in patient education specific to tobacco users or diabetics. T-tests for independent samples ($\alpha=.05$) showed no significant differences between the 2 and 4-year students on the variables of self-perception, behavioral intentions toward patient education, volunteerism, and career expansion. There was a significant difference in the variable of behavioral intentions toward professional leadership with 4-year students more likely to take an active role in the professional organization ($p=0.02$).

Conclusion: The vast majority of students participating in this study show positivity toward their role as patient educators. The expected difference in 2 and 4 year programs with regard to student perceptions of their role as patient educators was not found. The only area where 2 and 4 year students differed significantly was in their intentions toward professional leadership. Results of this study should encourage schools to require students to show competency in patient health education skills for smokers and diabetics. These are two of the most common issues affecting both oral and systemic health and less than half of the participating schools report requiring students to show competence in these areas of patient education. In order for dental hygienists to impact these two significant areas of need, they must be better trained.

Dental Hygienists' Perception of Preparation and Use for Ultrasonic Instrumentation

Joanna Asadoorian, RDH, PhD; Dani Botbyl, RDH; Marilyn J. Goulding, RDH, MOS

Problem Statement: Ultrasonic scaling technology has evolved dramatically providing greater clinical utility subgingivally including

instrumentation of light deposits and biofilm disruption, but it is unknown if dental hygiene curriculum has kept pace and reflects current applications.

Purpose: The aim of this ethically approved study was to assess new dental hygiene graduates' perceptions of preparedness and use of ultrasonic instrumentation.

Methods: All recent Canadian dental hygiene graduates were electronically surveyed about perceptions of preparedness and use with ultrasonic instruments. Descriptive and inferential statistics including frequencies, proportions, means and cross-tabulations were calculated to examine relationships between curricular characteristics and perceived perception of preparedness and use of ultrasonic instrumentation.

Results: Of the 1895 invited dental hygienists, 485 agreed to participate, reflecting a 26% response rate. Participants reported using ultrasonics about half of instrumentation time predominantly with magnetostrictive technology (75%). Of these, approximately 75% of respondents report primarily using straight inserts, demonstrating a lack of curve instrument use. Use focused on heavy deposits with straight, slim inserts, which indicated an incorrect use of the technology. Subjects were generally satisfied with ultrasonic education feeling reasonably well prepared in using ultrasonics. Although not statistically significant, higher levels of perceived preparedness were associated with graduates from the 3-year diploma program ($p=0.69$), whereas graduates from 18-month programs were associated with greater levels of confidence ($p=0.27$). Confidence with ultrasonics did not have an effect on subsequent use—a large proportion (70%) of participants increased use once in practice. An earlier introduction ($p=0.93$) and more practice time ($p=0.93$) in school were both associated with increased feelings of preparation and confidence.

Conclusions: New dental hygiene graduates perceive greater preparedness, confidence and use of ultrasonic instrumentation within a more traditional paradigm. In addition, the results indicate potentially incorrect and/or inappropriate application of current technology.

Funding for this project was provided by Dentsply Canada Ltd.

Teaching Dental Hygiene Students to Utilize the Logic Model for Community Outreach Programs

Karen M. Portillo, RDH, MS; Ellen Rogo, RDH, PhD

Purpose/Goals: A new program was implemented during the 2011-2012 academic year for the purpose of educating dental hygiene students to plan, implement, and evaluate community oral health programs using a Logic Model.

Significance: An essential role of the dental hygienist is to address community oral health needs to improve population health.

Approach/Key Features: In the fall semester, students selected groups of 2-4 and then identified an organization benefitting from an oral health program. Next, the group conducted a needs assessment to determine the type of program the target population required. A literature review on the target population was completed by each group to ensure students understood the dynamics of the population. Afterward, the students began planning the program using a Logic Model outlining the inputs, outputs, outcomes which included goals and objectives aligned with Healthy People 2020, assumptions and external factors. In the spring semester, the groups implemented the community outreach programs, evaluated the outcomes to determine if the goals and objectives were met, and wrote the analysis/evaluation using the Logic Model in a final report.

Evaluation: On the Logic Model assignments during the fall semester, students earned an average of 92.9% (n=26) in 2011; 93.9% (n=26) in 2012; and 92.9% (n=27) in 2013. On the Logic Model final report assignment during the spring semester, students earned an average of 89.1% (n=26) in 2012; 95.0% (n=26) in 2013; and 87.6% (n=27) in 2014. From a community impact perspective, students' programs provided outreach to 245 children and 43 adults in 2012; 246 children and 60 adults in 2013, and 254 children and 138 adults in 2014. For three years, students were successful in learning to utilize the Logic Model to address community oral health needs. The Logic Model was a useful framework for program planning, implementation, and evaluation.

The Effects of a Legislative Advocacy Project on Dental Hygiene Students' Knowledge, Values, and Actions

Leciel K. Bono, RDH-ER, BS; Ellen J. Rogo, RDH, PhD; Kathleen Hodges, RDH, MS; Teri Peterson, EdD

Problem Statement: Advocacy is vital to population oral health and professional growth. Linking leadership theory to practice as students participate in the legislative process is important in extending their knowledge of being change agents and becoming oral health advocates.

Purpose: The intent of this investigation was to assess the self-reported levels of knowledge, values, and actions of undergraduate and graduate students who participated in a legislative advocacy educational unit (LAEU).

Methods: A pretest/posttest design was employed with a convenience sample of 27 undergraduate and 13 graduate students. A questionnaire was administered before and after the completion of the LAEU – IRB approval #3594 and was administered using an online survey tool. Validity and reliability of the questionnaire was previously established. The data collection instrument assessed three subscales (knowledge, values, and actions) and barriers to future advocacy actions using a 7-point Likert scale. Assumptions of normality and homoscedasticity were tested before employing the RM-ANOVA to compare average scale responses.

Results: Both undergraduate and graduate students demonstrated a significant increase in knowledge, values, and actions ($p < 0.001$) from the pretest to the posttest. Bonferroni corrected p-values verified knowledge, values and undergraduate actions were statistically significant; however, actions at the graduate level were not significant. Actions were rated lower than the other two subscales. Cronbach's alphas revealed internal consistency of the subscales ≥ 0.80 . The top four barriers for both MS and BS students were lack of time to be involved, lack of comfort speaking to legislators or staff, lack of comfort testifying before legislators, and lack of priority to be involved in legislative advocacy.

Conclusions: Implementation of a LAEU with BS and MS students can positively influence the development of knowledge, values, and actions; however, mentorship in the professional association is needed after graduation to continue the development of future leaders.

Dental Hygiene Undergraduate Student Specialty Practicum Clinic: Medical and Dental Complexity of Clients

Lindsay Marshall, RDH; Rachel Haberstock; Sharon Compton; Minn Yoon

Problem statement: As the population ages and many older adults retain their teeth, there is an increasing need to better incorporate their complex medical and dental conditions into the dental hygiene care plan.

Purpose: The aim of this project was to determine the complexity of the medical and dental status of clients that attended a rehabilitation hospital based dental clinic as part of an undergraduate dental hygiene program.

Methods: The retrospective medical and dental histories of clients that attended a hospital-based dental clinic between September 2011 and April 2013 were reviewed by two independent research assistants. Information about demographics, existing medical conditions, medications and oral health conditions were recorded. Ten files were randomly chosen and audited to ensure calibrated data entry.

Results: Data from 164 client charts were entered into an electronic database. Clients had an average age of 66.5 years, with 61% (95/164) over the age of 65. Of these clients, 45% had experienced a major medical event while 12% suffered from dementia. 16% of clients required ambulatory support and close to 100% took multiple medications. Dental chart examination showed that 20% of clients had all twelve anterior teeth while 7% had at least sixteen posterior teeth and 22% of clients were edentulous. Review of the dental charts showed that 32% of clients seen had moderate to severe gingivitis while 22% had moderate to severe periodontitis.

Conclusions: Review of the records of these clients illustrates that this population has extensive medical and dental issues that can greatly influence dental hygiene treatment. A more thorough understanding of the complexity of these issues will allow the dental hygienist to better incorporate client conditions into the dental hygiene care plan, resulting in more comprehensive care.

Research funding for the project provided by School of Dentistry, University of Alberta.

Local Anesthesia Training Model Improves Confidence and Reduces Anxiety in Students

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Problem Statement: Administering the first local anesthesia injection is difficult and induces anxiety in dental hygiene students. There is no research on the benefit of using a preclinical model (eg. Frasco AG-3 IB), to enhance the transition from learning to practice of local anesthesia delivery.

Purpose: The aim of this study was to evaluate whether practicing on a local anesthesia training model prior to the students' initial injection on humans reduces anxiety and increases their confidence.

Methods: Following IRB approval, 29 senior dental hygiene students were randomly assigned to a control (n=14) and experimental (n=15) group. Both groups received the same didactic and cognitive concepts and technical skills necessary to administer local anesthesia. A pre-questionnaire was completed by all students. Participants in the control group took only classroom knowledge to the clinic. Students in the experimental group practiced on the training model for four one-hour sessions. Both groups administered local anesthesia during one 1½ hour clinical session to anesthetize the greater palatine, inferior alveolar and mental nerves of a student partner. All students completed a post-questionnaire.

Results: Univariate and multiple regression analysis revealed statistically significant differences in operator confidence and anxiety levels between experimental and control groups. Students in experimental group reported more confidence ($p < 0.001$) and significantly less anxiety ($p < 0.001$) when compared to the control group. Experimental group also reported fewer visible signs of anxiety (heart pounding, sweating, hands trembling) and needed less faculty guidance ($p < 0.001$).

Conclusions: In this study, practice on local anesthesia training model prior to students' live patient experience reduces anxiety, increases confidence levels and makes students less dependent on faculty assistance. This study suggests that pre-clinical models may have an important role to play in training dental hygiene students. A larger study is required to validate the results.

An Integrated Approach in Teaching Microbiology to Dental Hygiene Students

Laura Mueller-Joseph, RDH, EdD; Robert Elgart, PhD

Purpose: The purpose of this program was to evaluate the effectiveness of a redesigned microbiology laboratory course targeted for dental hygiene students with laboratory exercises focused on clinical applications.

Significance: Student centered learning in foundational science courses requires innovations to connect concepts, engage students and solidify intellectual understanding.

Approach: A foundational course in microbiology was redesigned to include 28 laboratory exercises utilizing microbes encountered in the dental hygiene clinic. The microbes were either confined to the oral cavity or to the clinical environment thereby enhancing the relevancy of the exercises to the discipline of dental hygiene. Each exercise was divided into six units, with a report due at the conclusion of each exercise. The key feature of the program was to utilize discipline related concepts to enhance the students understanding and appreciation of the subject matter. All of the basic laboratory principles of microbiology were covered in the redesigned course.

Evaluation: Evaluation of the program included a student opinion survey that addressed their level of engagement and appreciation of microbiology to the profession of dental hygiene. Students from previous microbiology lab sections taught by the same instructor were also surveyed. Results revealed that (80%) of students in the redesigned course felt very engaged/engaged as compared to (50%) of students in other course sections. Additionally, 90% of the students in the redesigned course felt their lab skills greatly improved/improved as compared to 30% of students in the other course sections. Of the students in the redesigned course who conducted a critique of the lab exercises, 74.3% found the laboratory exercises related well to the discipline of dental hygiene. Average end of course grades revealed (85%) for students in the redesigned course as compared to 83% for students in other course sections.

Funding was provided by Title III Student First Grant.

Enhanced Learning during the Dental Hygiene Process of Care

Cynthia Howard, RDH, MS; Andrea Beal, RDH, MS; Shirley Birenz, RDH, MS; Cheryl Westphal Theile, RDH, EdD; Robert Davidson, DDS, PhD

Purpose/Goals: To revise a dental hygiene care plan form for dental hygiene students whose clinical program is integrated into the curriculum of a large dental school. In this setting, a comprehensive clinical examination is completed by a dental student prior to the first dental hygiene appointment.

Significance: The new form includes both a template and a "guidebook" that: 1) Orients the dental hygiene student through the sequence of dental hygiene care, and 2) Fosters competency in clinical assessment without making the clinical encounter a passive and repetitive exercise for the patient.

Approach/Key Features: The revised form was fully implemented in 2013. Multiple evidence-based thinking skills are fostered by its design. Knowledge schema organization and slot features organize the process of care, coupled with watermarked cues that refer directly to evidence-based resources.

Evaluation: We compared the new form to that used in academic year 2011-2012. The most significant finding was its effect on students' analytical, i.e., predictive, skills regarding patient care. Using the new form, the median number of "Expected [Clinical] Outcomes" increased from a single outcome to three expected results of therapy (Mann-Whitney U Test; $N=50$; $W=1599$; $p < 0.001$). Our results show that the revised dental hygiene care plan form represents an improved instrument for dental hygiene students to gain competency in clinical assessment. Dental hygiene students were able to incorporate the completed dental student's treatment plan into one from a dental hygiene perspective, and identify an increased number of meaningful clinical outcomes.

Online Course Evaluations: Program Directors' and Students' Knowledge, Beliefs, and Practices of Online Course Evaluations From 100% Online Dental Hygiene Education

JoAnn M. Marshall, CDA, RDH, MSDH

Problem Statement: Dental hygiene students from 100% online dental hygiene programs have the convenience of completing course evaluations online, but most do not. It was the intent of this study to investigate reasons/methods to initiate change in student response rates to online course evaluations.

Purpose: This study sought to determine: If a relationship between program directors' knowledge and beliefs and students' knowledge, beliefs, and practices of online course evaluations influence students' response rates.

Methods: Two confidential electronic surveys with open and close-ended questions were sent to thirty-four program directors from 100% online BSDH degree completion programs and 100% online MSDH degree programs via e-mail. The survey instrument developed for the program directors contained 25 items and the student survey instrument contained 24 items. The instruments were pilot-tested with online students and faculty to establish content validity. The survey information was obtained through the use of an online survey website. Participation was voluntary and confidential. Descriptive statistics were used to analyze the data. IRB approval was obtained from the University of Bridgeport.

Results: The data revealed that the majority of program directors (78%) believe that students do not know how the course evaluations are used by the institution. The program directors suggested impressing upon the students the importance of the course evaluation process, a mid-term evaluation, and making the course evaluations mandatory. The data collected from the students revealed that few students (17%) believe their feedback is used to improve course content. The student respondents expressed that the course evaluation instrument is not always applicable to the particular class. Student respondents suggested that incentives would not increase their response rate. Additionally, students are concerned with anonymity.

Conclusions: As institutions of higher education continue to develop online distance education in dental hygiene, it is important to determine what factors motivate students to respond to online course evaluations and for faculty to educate students about the purpose of course evaluations in order for them to fully understand the importance of their participation in the course evaluation process.

Basic Science

Comparative Anti-Gingivitis Efficacy of Oscillation-Rotation Electric Toothbrush versus A Manual Toothbrush

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Problem Statement: Plaque control is essential for preventing gingivitis. A new brushhead design was developed to increase the potential for better plaque control and ultimately decreasing the risk of developing gingivitis.

Purpose: To evaluate an oscillating-rotating (OR) power brush with a novel brushhead utilizing angled bristle tufts to a manual brush for the reduction of gingivitis.

Methods: This study was a 4-week, randomized, examiner-blind, 2-treatment, parallel group study design. One hundred subjects with mild to moderate gingivitis were enrolled and instructed to brush twice daily at home for 4 weeks with their assigned toothbrush and marketed dentifrice. Gingivitis measurements were evaluated at Baseline and 4 Weeks using the Modified Gingival Index (MGI) and Gingival Bleeding Index (GBI). Data was analyzed using the Analysis of Covariance with Baseline as the covariate.

Results: The average baseline whole mouth MGI score was 2.060 for the OR and 2.048 for the manual group ($p=0.303$). The average BL number of bleeding sites was 14.6 for the OR and 14.8 for the manual group ($p=0.676$). At Week 4 the OR power brush group showed a 15.2% reduction in gingivitis, and 70.7% in number of bleeding sites, differing significantly ($p<0.001$) from baseline. The manual group had a 6.8% reduction in gingivitis and 46.3% in number of bleeding sites,

differing significantly ($p < 0.001$) from baseline. Between-group comparisons showed that the OR brush with novel brushhead was significantly better for reduction of gingivitis (123.7%, $p < 0.001$) and reduction of bleeding sites (51.5%, $p < 0.001$) at week 4 vs the manual toothbrush.

Conclusions: The oscillation-rotation power brush with the novel brushhead provided significant improvements in gingivitis as compared to a manual toothbrush.

Funding for this project was provided by Procter & Gamble.

Effects of Aromatase Inhibitors on Alveolar Bone Loss among Postmenopausal Women with Breast Cancer

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Problem Statement: Aromatase inhibitors (AIs) are the standard of treatment for women with estrogen receptor positive breast cancer due to their ability to lower the risk of tumor recurrence. AI use results in estrogen depletion increasing the risk of osteoporosis and low skeletal BMD and may impact the alveolar bone.

Purpose: The purpose of this investigation was to determine the impact of AI use on alveolar bone loss through the use of clinical parameters, salivary bone biomarkers, and the supplemental use of bisphosphonates, vitamin D, and calcium in postmenopausal women on AIs.

Methods: An 18 month prospective examination of periodontal health in postmenopausal women (29 receiving AI therapy; 29 controls) was conducted between August 2009 and September 2013 at University of Michigan. Periodontal examinations including clinical attachment loss (CAL), periodontal probing depths (PD), and bleeding on probing were conducted. Linear measurements between the CEJ/restoration margin, and the alveolar crest of first molars were taken on baseline, 12, and 18 month radiographs. Bisphosphonate, vitamin D and calcium supplementation was collected via chart review. The UM IRB approved this study.

Results: AI users had significantly deeper PD and CAL as compared to those not on AIs at the 18 month study visit. A linear mixed model was constructed to investigate bone height as a function of time, AI, calcium, vitamin D and bisphosphonate status, along with an interaction between AI and calcium status. A significant effect of time was found along with a significant AI status by calcium use interaction. Those on AI and calcium had a significantly lower bone height value (Mean=2.509, SE=.137) than those not on calcium (Mean=3.325, SE=.231) ($p = 0.005$).

Conclusions: AI therapy has an impact on the oral health of postmenopausal women. Data suggests a positive relationship between alveolar bone loss and the use of calcium supplementation among postmenopausal women.

Funding for this project was provided by the Michigan Institute for Clinical Health Research/CTSA pilot grant UL1RR024986, and the National Institute of Dental & Craniofacial Research (NIDCR) grant 1K23DE021779.

Gingival Abrasion and Recession in Manual and Power Brush Users

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Problem Statement: An investigation to evaluate if the use of manual and power brushes result in gingival recession and/or abrasion.

Purpose: To assess the presence of gingival recession in manual and power toothbrush users and to evaluate the relationship between the incidence of gingival abrasion and gingival recession. Secondary outcomes were the level of gingival inflammation, plaque scores and brushing duration.

Methods: This was a single center, examiner-blind, cross-sectional study consisting of a single visit including 181 subjects, 90 manual (MTB) and 91 power brush (PTB) users. Baseline assessments included gingival recession (GR) and abrasion (GAS) as primary parameters and level of gingivitis (BOMP) and pocket depth (PPD) were evaluated as periodontal parameters. Subjects brushed with their own toothbrush as they would at home. Plaque (TMQHPI) and brushing

time were assessed. A non-parametric ANCOVA was used for analysis of post-brushing group changes in GAS and an ANCOVA was used to compare brushes for TMQHPI reductions with baseline as the covariate. Two-sample t-test was used to analyze BOMP, PPD and GR.

Results: Whole mouth mean scores for GR were 0.10mm in the MTB and 0.08mm in the PTB group. Full mouth pre-brushing mean GAS scores were 11.5 for the MTB group and 10.6 for the PTB group ($p=0.389$). There was no correlation between GR and GAS for MTB and PTB. Overall GAS for PTB showed less incremental change following a single brushing exercise than PTB ($p=0.004$). The PTB group removed significantly more plaque ($p<0.001$) and brushed significantly longer ($p=0.008$) than MTB users.

Conclusions: In this adult population little gingival recession was observed in either the manual or power toothbrush user group. Both groups had comparable levels of GR and GAS. GAS scores were not explanatory for the observed recession.

Meta-Analysis of Oral Safety Data For 0.454% Stannous Fluoride Sodium Hexametaphosphate Dentifrice

Rebecca VanHorn, RDH, BA; Tao He, DMD, PhD; Matthew L. Barker, PhD; Melanie C. Miner, BS; Ghebre Tzeghai, PhD; Robert W. Gerlach, DDS, MPH

Problem Statement: Anecdotal reports of desquamation after using a 0.454% stannous fluoride (SnF₂) dentifrice with sodium hexametaphosphate (SHMP) have been documented. Consequently, steps were taken to objectively review the safety data collected from clinical trials investigating the dentifrice where normal, healthy subjects brushed daily with the dentifrice to determine the prevalence of this condition.

Purpose: To evaluate the safety of a 0.454% SnF₂ SHMP dentifrice by conducting a meta-analysis of data from clinical trials.

Methods: Forty-one randomized clinical studies involving 2664 subjects assigned to the 0.454% stabilized SnF₂ SHMP dentifrice leg of each study were included in the meta-analysis. The studies ranged from 2 weeks to 2 years in length depending on the study design. Subjects

were required to use the dentifrice daily under routine conditions at home. In each study, safety was assessed via clinical examination or voluntary subject report. Data from the 2,664 subjects was then analyzed and adverse events (AE) were summarized both by subject and event occurrence and assessed for severity and causality.

Results: The population exhibited considerable diversity in demographics, behaviors and oral health. Of the 2664 subjects assigned the SnF₂ SHMP dentifrice, 50 subjects (1.9% of the population) experienced an AE, with a 95% confidence interval of (1.4%, 2.5%). Desquamation was the most frequent AE identified in 17 subjects (0.6% of the population), with a 95% confidence interval of (0.4%, 1.0%). Desquamation was mild in severity, and contributed minimally to dropout (0.08% of the population). Other findings were less common, and overall, only 8 subjects discontinued use due to a treatment related AE.

Conclusions: This inclusive meta-analysis demonstrated that a 0.454% stannous fluoride dentifrice with sodium hexametaphosphate was generally well-tolerated over periods of up to 2 years daily use, with mild transient desquamation (<1%) representing the most common finding.

Funding for this project was provided by Procter & Gamble.

Access to Care

Dental Hygienist Attitudes Concerning Willingness to Volunteer Care for the Underserved Population

Lynn A. Marsh, RDH, EdD

Problem Statement: In pursuit of healthier communities, disparities in oral health care should be recognized and local resources for oral health services should be more readily available for the underserved population.

Purpose: The purpose of this study was to investigate registered dental hygienist attitudes concerning community service, sensitivity to patient needs, job satisfaction and their frequency to volunteer care for the underserved population.

Methods: The survey instrument was cre-

ated to measure the registered dental hygienist attitudes related to community service, spirituality, volunteerism, job satisfaction, sensitivity to patient needs and social responsibility and their willingness to volunteer care for the underserved population. There were 306 surveys distributed to registered dental hygienists on Long Island for completion. All items on the survey instrument were subjected to a factor analysis in SPSS version 19.0 to acquire distinct variables which were reduced to three variables, including job satisfaction, attitude toward community service and sensitivity to patient needs. This research study was conducted with IRB approval.

Results: This research study indicated that registered dental hygienists tend to be satisfied with their job position, held slightly positive attitudes toward community service and had a strong positive sense of sensitivity to patient needs. Registered dental hygienists who are members of the American Dental Hygienists' Association were more likely to hold positive attitudes toward community service activities than non-members. In addition, registered dental hygienists with higher levels of education had more positive attitudes toward community service. They did not differ in their level of job satisfaction.

Conclusions: Understanding what influences registered dental hygienists to volunteer care for the underserved population provides valuable information to dental hygiene programs and the importance of attitudes toward community service, sensitivity to patient needs and job satisfaction. It is vitally important that dental hygienists volunteer preventive and emergent care to the underserved population.

Dental Hygiene Students and Interprofessional Education in HIV, Involvement in the Institute of Humary Virology's Jacques Initiative (JI)

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Purpose/Goals: One in 40 persons thirteen and older living in Baltimore City has been diagnosed with HIV.

Significance: Preparing the Future (PTF) though the Jacques Initiative is an interprofes-

sional initiative with a goal of addressing the National HIV/AIDS Strategy by normalizing and integrating HIV into health professionals' future clinical practices. Dental Hygiene students participate in this program with peers through a multidisciplinary didactic and hands-on curriculum. In this hands on and didactic curriculum, students from these disciplines are introduced to the HIV epidemic and their role in addressing this issue collaboratively and interprofessionally.

Approach/Key Features: The curriculum emphasizes the dental hygienist's role as a primary care provider. Students were didactically and practically trained how to conduct rapid oral HIV testing. Through case scenarios presented by the PTF mentor, students developed skills in communicating and educating patients based on their test results. During the fall semester 2013, dental hygiene students tested 142 patients in the screening and urgent care clinics of the School of Dentistry. Testing provided awareness to individuals of their HIV status. Patients testing positive were linked to care via the PTF mentor.

Evaluation: Dental hygiene students completed a pre and posttest assessing their knowledge and attitudes toward HIV. Overall scores increased in both categories. The students' rating of 1) ability to have an informed conversation with my patients about HIV; 2) ability to discuss HIV in a culturally competent manner with patients; 3) comfort offering HIV testing to all patient rose by 75%, 48% and 25% respectively. All students (100%) issued high ratings for their experience in the PTF program as very good (63.6%) and good (36.4%) respectively. Interprofessional education creates an environment conducive to collaborative practice. Students also learn and value how members of other disciplines contribute to creating a stronger team when care is provided. Other health care providers gain insight into oral health care concerns which may not have been discussed in their curriculums prior to this innovative experience. This integrated learning experience provides student certification in salivary testing. Students are able to address HIV across the continuity of care spectrum.

Funding provided thru the JACQUES Initiative for testing kits and the University of Maryland School of Dentistry.

The Association between Early Childhood Caries (ECC), Feeding Practices, and an Established Dental Home

Erin A. Kierce, RDH BA; Linda Boyd, RDH, RD, EdD; Lori Rainchuso, RDH MS; Carole A. Palmer, EdD, RD, LDN; Andrew Rothman, MS, EIT

Problem Statement: ECC is a significant public health concern disproportionately affecting low-income children. Consistent preventive dental services are critical for Medicaid-enrolled children to reduce their risk of developing caries.

Purpose: The purpose of this study was to determine the association between the prevalence of ECC and the nutritional intake of a low-income child, with an established dental home. This study also compared ECC among two groups of children, one without an established dental home and one with an established dental home.

Methods: A cross-sectional survey was conducted among 132 Medicaid-enrolled children between 2 and 5 years of age with and without a dental home to compare feeding practices, parental knowledge of caries risk factors, and oral health status.

Results: Children with a dental home had lower rates of plaque ($P<0.05$), gingivitis ($P<0.05$), and mean dmft score ($P<0.05$). Children without a dental home consumed more soda ($P<0.05$) and juice ($P<0.05$) daily, and ate more sticky fruit snacks ($P<0.05$) than children with a dental home.

Conclusions: The results suggest that the establishment of a dental home, especially among high-risk, low-income populations, decreases the prevalence of ECC and reduces the practice of cariogenic feeding behaviors.

Snapshot of Dental Hygiene Diversity Trends

Andrea L. Beall, RDH, MA; Rosemary D. Hays, RDH, MS; Lisa B. Stefanou, RDH, MPH; Cheryl M. Westphal Theile, RDH, EdD

Problem Statement: As the U.S. becomes more ethnically diverse, there is need for health-care providers that can reflect and respond to an increasingly heterogeneous population. Workforce diversity has been associated with greater patient satisfaction with care and improved patient-provider communication. In addition, health profes-

sionals from underrepresented backgrounds are also more likely to provide care to underserved communities and to conduct health disparities research. Unfortunately, there is a lack of racial and ethnic diversity in the oral health workforce.

Purpose: The purpose of this poster is to compare ethnic backgrounds of the current U.S. population to dental hygiene students in the U.S and those specifically at New York University College of Dentistry (NYUCD).

Methods: Distribution of population by ethnicity was compared using the 2010 U.S Census and the 2010-2011 ADA Allied Dental Education Survey results.

Results: According to the survey, there was obvious disparity in the representation of minorities in the future of the dental hygiene profession compared to the U.S population (over 75% of enrolled students in all dental hygiene programs were White). However, the NYUCD dental hygiene program demonstrated a more accurate reflection in all groups. Minorities comprised almost half (46%) of this program's dental hygiene student population and Hispanic students (14.8%) and were almost a mirror image to the U.S. census. Black/African American students were still somewhat underrepresented in the program (7.4% compared to the U.S. population (12%) whereas Native Hawaiian and other Pacific Islanders (14.8%) were almost fifty times the Nation's distribution (0.2%).

Conclusions: Efforts to enroll more minority dental hygiene students across the country may result in a more equitable geographic distribution of dental hygiene health care providers and ultimately address one aspect of the access to care problem.

Geographic Comparisons of Washington State Non-Traumatic Dental Complaint Emergency Department Patients

Jacqueline A. Juhl, RDH, MSDH Candidate; Ellen J. Rogo, PhD; JoAnn Gurenlian, RDH, PhD

Problem Statement: The treatment costs for Non-Traumatic-Dental-Complaint [NTDC] patients to Emergency Departments [EDs] has been reported as skyrocketing and ineffective. Local, state, and federal agencies struggle seeking cost-effective options while providing clinically effective quality of care for NTDC treatment.

Purpose: This study investigated rural-to-urban and an urban Washington State hospital Emergency Department [EDs] utilization from March, 2012 to March, 2013 to determine the demographic profiles, institutional administrative experiences, and clinical experiences of 1380 Non-Traumatic Dental Complaint [NTDC] patients.

Methods: After receiving IRB approval, (HSC #4005), data were electronically extracted from de-identified patient records and analyzed using a one-way t-test, Mann-Whitney U test, Pearson Chi-square analysis, and Fisher's Exact test with a 0.05 alpha level.

Results: Results indicated males (RTU=52.8%, URB=63.1%) utilized EDs more than female (RTU=47.2%, URB=36.9%) in both sample populations. Significant differences were found in demographic patient profiles ($p < 0.001$). In the rural sample population, more patients were <10 years of age (RTU=8.1%, URB=0.7%), and >70 years of age (RTU=3.0%, URB=1.0%) presented to the ED than in the urban sample population. Differences between geographic site providers were found in utilization of ICD-9 diagnostic codes ($p < 0.001$). Differences were observed in the kinds of ICD-9 codes used between both institutions and between provider types at the URB site. No significant differences were found for the institutional administrative experiences due to provided data inconsistencies.

Conclusions: Variances existed between URB and RTU institutions in several aspects of NTDC ED patient experiences which could impact policy development, federal funding, and future research. This investigation identified provider variance of ICD-9 codes in diagnoses of NTDC patients between URB and RTU providers and between provider types within EDs which might adversely affect patient outcomes.

Gender Differences in Masticatory Difficulty in Elderly Koreans

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Problem Statement: Masticatory difficulty is a common oral problem in aging people, affecting 50% of elderly Koreans. Thus, factors influencing the occurrence of masticatory difficulty

in males and females are of interest to dental hygienists.

Purpose: To identify gender differences in masticatory difficulty in elderly Koreans.

Methods: This study used data obtained during the 2011 Community Health Survey (CHS) of Korea. Data from 56,624 subjects aged over 65 years old who participated in the CHS were included in this study. Power analysis suggested that this was representative of 5,639,218 persons. Of those persons, 2,368,200 (42.0%) were males and 3,271,018 (58.0%) were females. Masticatory dysfunction was the dependent variable and independent variables were divided into regional factors (regional urbanization), demographic factors (age, education, monthly household income, qualification of basic livelihood recipient, private insurance, economic activity, living together), chronic disease factors (medical history of hypertension, diabetes), and oral health factors (number of teeth, denture status, subjective gingival health). The SPSS 20.0 program was used for statistical analysis, and T-test, ANOVA and multiple logistic regression were performed. To identify the factors that affected masticatory dysfunction, multiple logistic regression analysis was performed with demographic factors set as control factors.

Results: Prevalence of masticatory dysfunction was higher in elderly females than in elderly males (50.2% and 42.6%, respectively ($p < 0.05$)). The number of teeth (males: aOR=2.01, females: aOR=1.68) and subjective gingival health (males: aOR=7.60, females: aOR=7.31) had a higher influence on masticatory dysfunction in males than in females ($p < 0.05$). Hypertension (females: aOR=0.97, males: aOR=0.96), diabetes (females: aOR=1.07, males: aOR=1.05), and type of denture (females: aOR=1.75, males: aOR=1.57) exerted higher influence on masticatory dysfunction in females than males ($p < 0.05$).

Conclusions: Masticatory dysfunction in the elderly is mainly influenced by gender, customized management and education. Considering each influencing factor is required when planning dental hygiene interventions.

This study was performed with financial support of the 2013 Community Health Survey Research Fund of Korea Centers for Disease Control and Prevention.

Attitudes, Behaviors, and Needs of Team Dentists

Lesley A. McGovern, RDH, BS, MS(c); Ann E. Spolarich, RDH, PhD

Problem Statement: Elite athletes strive to attain superior levels of health and fitness; however, many have high levels of oral disease. Oral health may not directly affect physical ability to perform athletically; however, dental pain and dysfunction could alter level of performance during practice and competition. Oral screenings detect disease and need for treatment, and identify opportunities for preventive interventions. Many dentists volunteer their time with sports organizations, but knowledge about their scope of practice and needs are unknown.

Purpose: The purpose of this study was twofold. First, to gather baseline data to learn about practice behaviors, attitudes, and needs of team dentists. Second, to identify if/ how often oral screenings are conducted on athletes, differences in screening practices across leagues, and barriers to implementing regular oral screening programs.

Methods: An online survey using 37 supplied response questions was developed and pilot-tested for face and content validity. All dentist members of the Academy for Sports Dentistry were invited to participate (n=491), and 150 responded, yielding a 30.5% response rate. Data collected included level of athletes, league affiliation, scope of services provided, and type of oral screenings performed. Dentists' attitudes regarding athletes' treatment and preventive needs, practice behaviors, and self-identified needs were assessed. Descriptive statistics were used to analyze the data. IRB approval was obtained (USC UPIRB #UP-14-00326).

Results: Preliminary results revealed that 79.5% (n=116) of team dentists have a league affiliation. The most frequently provided services to athletes were emergency treatment and mouthguards (95.5%), restorative treatment (78.5%), oral hygiene instruction (63%), and prophylaxis (61%). Most team dentists (80%; n=90) perform oral screenings, with the most commonly reported screening being for all athletes prior to the season with individualized follow-up examinations (41%; n=36). The most commonly cited barrier to screenings reported was lack of awareness of the importance of oral health.

Conclusions: The majority of team dentists do perform oral screenings; however, lack of awareness about oral health supports the need for educational strategies for athletes, coaches, owners, schools and leagues.

Clinical Dental Hygiene Practice

Views of Dental Providers on Primary Care Coordination

Shirley Birenz, RDH, MS; Mary E. Northridge, PhD, MPH; Danni Gomes, RDH, BS; Cynthia Golembeski, MPH; Ariel Port, DMD; Janet Mark, MA; Donna Shelly, MD, MPH; Stefanie L. Russell, DDS, MPH

Problem Statement: Dental hygienists are well-positioned to screen for diabetes and hypertension and provide tobacco cessation and nutrition counseling at the dental hygiene treatment visit, notwithstanding such challenges as limited time and access to evidence-based resources.

Purpose: To assess dental hygienists' and dentists' perspectives and experiences regarding current scope of practice and the integration of primary care activities with routine dental care; and to assess the needs of hygienists and the office environment around primary care screening using a clinical decision support system (CDSS) at chairside.

Methods: In this exploratory study, we utilized maximum variation sampling to recruit 10 hygienists and 6 dentists from 10 urban dental offices with diverse patient mixes and volumes. A faculty dental hygienist conducted semi-structured, in-depth interviews, which were digitally recorded and transcribed verbatim. Data analysis consisted of multilevel coding based on consistent and systematic review, resulting in emergent themes with accompanying categories and identified hierarchy and predominance patterns.

Results: The majority of dentists and hygienists interviewed identify screening for hypertension and diabetes and discussing tobacco use and nutrition as relevant to their dental practices, particularly for vulnerable patients. Respondents suggested that such activities are important for many of their colleagues, although further analysis suggests certain challenges, including lack of continuity, accountability, resources, and systems-level support, with opportunities for im-

provement regarding timeliness, efficiency, and effectiveness. Dental providers' perspectives of patients' reactions to discussing the aforementioned health matters underscore salient barriers to care and support increased care integration. Overwhelmingly, hygienists reported using electronic devices at chairside to obtain web-based health information, with variation in terms of accuracy, quality, and reliability.

Conclusions: Dental hygienists occupy a unique and vital role in providing trusted patient-centered primary care, and may be well-positioned to help facilitate greater integration of oral and general health care, including screening, monitoring, and care coordination.

Funding for this project is supported in part by grant UL1 TR000038 from the National Center for Advancing Translational Sciences, National Institutes of Health.

Gingival Bleeding and Oral Hygiene of Women with Von Willebrand Disease

Stefanie Marx, RDH, BSDH; Jill Bashutski, DDS, MS; Karen Ridley, RDH, MS; Mark Snyder, DDS; L. Susan Taichman, RDH, MS, MPH, PhD

Problem Statement: Von Willebrand Disease (vWD) is the most common hereditary coagulation abnormality, presenting in roughly 1% of the population. Individuals with vWD experience increased gingival bleeding. Some evidence suggests gingival bleeding is due to poor oral hygiene. However, no studies have shown a correlation between vWD and gingival bleeding when adjusting for possible confounding factors such as plaque, dental care utilization, and oral hygiene habits.

Purpose: The purpose of this pilot study was to examine the relationship between vWD, plaque score, and gingival bleeding and to determine oral hygiene habits, oral health quality of life, and dental care utilization in those with vWD.

Methods: This multi-site study included 40 adult women with vWD who completed a questionnaire to evaluate demographics, oral hygiene habits, and dental care utilization. The reliability and validity of the survey have been established, as the questions were derived from a previously conducted study on women's oral health. Clinical dental examinations were conducted to

determine the presence of plaque and gingival bleeding on the 6 Ramfjord teeth. vWD type and severity was determined through a chart review. IRB approval was obtained from the University of Michigan and Michigan State University prior to data collection.

Results: Data collection is ongoing. Current data shows that 50% of sites contained plaque, yet did not bleed upon flossing. Only 4.5% of sites without plaque bled upon flossing. A chi-square test will determine if bleeding is dependent on plaque presence. Each test will provide an odds-ratio and 95% confidence interval. Logistic regression will be used to control for confounding variables.

Conclusions: Current data suggests that vWD has minimal effect on the amount of gingival bleeding that occurs.

Funding for this study was through the Rackham Graduate School-University of Michigan-Ann Arbor.

Diabetes Detection: A New Intraoral Screening Approach in the Dental Setting

Lindsey Cohen Vine; Joanna Pitynski; Rosemary Hays, RDH, MS; Dianne Sefo, RDH, BA; Mary T. Rosedale, PhD, PMHNP-BC; Shiela M. Strauss, PhD, MA, BS

Problem Statement: According to the American Diabetes Association, approximately 25.8 million Americans have diabetes. Of this population, 7 million remain undiagnosed and unaware of their condition.

Purpose: The research study, "Novel Interdisciplinary Intra-Oral Diabetes Screening in Dental Patients," is examining whether oral blood (i.e., gingival crevicular blood (GCB)) collected from persons whose gingiva bleed on probing may be an efficient screening method for diabetes identification. A key component in this examination is the extent to which an optimal GCB sample can be obtained for analysis of hemoglobin A1c (HbA1c) in the laboratory. HbA1c, also referred to as glycated hemoglobin, is currently viewed by the American Diabetes Association (ADA) as an acceptable test for diabetes as it identifies the average plasma glucose concentration over a 2-3 month period.

Methods: Dental and dental hygiene students have been charged with collecting a debris free,

steady stream of GCB into a micro-pipette which is then released onto a sample card. Simultaneously, nursing graduates collected finger stick blood (FSB) from the patient for HbA1c comparison. Armamentarium, site selection and control of contamination factors assist the clinician in obtaining a sample viable for analysis. Several factors, including the patient's medical and social history, may affect the quality of GCB samples. Despite the factors outside of operator control, proper instrumentation, periodontal knowledge of the clinician, and the utilization of a laboratory adhering to ADA protocols can increase the likelihood of obtaining an accurate HbA1c result.

Results: In view of the large number of Americans who remain unaware that they have diabetes, it is imperative that we identify innovative, evidence-based tests and alternate sites for diabetes screening. Utilizing this novel approach to diabetes screening would increase opportunities to screen for this life-threatening condition. In fact, collection of GCB has been proven to be a promising method to enable HbA1c testing in the dental setting with preliminary findings indicating a correlation of GCB HbA1c and FSB HbA1c of 0.99.

The Frequency of Dietary Advice Provision in a Student Dental Hygiene Clinic: A Retrospective Cross-Sectional Study

Johanna Franki, BOH, BHSc(Hons); Melanie J. Hayes, BOH, BHSc(Hons), PhD; Jane A. Taylor, BDS, BScDent (Hons), MScDent, PhD

Problem Statement: While the majority of dental hygienists agree that they should have a role in providing dietary advice, research indicates it is implemented infrequently in practice. The perceived extent of training appears to affect dental hygienists' confidence in providing dietary advice; it would be therefore valuable to review whether students are adequately experienced in dietary counseling during their education and training.

Purpose: The aim of this retrospective, cross-sectional study was to assess the frequency of dietary advice provision by dental hygiene students and to investigate factors that influence the frequency that dietary advice is provided.

Methods: IRB approval was gained (Approval no H-2013-0116) and data were obtained from clinical records (n=1189) of third-year Bachelor of Oral Health students at the University of Newcas-

tle. The study examined the frequency with which dietary advice provision was recorded by students over a 12-month period. The study also investigated the age and gender of patients, as well as other treatment provided during the appointment, to determine whether these factors influenced the frequency that dietary advice was provided.

Results: The results indicated that dietary advice was provided infrequently by dental hygiene students, with only 6.48 percent of all patients seen during the 12-month period receiving dietary advice. Logistic regression analysis revealed a statistically significant correlation between dietary advice and age, with children 2.5 times more likely than adults to receive dietary advice ($p < 0.012$). Additionally, patients who received oral hygiene instruction were 2.5 times as likely to receive dietary advice ($p < 0.003$). Strong correlations were also observed between fluoride applications and dietary advice.

Conclusions: The findings from the present study indicate that dietary advice is provided infrequently by dental hygiene students. Further research is required to investigate barriers to dietary advice provision, including whether education and training in this skill is sufficient for future clinical practice.

Occupational Health

Radiographic Imaging for Disaster Victim Identification (DVI) In Dental Hygiene

Ann M. Bruhn, BSDH, MS; Tara L. Newcomb, BSDH, MS

Problem Statement: The ABFO recommends dental hygienists (DH) on disaster victim identification (DVI) teams; however, no curriculum exists on infection control in mortuary settings or radiation safety and technique when imaging human dental remains.

Purpose: The purpose of this study was to compare two groups (high media/low media) on DVI and errors made with radiographic techniques (paralleling and bisecting) for the exposure of images on simulated victim remains.

Methods: Participants were divided into two groups to compare knowledge and interest: the experimental group (n=20) received a high media lecture with topics on safety and radio-

graphic technique; the control group (n=18) received a low media lecture on the same topics. All participants took a pre-test measuring baseline knowledge and interest, participated in a radiology lab including 11 intraoral exposures with both techniques on simulated victim remains, and a post-test. A handheld x-ray device, (Nomad Pro®), direct digital sensor, lead barriers and modified image receptor holder were used.

Results: Interest was high from baseline (99.9%) to post-test (94.8%) on the role of the DH's for DVI teams. While no overall difference between groups was found for knowledge scores (p=0.6455). All participants improved from baseline to post-test in radiation safety (+58.9%) and infection control in a mortuary setting (+61.5%); scores were decreased from baseline to post-test in dental radiation technique (-17.9%) and forensics (-17.9%). The bisecting technique had significantly higher errors than the paralleling technique at the .05 level (p<0.001); errors in angulation occurred more frequently (mean=8.4).

Conclusions: DVI training is applicable for DH's with interest in safety protocols and radiographic technique when working in a mortuary setting. Knowledge increased similarly between the high and low media groups. The paralleling technique yielded better quality images with fewer errors on simulated victim remains.

Funded by Old Dominion University's Faculty Innovator Grant.

Musculoskeletal Disorders – Does Operator Positioning or Use of Ergonomic Devices Matter?

Beckie M. Barry MEd, RDH; Ann E. Spolarich, RDH, PhD

Problem Statement: Results of worldwide studies indicate that musculoskeletal disorders (MSDs) are highly prevalent and remain a potential occupational health hazard to practicing dental hygienists. It is unknown how current recommendations for operator positioning and use of ergonomic devices impact development of MSDs and workforce issues among dental hygiene practitioners.

Purpose: The purpose of this study was

threefold: to determine if self-reported operator positioning was correlated with development of MSDs; to assess whether use of ergonomic devices helped reduce risk for occupational injury; and to measure the impact of MSDs on dental hygiene workforce issues in Mississippi.

Methods: A 47 item questionnaire was developed and pilot-tested for face and content validity. The online survey was sent to all licensed Mississippi dental hygienists (n=1,553), obtaining a 22% response rate. This IRB-approved study utilized a correlational design examining relationships between operator positioning and development and time to onset of MSDs, and impact of MSDs on practice behaviors and workforce retention. Data analysis consisted of Pearson chi-square correlation and Kaplan Meier survival analysis.

Results: There was no significant difference in prevalence of MSDs between those sitting in front of or behind the patient ($\chi^2 (1) = 1.67$, p=0.196), although those who sat behind the patient developed MSDs sooner ($\chi^2 (1) = 3.92$, p=0.048). Regardless of operator position, by 16+ years in practice, 80% (n=271/338) of dental hygienists developed MSDs. Having MSDs did not impact ability to work, need to take time off from work, reduce work hours or reduce patient load. Ergonomic devices were used by only 21.6% (n=73/338) of study participants.

Conclusions: The majority of practicing dental hygienists develop MSDs regardless of operator position. Sitting behind the patient resulted in earlier development of MSDs. Few practitioners use ergonomic devices. Dental hygiene workforce issues were not negatively impacted by MSDs.

Dental Radiographic Prescribing Practices: Survey of Illinois Dental Hygienists

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Problem Statement: Potential harm from ionizing radiation has led to the development of guidelines to protect patients and practitioners from unnecessary radiation exposure, which may or may not be followed in practice.

Purpose: The purpose of this pilot study was

to survey Illinois Dental Hygienists regarding radiology policies in the workplace.

Methods: The survey was based on the 2004 American Dental Association (ADA) and Food and Drug Administration (FDA) "Guidelines for the Selection of Patients for Dental Examinations" and consisted of 46 knowledge and practice items regarding use of dental x-rays. Study granted exempt status by TAMU, BCD, IRB. All 823 dental hygienists, who were members of the Illinois State Dental Society, were sent an email that contained the survey link.

Results: Descriptive statistics were used to identify trends in decisions for taking radiographs within Illinois dental practices. One hundred twenty-two dental hygienists completed the survey for a 16% response rate. Approximately 48% of the respondents reported the dentist determined the need for radiographs and 47% reported the decision was made by the dental hygienist. The majority of respondents (81%) reported that a clinical examination was not performed before radiographs were taken. However, 91% stated they "sometimes or always" took radiographs based on the patient's clinical symptoms. A majority (92%) reported radiographs were ordered based on a set time interval and/or were taken when no clinical disease was evident (91%). Approximately 54% took radiographs based on insurance reimbursement. Roughly 62% had not taken a dental radiology course within the past 8 years.

Conclusions: This study suggests that dental practices were not following the ADA/FDA radiographic guidelines. However, due to the low response rate, the results cannot be generalized to all dental practices. A national study will be conducted to determine whether the radiology practice trends observed in this pilot study is widespread throughout the U.S.

Technology

Efficacy of Total Mouthwash Compared To Pro-Health and Placebo Mouthwash

B. Stewart; M. Morrison; J. Miller; J. Chung, DMD, MPH; S. Pilch; A. R. Elias-Boneta; R. Ahmed

Purpose: The objective of the double-blind, randomized clinical study was to evaluate the

clinical efficacy of Colgate Total Mouthwash - 0.075% CPC (fluoride and alcohol free) and Crest Pro-Health Mouthwash - 0.075% CPC (fluoride and alcohol free) vs. a negative control mouthwash in controlling established dental plaque and gingivitis after six weeks of product use.

Methods: Subjects were randomly assigned to one of three treatment groups according to their baseline gingival and plaque scores. The three treatment groups were: (1) Colgate® Total® Mouthwash containing 0.075% CPC - fluoride and alcohol free (Test Group), (2) Crest Pro-Health Mouthwash containing 0.075% CPC - fluoride and alcohol free (Positive Control Group) and (3) Placebo Mouthwash - fluoride and alcohol free (Negative Control Group). After brushing, subjects were instructed to rinse their mouth with 20ml of their assigned mouthwash twice daily for thirty seconds.

Results: After 6 weeks of product use, the Test Group exhibited statistically significant ($p < 0.05$) reductions of whole mouth gingival (24.4%), gingival interproximal (25.0%), gingival severity (46.4%), whole mouth plaque (21.5%), plaque interproximal (20.1%) and plaque severity (25.4%) index scores as compared to the Negative Control Group. After six weeks of product use, the Positive Control Group exhibited similar statistically significant ($p < 0.05$) reductions vs. the Negative Control Group. After six weeks of product use, no statistically significant ($p > 0.05$) difference was observed between the Test Group and the Positive Control Group.

Conclusions: The results of this double-blind clinical study support the conclusions that (i) both mouthwashes containing 0.075% CPC - fluoride and alcohol free - provide a significant reduction in dental plaque and gingivitis after six weeks of product use and (ii) no statistically significant ($p > 0.05$) difference was observed between the two CPC-containing mouthwashes in controlling established dental plaque and gingivitis after six weeks of product use.

Funding provided by Colgate-Palmolive Company.

Clinical Investigation of Whitening Efficacy on Colgate Optic White Dentifrice

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Purpose: The aim of this two-cell, double-blind clinical study was to assess the intrinsic tooth whitening efficacy for (1) Colgate Optic White Toothpaste (1% H₂O₂ and 0.76% sodium monofluorophosphate), and (2) matching placebo (0% H₂O₂ and 0.76% sodium monofluorophosphate).

Methods: Baseline Mean shade guide scores (Vitapan Classical) among maxillary anterior teeth were calculated for each of the consenting participants 7 days after a professional dental prophylaxis procedure. Participants were then randomly assigned to brush twice daily (morning and evening) for 1 minute each time with either the test or placebo dentifrice. Mean tooth shade guide and soft tissue examinations were repeated after 1 and 4 weeks of assigned product use. All examinations were performed under the same lighting condition and by the same examiner.

Results: Eighty voluntary participants entered the study, complied with the protocol and completed the four-week clinical trial. Both study groups (test and placebo) were balanced for Vita shade guide scores and all participants had an A3 or darker mean shade score at the baseline examination. The mean tooth shade improvements after 1 and 4 weeks of product use were respectively 1.05 and 2.38 for the test group and, 0.09 and 0.23, for the placebo group. The test group demonstrated statistically significant ($p < 0.05$) whitening improvements of 0.96 in mean tooth shade as compared to the placebo group after 1 week of product use and 2.15 after 4 weeks of product use.

Conclusion: The clinical results demonstrate that the 1% H₂O₂ and 0.76% sodium monofluorophosphate dentifrice provides statistically significant intrinsic tooth whitening improvements in mean shade scores as compared to a matching placebo dentifrice after 1 and 4 weeks use.

Funding provided by Colgate-Palmolive Company.

Efficacy of Total Mouthwash Compared To Listerine and Placebo Mouthwash

P. Chaknis; J. Miller; M. Morrison, PhD; S. Pilch; B. Stewart; A.R. Elias-Boneta; R. Ahmed

Purpose: This double-blind, randomized clinical study evaluated the clinical efficacy of two commercial mouthwashes against a negative control mouthwash in controlling established dental plaque and gingivitis after six weeks of product use.

Methods: Subjects were randomly assigned to one of three treatment groups according to their baseline gingival and plaque scores. The three treatment groups were: Colgate Total Mouthwash containing 0.075% CPC - fluoride and alcohol free (Test Group), Listerine Mouthwash containing essential oils with 21.6 alcohol - fluoride free (Positive Control Group) and Placebo Mouthwash - fluoride and alcohol free (Negative Control Group). After brushing, subjects were instructed to rinse their mouth with 20ml of their assigned mouthwash twice daily for thirty seconds. Gingivitis and plaque assessments were conducted after six weeks of product use.

Results: After six weeks, the Test Group exhibited statistically significant ($p < 0.05$) reductions of whole mouth gingival (27.0%), gingival interproximal (27.9%), gingival severity (48.5%), whole mouth plaque (27.4%), plaque interproximal (24.5%) and plaque severity (30.6%) index scores as compared to the Negative Control Group. After six weeks, the Positive Control Group exhibited similar statistically significant ($p < 0.05$) reductions vs. the Negative Control Group. After six weeks, no statistically significant ($p > 0.05$) difference was observed between the Test Group and the Positive Control Group.

Conclusion: The results support the conclusions that (i) Colgate Total Mouthwash containing 0.075% CPC - fluoride and alcohol free and Listerine Mouthwash containing essential oils with 21.6 alcohol - fluoride free provide a significant reduction in dental plaque and gingivitis after six weeks vs. the negative control mouthwash and (ii) no statistically significant ($p > 0.05$) difference was observed between Colgate Total Mouthwash containing 0.075% CPC - fluoride and alcohol free and Listerine

Mouthwash containing essential oils with 21.6 alcohol - fluoride free in controlling established dental plaque and gingivitis after six weeks.

Funding provided by Colgate-Palmolive Company.

In Vitro Stain Prevention Efficacy of Commercially Available Whitening Dentifrices

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Purpose: To evaluate the stain prevention effects of four commercially available whitening dentifrices.

Methods: HAP discs were cycled through treatments to model daily exposure to toothpaste and stain components. HAP discs were treated with a 1:2 (w/w) dentifrice slurries made with Colgate® Optic White Whiten and Protect, a toothpaste containing 1% peroxide and a pyrophosphate system, Crest 3D White Luxe Glamorous White, a toothpaste containing disodium pyrophosphate, Rembrandt Deeply White + Peroxide, a toothpaste containing peroxide, and Colgate® Cavity Protection Paste, a toothpaste that does not contain peroxide or pyrophosphates. The discs were rinsed and baseline CielAB values measured with a spectrophotometer. Discs were cycled through three alternating exposures of a staining broth composed of coffee, tea, and wine (15 minutes), and saliva (20 minutes). CielAB measurements were recorded after the completion of each cycle. The HAP discs were treated with a 1:2 (w/w) toothpaste slurries and CielAB values measured. The change in whiteness before and after cycling is reported as ΔW^* . Analysis of variance was used to compare the mean ΔW^* values with $p < 0.05$ indicating significant differences.

Results: The dentifrice containing peroxide and pyrophosphate after cycle completion achieved a ΔW^* of 9.358 ± 0.330 , which is statistically significantly lower than the other tested dentifrices. The dentifrice containing pyrophosphate and the dentifrice containing peroxide produced ΔW^* values of 21.260 ± 0.681 and 21.738 ± 0.966 , respectively, and were not statistically different from each other. The toothpaste without peroxide or pyrophosphate gave a ΔW^* value of 32.172 ± 0.282 . This value represented statistically significantly more staining than the other three dentifrices.

Conclusions: In vitro testing demonstrated that Colgate® Optic White Whiten and Protect, a dentifrice containing a combination of 1% peroxide and pyrophosphates, provides superior stain prevention effects to other commercially available products.

Funding provided by Colgate-Palmolive Company.

Health Literacy/Cultural Competency

Avatar-Mediated Practice Scenarios to Evaluate Cross-Cultural Knowledge and Understanding

Tara Newcomb, RDH, MS; Joyce Flores, RDH, MS; Amy Adcock, PhD; Brett Cook, MS; Laurie Craigen, LPC, PhD

Problem Statement: Identified as a critical issue in dental hygiene education, to date there is no standardized assessment tool for cultural competence.

Purpose: The purpose of this study was to evaluate cross-cultural knowledge and understanding using avatar-mediated practice scenarios.

Methods: With IRB approval, 71 students from various mid-Atlantic community colleges, colleges and universities participated in this study. All materials and data collection instruments were embedded into an online computer-based instructional unit, which integrated instructional content, assessment items, and interview simulations into a seamless, dental hygiene environment. Participants were randomly assigned to one of the two groups: the experimental group received a pre-instructional unit, evaluation survey, knowledge posttest and culminating role play simulation and the control group did not receive the pre-instructional unit but completed the same other materials. Patient agent response was designed to be indicative of their culture.

Results: Using a One-way Analysis of Variance (ANOVA), results yielded an unexpected significant difference ($p < .01$) for the experimental group receiving both the pre-instructional and culminating role-play simulations. Formative evaluation on instructional content and simulation package were favorable. Participants were asked to rate the quality of instructional content, quality of

visual content, quality of audio content, and ease of use. A composite score for all categories yielded an average rating of 3.9 with a median of 4 and a mode of 5.

Conclusions: Instructional simulations mimicking real-world scenarios may be an effective means of instruction for complex and ill-structured diagnosis-solution problem types when participants are repeatedly exposed to the instructional simulation.

Health Behaviors

Systematic Review of Medical Providers' Knowledge and Attitude towards Oral Health Screenings for Children

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Student; Deanne Shuman, BSDH, MS, PhD

Objective: The incidence of Early Childhood Caries (ECC) remains a global concern; and affects a child's growth, development, cognitive and speech abilities. Unlike dental providers, medical providers such as pediatricians, nurses and physician assistants have more encounters with the mother and child during the first 12 months of life. Therefore, assessing the risk for ECC and educating mothers on establishing a dental home for the child should be encouraged among medical providers.

Search Strategy/Selection Criteria: Systematically review the literature of medical providers' knowledge and attitude towards oral health screenings for children.

Data Collection and Analysis: The literature was searched for articles published from 2000-2014 in the following databases: Pubmed, Medline, CINAL Plus Full Text, Cochrane Library. Inclusion criteria were: peer-reviewed journal articles of medical providers' knowledge and attitude towards oral health screenings for children, dental caries prevention, or caries risk assessments to children <6 years. The two researchers independently assessed quality and results of studies. Studies were organized according to specialty of the medical provider, type of study, sample characteristics, methodology and results.

Main Results: Preliminary results from the

databases used contained 819 articles to which 41 articles met inclusion criteria.

Conclusions: Medical providers' age, time of education, exposure to oral health training and the environment of medical practice influence the knowledge and attitude towards oral health screenings. Curricular modifications and continuing medical education (CME) courses pertaining to oral health education have been made in medical field to increase competency among providers.

Statistical Methods: Meta-analysis was not performed due to variations in methodology, research design and inferential statistics among studies.

Motivational Interviewing: Assessment of Dental Hygiene Students' Perceptions of Importance in Using and Confidence in Applying

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Problem Statement: Motivational Interviewing (MI) is an evidence-based, patient-centered counseling approach for eliciting behavior change. In 2012, the University of Michigan (U-M) Dental Hygiene Program significantly enhanced their Motivational Interviewing curriculum.

Purpose: The purpose of this study was to examine students exposed to the enhanced MI curriculum and assess both their perceptions of the importance of MI and their confidence in using it.

Methods: A convenience sample of 22 dental hygiene students receiving the enhanced curriculum from the U-M Class of 2015 participated in this study utilizing a retrospective pre-test/post-test design. A comparison group of dental hygiene students from the Classes of 2014 (28) and 2013 (25), who did not experience the enhanced MI curriculum, completed one of the post-tests. The U-M IRB approved this study as exempt.

Results: A t-test compared the Class of 2015 means and standard deviations reported for the importance and confidence questions. Students' perceptions of importance increased with statistical significance in five out of eight MI strate-

gies. Perceptions in confidence increased in seven out of eight strategies. Comparisons between the Class of 2015 and the Classes of 2013 and 2014 were analyzed using one-way ANOVAs. Significant cohort differences were found for importance with three MI strategies and for confidence with two MI strategies. Assessment of qualitative data provided additional insight on student experiences.

Conclusions: Class of 2015 student perceptions of importance of using and confidence in applying MI increased in a majority of the strategy categories. Successes with patient health behavior change and challenges with time to integrate this in practice were noted. Minor modifications in the curriculum have resulted. Research on longitudinal impact, utilization of individual strategies and faculty feedback calibration is recommended.

Funding for this project was provided by the U-M Center for Research on Teaching and Learning Faculty Development Grant.

The Role of Technologies in Promoting Periodontal Health

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Problem Statement: In order to improve our knowledge on the role of technologies (intra-oral camera, SMS and Gum Chucks) in dental hygiene appointments, we propose to investigate their predictive power in the Health Action Process Approach (HAPA), a self-regulation model of health behavior change.

Purpose: The aim of the study is to verify the applicability of the HAPA model in studying a sample of patients with gingivitis and the role of different types of technologies used in a dental hygiene appointment.

Methods: We are in the process of launching a four-wave longitudinal study for participants, patients with gingivitis, who will answer an online self-reported questionnaire, which will analyze their oral health behavior and the determinants of behavior proposed by the HAPA model (risk perception, outcome expectancies, self-efficacy, planning, and action control). Since the literature on dental hygiene behavior and on dental floss in particular has been criticized for being solely based on self-reported data collection, concrete clinical measures will be considered. Clinical data to evaluate the state of gingival health will be collected since, for instance, the fact that a person uses dental floss does not mean that its use is clinically effective. Thus, the data of Bleeding on Marginal Probing (BOMP) will enable the assessment of gingival health. The strategy for data collection, according to a quasi-experimental design, will be based on the use of qualitative and quantitative measures that will facilitate understanding the role of technologies in oral health behavior change.

Results: A multiple regression analysis will be performed to ascertain whether the use of technologies is among the best predictors of oral health behaviors.

Conclusions: We expect the study to help Dental Hygienists to decide when and what type of technologies to use in appointments on the basis of their role in health behavior change.