Implementation of STFM's "Smiles for Life" Oral Health Curriculum in a Medical School Interclerkship

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Background and Objectives: *While oral health is an important topic for medical education, it is often not covered in medical school. The Association of American Medical Colleges (AAMC) has recently set guidelines for oral health training in medical education. Our objective was to demonstrate how a mandatory interclerkship (half-day workshops taught between third-year clerkships) that covers pediatric, urgent care, examination skills, and prevention topics in oral health can lead to an increase in knowledge for medical students.* Methods: *Teaching methods included the use of interactive lectures, an audience response system, and small-group workshops taught by medical and dental educators. The curriculum was based on the Society of Teachers of Family Medicine (STFM) Smiles for Life National Oral Health Curriculum. Students were given pretests and posttests, including a 6-month follow-up test.* Results: *Students showed a significant improvement in knowledge between pretesting and immediate posttesting across a range of topics. Long-term knowledge retention was more limited. The majority of students reported enthusiasm for this topic and found the materials essential for their training.* Conclusions: *A brief interclerkship can improve medical students' oral health knowledge and be engaging. More research is needed to evaluate means to sustaining the knowledge.*

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The Surgeon General's Report on Oral Health in America stated that oral health is essential to the overall health and well-being of Americans.[1] While the Report states that poor oral health in America is improving, current trends indicate that the "silent epidemic" of dental and oral diseases continues to affect the country's most vulnerable citizens.[2]

An important objective outlined in the Reports' Framework for Action was the need to recognize "that all primary care providers can contribute to improved oral and craniofacial health." Studies reveal that medical conditions, such as certain cancers, heart disease, and diabetes, may manifest in the oral cavity.[3] Therefore, it is imperative that primary care providers play an integral role in promoting oral health prevention, education, and dental referrals for their patients who they often see multiple times before patients visit a dental professional (if they visit at all).[4]

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Despite these findings, oral health topics are still typically overlooked in most medical schools.[5] Results from a survey to assess the dental education of pediatricians and family physicians found that 59% of respondents did not receive any preventive oral health education during medical school, and overall 85% received less than 2 hours of training.[6] This trend continues despite the addition of oral health questions on the US Medical Licensing Exams (USMLE) Steps II and III.[7]

To address the need for oral health education of medical students, the Association of American Medical Colleges (AAMC) recently released a new Oral Health Education report as part of the Medical School Objectives Project (MSOP). The report promotes a "significant change in the curricula" to address "oral health disparities that can be aggravated by health professionals' lack of oral health knowledge."[8]

This paper outlines a required interclerkship program (workshops taught between third-year clerkships) in oral health for our medical students, held in collaboration with faculty and residents from our general practice residency in dentistry. Our objective was to demonstrate how a mandatory half-day oral health interclerkship taught by medical and dental educators covering pediatric, urgent care, examination skills, and prevention

topics is one strategy to increase oral health knowledge for medical students.

Methods

Our medical school has developed a third-year interclerkship program to address topics that are not well covered in the traditional core curriculum. The program involves half-day workshops that occur between the 6-week third-year clerkships. Covered topics have included health policy, chronic pain management, and domestic violence.[9,10] This approach of using short half-day sessions to address unique, neglected medical topics has also been advocated elsewhere.[11]

Learning Objectives

In January 2008, we implemented our first oral health interclerkship. The curriculum and learning objectives were developed in collaboration with our dental residency director and with a family medicine faculty member who had been involved in the development of the Society of Teachers of Family Medicine's (STFM) Smiles for Life program.[12] The Smiles for Life Curriculum is a comprehensive oral health curriculum for primary care clinicians created by family physicians from across the country. It includes PowerPoint presentations, test questions, and provider and patient resources. We chose to use the Smiles for Life curriculum because of its comprehensive and diverse coverage of topics. Our specific learning objectives are shown in Table 1.

Interclerkship Schedule

Pretest. To focus students' attention, we started with a pretest using an audience response system (ARS).[13] ARS allows learners to instantly answer questions with a handheld device. We could observe the number of respondents in real time to assure that everyone answered. Students were given approximately 20 seconds to reply to avoid sharing of answers. The distribution of responses, though not each individual's responses, can then be projected on a screen.

The initial ARS pretest included 10 multiple choice questions about the management of common dental conditions, normal anatomy, and photo diagnosis. The 10 questions were selected from the 60 questions previously published in the Smiles for Life Test curriculum.[12]

Lectures. Next we conducted two large-group half-hour seminars. The first was given by our dental residency director, and it covered basic dental pathophysiology. The second lecture, from a family medicine faculty member, focused on prevalence and oral implications for overall health. During these presentations, the ARS system was used episodically as a means of keeping the students engaged and to assess understanding.

Small-group Sessions. Next, we had the students rotate through five 20-minute practical, hands-on small-group sessions co-led by either a dentist or physician, accompanied by a dental resident. The topics covered in the small-group sessions are shown in Table 2.

Resources

The majority of the materials used for all of the teaching sessions and handouts were adapted from the Smiles for Life curriculum.[12] Students were provided with a resource book of relevant materials (slides, exam pearls) and laminated reference pocket cards for practical use.

Posttest/Summary/Evaluation. Prior to being dismissed, the students were given a repeat of the pretest (Posttest 1), again using the ARS system. The use of the ARS allowed us to make summary points and answer questions as we reviewed the test results. A standard paper-based course evaluation was also administered.

Six months later the students were also asked to voluntarily fill out a paper copy of the original ARS pretest (Posttest 2) at the beginning of an unrelated interclerkship. No other formal oral health curriculum was offered in the interim to the students in other rotations.

Data Analysis

Chi-square statistics were used to determine whether the percentage of correct responses differed between the pretest and posttests 1 and 2. All statistical tests were performed using the Statistical Package for the Social Sciences.

Table 1

Learning Objectives of the Interclerkship Course on Oral Health

1. Appreciate the effect of oral health on overall health
2. Understand how to approach/treat common dental emergencies
3. Learn how to conduct an oral exam of young children and adults to determine the need for dental referral
4. Understand basic dental pathophysiology and common oral lesions
5. Appreciate ways, from advocacy to in-office care, in which medical providers can have a positive influence on dental health

Results

Ninety-one students participated in the ARS pretest, though not all of the students completed every question. Eighty-eight of the 91 students present on the day of the course completed the course survey. Eighty-three of the students completed the ARS posttest (Posttest 1), though again, not all students completed every

Table 2

Topics Covered in the Small-group Sessions

Topic	*Mode of Instruction*
Adult oral examination	Short PowerPoint presentation; practice of physical exam
Pediatric examination and prevention	Case-based discussion with PowerPoint photos
Urgent care	Case-based discussions on infections, primary and secondary teeth injuries
Fluoride overview and varnish	Students apply varnish application on each other's teeth; short PowerPoint presentation
Oral health Web and local resources	Review Web sites, patient handouts

question; there was no pattern to which questions were missed. Seventy-three students completed the 6-month follow-up test (Posttest 2); however, three students responded that they had not been present for the oral health interclerkship so their answers were excluded.

Posttest 1 results demonstrated statistically significant improvement in all areas of tested knowledge (Table 3). Examples of these improvements included being able to identify caries (pretest 33%; posttest 85%; $P<.05$), identify the correct antibiotic choice for an oral infection (pretest 34%; posttest 70%; $P<.05$), and recall the correct number of teeth for primary dentition (pretest 14%; posttest 77%; $P<.05$).

Posttest 2 results showed a decrease in the students' knowledge from the first posttest, though there was still an increase in the knowledge from the pretest. However, for fewer items on posttest 2 did the students still show a statistically significant increase in knowl-

Table 3

Student Knowledge Results Pretest, Posttest, and 6 Months After the Interclerkship

	Pretest (n=91*)	***Posttest (Posttest 1) (n=83*)***	***6-month Posttest (Posttest 2) (n=70*)***		
Question	*% Correct (# Correct/Total)*	*% Correct (# Correct/Total)*	*% Correct (# Correct/Total)*	*Pretest to Posttest 1*	*Pretest to Posttest 2*
1. Normal # of adult teeth	65% (55/84)	95% (76/80)	77% (54/70)	<0.05	0.159
2. Normal # of teeth for a 3 year old	14% (13/91)	77% (62/80)	21% (15/70)	<0.05	0.329
3. Medication linked to gingival hyperplasia	88% (78/88)	97% (81/83)	94% (66/70)	<0.05	0.337
4. Medical condition linked to periodontitis	24% (21/86)	75% (62/83)	54% (38/70)	<0.05	<0.05
5. Identify early childhood caries (photo)	33% (28/85)	85% (67/79)	77% (54/70)	<0.05	<0.05
6. Negative oral effects of head and neck radiation	50% (44/87)	82% (62/76)	61% (43/70)	<0.05	0.231
7. Uncommon site for oral cancers	66% (59/89)	99% (80/81)	73% (51/69)	<0.05	0.391
8. Antibiotic choice for oral infection	34% (30/88)	70% (57/81)	49% (34/70)	<0.05	0.093
9. Negative effects of tongue piercings	67% (57/85)	99% (82/83)	91% (64/70)	<0.05	<0.05
10.0ptimal re-implant time for avulsed adult tooth	12% (11/90)	61% (51/83)	20% (14/70)	<0.05	0.261

* The students were given a fixed amount of time to answer each question during the pretest and initial posttest with an Audience Response System (ARS). If a student took too long to respond, their answer was not recorded. The 6-month posttest was a written paper test, and not all questions were answered by every student.

edge from the baseline test (pretest 1). Those items for which statistically significant changes persisted were being able to identify caries (pretest 33%; 6 months posttest 77%; $P<.05$), the negative effects of tongue piercing (pretest 67%; 6 month posttest 91%; $P<.05$), and a medical condition linked to periodontitis (pretest 24%; 6-month posttest 54%; $P<0.05$).

The standard course evaluation revealed student support for the curriculum. Ninety-nine percent of the students agreed or strongly agreed that they learned new knowledge and skills not taught elsewhere, and 97% felt that this was essential information for a physician to learn (Table 4).

Discussion

Based on pretest results, our students were lacking comprehensive oral health knowledge prior to our interclerkship, and knowledge improved after the course. But, there was a decline in knowledge by 6 months after the course. This decrease could perhaps be reduced with a curriculum that is interwoven into a variety of courses throughout medical school, to give students several opportunities to acquire and reinforce key messages, rather than given at just one point in time. There are, however, no studies on which to determine the best approach. Most of the literature addressing oral health teaching for physicians is based on residents and primary care providers.[2,14,15] One school has reported on the implementation of a "spiral" oral health curriculum addressing public health, oral cancer, caries, periodontal disease, and oral-systemic linkages across the 4-year experience.[16]

The AAMC has also suggested interprofessional collaboration, service learning, and experiential learning as a means to teach such curriculum.[8] We included such interprofessoinal collaboration in our school by including medical and dental faculty and by using sessions in the anatomy curriculum to address oral exam skills during the head and neck section of the first-year anatomy course.

It is possible that our approach might have applicability to residency training. Now that family medicine residencies are required to have a hands-on component in oral health,[17] and the American Board of Family Medicine certification examination includes questions on oral health, a curriculum similar to ours could be adapted to a half-day theme workshop for residents.

Limitations

Our study has several limitations that should be considered when interpreting the results. First, we administered the second posttest in a different format (paper), which may have allowed students more time to complete individual questions, and this could have affected results, though scores on the second posttest were lower than on the first.

Second, we did not evaluate clinical performance, skills, or attitudes; we only addressed knowledge. Clinical skills, performance, and attitudes could be assessed in the future with an objective structured clinical examination (OSCE) or questions on the tests that address these areas.

Conclusions

Our third-year interclerkship program used an ARS to engage our dental residency faculty and residents in teaching oral health topics to medical students. Evaluations demonstrated oral health knowledge gains and a well-accepted program. Because the knowledge gains were modest in their longevity, additional study is needed to determine how best to achieve longer lasting knowledge retention.

Table 4

Student Evaluation of the Interclerkship

This interclerkship experience….	*Disagree n (%)*	*Undecided/ No Opinion n (%)*	*Agree n (%)*	*Strongly Agree n (%)*	*Total n (100%)*
Integrated clinical, basic science, and psychosocial aspects	1 (1%)	7 (8%)	68 (77%)	12 (14%)	88
Provided new knowledge and skills not obtained elsewhere in medical education		1 (1%)	44 (50%)	43 (49%)	88
Focused on a topic essential to training as a physician		3 (3%)	62 (71%)	23 (26%)	88
Emphasized the role of physician as a patient advocate	1 (1%)	9 (10%)	60 (68%)	18 (21%)	88
Had an appropriate mix of lecture and small-group activities	1 (1%)	4 (5%)	51 (58%)	32 (36%)	88

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