Medical Students' Exposure, Knowledge, and Attitudes Towards Early Childhood Caries Etiology and Prevention

Hawazen Sonbol[1], Rawan ElKarmi[1], Suha Abu-Ghazaleh[1], Ahmad AlJafari[1], Darwish Badran[2]

Abstract

Aim

To evaluate the exposure, knowledge and attitudes of graduating medical students at the University of Jordan towards the etiology and prevention of Early Childhood Caries (ECC).

Methods

An anonymous 21-item survey was distributed to final year medical students at the Faculty of Medicine at the University of Jordan. The survey investigated exposure, knowledge and attitude regarding ECC, its etiology and prevention.

Results

Out of 186 questionnaires distributed, 118 were completed giving a response rate of 63%. The level of oral health knowledge was generally poor. Less than half of the students knew that brushing should begin with the appearance of the first baby tooth and only 15% knew that the first dental visit should be by the age of 12 months. More than half of the students were not familiar with fluoride varnish and its role in prevention (n=68) while 81% (n=96) did not know how fluoride varnish is applied.

Conclusion

The overall knowledge of graduating medical students at the University of Jordan about ECC etiology and prevention was poor. It is very important to improve the ability of medical students to diagnose caries, understand its etiology and give appropriate advice on its prevention

Keywords: Medical students' knowledge, Early Childhood Caries, Caries prevention.

(J Med J 2020; Vol. 54 (2):67- 78)

Received	***Accepted***
July 17, 2019	*May 3, 2020*

Introduction

Early childhood caries (ECC) remains one of the most prevalent diseases in children worldwide[1]despite increasing knowledge and evidence of the efficacy of preventive measures. Between 2007 and 2017, an estimated 64.6 million children younger than 36 months were affected by ECC; the mean ECC prevalence worldwide was 23.8% in children younger than 36 months and 57.3% in children aged 36 to 71 months[1]. Middle Eastern countries have shown high prevalence of ECC, and Jordan is no exception. Data regarding the prevalence of ECC in Jordan is

1.Pediatric Dentistry, Orthodontics and Preventive Dentistry, School of Dentistry, The University of Jordan.

2.School of Medicine ,The University of Jordan

**** Correspondence should be addressed to:***

Dr. Rawan ElKarmi (Corresponding author)

Rawankarmi@yahoo.com

limited. Most of the studies reporting prevalence rates are outdated and confined to selected areas of the country. In addition, there appears to be an inconsistency in diagnostic criteria of ECC and in sampling techniques.[2] However, the data available shows the prevalence to range from 48%[3] to 72%.[4]

Dental caries in young children is not life threatening, however; it has a major effect on a child's quality of life,[5] the wellbeing of parents.[6] In addition to the difficulty in managing caries in this young age group and the financial burden of its treatment.[7] The etiology of caries is multifactorial with biological, genetic, behavioral and social modifying factors. In Jordan, different studies investigated the association between ECC and associated risk factors.[2] For example, it was shown that children from families of lower socioeconomic status were at higher caries risk. Poor infant feeding habits, poor child eating habits, and inadequate oral hygiene practices were very common among Jordanian families, and were definitely associated with a higher caries risk.[3,8-10] Results of a recent study of expectant mother knowledge on caries prevention were not promising and showed no improvement over the past two decades.[11]

Caries is completely preventable. Prevention of caries includes oral hygiene instructions, dietary advice, fissure sealants and fluoride varnish application.[12-14] Education of parents and caregivers is also an important preventive arm and has been shown to reduce caries in young children.[15] Parental education should ideally start early in a child's life to be well established.[16] The age of 1 year for the first dental visit is the best time for anticipatory guidance, where parental education on all aspects of infant and child oral health care takes place.[17] Paediatric dentists and general dental practitioners are responsible for delivering preventive advice and educating parents about infant oral health care. Unfortunately, a small number of patients and parents are seen by paediatric dentists. Medical professionals are in a unique position to incorporate ECC preventive advice as they encounter young children regularly during the first 3 years of life. Efforts to engage physicians in oral health training and to incorporate applied components in training curricula may improve physicians' oral health knowledge and increase their confidence in conducting oral health screenings and caries risk assessments.[18] On the other hand, the lack of or inadequacy of education and training in child oral health represents a barrier for general physicians and pediatricians to play a role in preventing dental disease.[19-21] This is the first study assessing medical students' child oral-health related knowledge in Jordan. Therefore, the aim of this study was to evaluate the knowledge and attitude of graduating medical students at the University of Jordan towards ECC etiology and prevention.

Methods

This study was approved by the ethical committee of the School of Dentistry at the University of Jordan (Reference number 10/2016/133). An anonymous 21-item survey was constructed using a true-false and multiple-choice question format. The questions were developed by specialist pediatric dentists based on a past research,[20-21] as well as American Academy of Pediatric Dentistry (AAPD) policy statements and guidelines regarding caries risk assessment, perinatal oral health care, and infant oral health care.[22] The questionnaire was piloted by

20 medical students and changes according to their suggestions were made. The questionnaire was designed to obtain demographic information (age, gender) as well as investigating the following topics of concern:

- Exposure, clinical experience and ability to diagnose caries
- Knowledge about caries etiology and prevention
- Attitudes towards prevention of dental caries

The questionnaire was distributed following end of the year examination of 6th (final) year medical students at the Faculty of Medicine at the University of Jordan. One hundred and eighty-six final year medical students attended the exam. The students were given time to complete the questionnaire with the researchers available for any questions at the time. Questionnaires were collected on the same day. Data management was carried out using SPSS version 22 (SPSS Inc). Descriptive statistics and frequencies were analyzed for the topics of concern.

Results

Out of 186 questionnaires distributed to final year medical students, 118 were returned and completed correctly, giving a response rate of 63%. The mean age of the respondents was 24 years (min 22, max 27, SD 0.82). Sixty-five were males (55%) and 53 were females (45%).

Exposure, clinical experience and ability to diagnose caries

Thirty one percent (n=38) of the students read literature on dental caries, its prevention, and associated risk factors while only 13% (n=15) reported attending lectures or courses outside of formal medical training discussing dental caries and its prevention. More than half of the students were not familiar with fluoride varnish and its role in prevention (n=68) while 81% (n=96) did not know how fluoride varnish is applied. Fifty-one percent of the students (n=60) reported not noticing caries in children 5 years old and less in a clinical setting.

Knowledge about caries etiology and its prevention

Table 1 shows data regarding questions related to the knowledge about the etiology of dental caries. Seventy four percent of the students answered correctly that the frequency and amount of sugar should be reduced to prevent caries. Forty two percent did not know of the role of transmission of caries-causing bacteria from mother to child as a factor in caries etiology. The majority of students (81%) agreed that children should be supervised until the age of 7 years while brushing. Approximately half (49%) agreed that brushing should begin with the appearance of the first baby tooth. Only 15% identified correctly that the child's first dental visit should be by 12 months of age with 40% answered that the first dental visit should be at 6 years of age.

Attitudes towards caries prevention

To evaluate the students' attitudes towards promoting oral health, they were asked several questions related to examining a child patient. **Figure 1** shows the number of students that were likely or very likely to examine a child's teeth for cavities, counsel the parents on the importance of going to the dentist, counsel the parents on the importance of regular tooth brushing, assess the child's fluoride intake, and inquire about mother's dental health. Students were finally asked about their opinion

on promoting oral health as part of child care. **Figure 2** shows the number of students who agreed that routine child medical care should include several dental aspects.

DISCUSSION

Oral health is integral to overall health and essential for wellbeing. The close relationship between oral and general health, and its impact on an individual's health and quality of life, provides a strong argument for the integration of oral healthcare into general healthcare approaches, which is an accepted strategy based on existing evidence.[23] This study showed deficiencies in the knowledge and training of medical students in basic dental caries prevention in Jordan which may apply to similar settings. Only half of the respondents noticed caries in children less than 5 years old during their clinical rotations in the hospital. Given the high prevalence of ECC in Jordan and the fact that medical students are exposed to a large number of young patients from all around the country, this oversight is a major area of concern. The medical school curriculum at the University of Jordan does not include any formal training on ECC, its etiology or prevention. Similarly, the majority of pediatricians in Europe received training in oral health education through continued medical education and experience rather than in medical school curriculum.[21] The majority of interns in a medical school in Saudi Arabia (87.5%) rated their medical training as fair or poor in child-oral health and providing oral health assessments. [20]

Knowledge of the etiology of caries is an important part of any preventive program. Only one third of medical students in this study recognized that a child may acquire cariogenic bacteria from the mother although this has been documented in the literature for many years.[24] Moreover, only 30% of medical students in this study believed that prevention of dental caries begins during the prenatal or perinatal period. Oral health promotion initiated during pregnancy was successful in reducing early childhood caries.[25]

In general, medical students recognized the importance of causative factors and preventive techniques, but knowledge of the details of causes and methods of prevention was found to be inadequate. For example, although 74% believed the frequency and amount of sugar food and drinks should be reduced and limited to mealtimes, only one third correctly identified that not only bottle-fed children develop ECC. Only 30% believed that children should be weaned from the bottle at 12 months of age compared to 72% of 4th year medical residents in the United States.[26] Knowledge of the recommendations regarding oral hygiene procedures was lacking, with less than half agreeing that brushing should begin with the appearance of the first primary tooth.

The role of fluoride is one of the established areas of caries prevention.[14,27] Fluoride toothpastes significantly prevented caries in children and adolescents compared with placebo but only from a concentration of 1000 ppm F and above.[27] As a result, the recommended concentration of fluoride for caries prevention for children is 1000-1500 ppm with a smear of toothpaste recommended for children aged 3 years and younger, and a pea-sized amount for children older than 3 years to limit the risk of fluorosis.[12] In this study, 47% of medical students responded 'do not know' to the question on the recommended fluoride concentration in toothpastes for children 6 years and under.

Evidence supports the preventive effect of

fluoride varnish application in children and adolescents.[14] However, less than half of medical students were familiar with this concept, and only 19% knew how fluoride varnish is applied. Other studies have shown similar deficits in dental knowledge in both medical students[26] and pediatric primary care providers and paediatricians.[28,29] A little more than half of the respondents agreed that fluoride varnish application should be part of the routine well-child care. Although this was higher than than the 19% published on a national sample of pediatricians in the United States,[19] it is a concept that is simple to perform yet not emphasized in their medical education.

Researchers have reported that a majority of medical students, pediatricians and general dentists were not advising patients to see a dentist by one year of age.[19-20,30] This is especially important as a recent study has found that after 18 months of age there is a 'steep increase' in non-cavitated lesions in children, particularly in molar teeth, and at this time cavitated lesions start to appear.[31] Alarmingly 40% of respondents in this study believed the appropriate time for the first dental visit should be at age of 6 years, the time at which the permanent teeth are starting to erupt.

Generally, medical students' attitude towards promoting oral health and caries prevention was positive. It is encouraging that the majority of respondents agreed that oral health assessment and prevention should be a part of routine well-child care. More than half reported they would likely inquire about the mother's dental health, compared to 8% of the pediatricians in the United States.[28] Similarly, 85% of the respondents in this study were likely or very likely to give counsel on the importance of tooth brushing. However, there exists a gap between the community needs and level of knowledge and training of medical students in Jordan. With the high prevalence of dental caries in the region and the current preventive programs being inadequate,[3] it is has become clear that the burden of dental disease prevention should not be the sole responsibility of dentists. This is especially pertinent as health visits in medical offices are more common than dental visits for children aged 0-2 years and provide a unique opportunity to start preventive oral health care. Increasing training and knowledge in oral health for medical students is recommended to further develop the medical professions role in providing oral health care.[18] This may be achieved by adding an oral health component in the undergraduate medical school curriculum including an oral health rotation to allow physical examination and diagnosis of dental disease. Positive influence on medical students and physicians has been seen with collaborative programs between dental and medical schools.[18,32] For example, following incorporation of children's oral health in the medical curriculum at a university-affiliated hospital in Washington State, dental caries became the eleventh most common diagnosis seen in the clinic when, previously, it was not seen in the top 40 conditions.[32]

The present study has several limitations. Because it was a self-reported questionnaire, there is the potential for "social desirability bias" to affect the response of participants; where they may answer questions in a way to be seen favorably by others. This explains the high percentage of students answering likely or very likely to questions evaluating their attitude and opinions on promoting oral health which were not consistent with their

inadequate knowledge.

The fact that recruitment took place following a final exam when students were tired may have affected the response rate (63%) and the responses themselves.

In addition, students recruited were from one institution, so it may be difficult to generalize the results to other institutions in Jordan and the region. However, as the University of Jordan Medical Faculty is accredited by the ACCM (http://www.accredmed.org/accredited_schools/default.html) the general outline of the curriculum is similar to other accredited medical schools.[33]

Conclusion

This study highlights the deficiency in knowledge about ECC among medical students at Jordan University. Given the high rates of childhood caries in the country and the fact that medical health care providers are more likely to encounter children younger than 2 years of age, the inclusion of education regarding the infectious and transmissible nature of bacteria that cause childhood caries, methods of caries risk assessment, anticipatory guidance, and early intervention into the curriculum of medical programs is recommended.

It is important to educate medical students not only on the need for oral examination but also on the appearance of dental caries at various stages including early incipient lesions, cavitated and destructed teeth to allow the delivery of proper preventive advice as well as the provision of referrals to a paediatric dentist as needed.

Acknowledgements

The authors acknowledge the kind assistance of the faculty of medicine at the University of Jordan and medical students participated in the study.

The manuscript has been seen and approved by all authors involved and is not being published nor considered for publication elsewhere. The authors transfer all copyright and ownership to "Jordan Medical Journal".

"All authors have made substantive contribution to this study and/or manuscript, and all have reviewed the final paper prior to its submission."

"The authors declare no conflict of interest".

Ethical approval was obtained from the research ethics committees at the University of Jordan and in accordance with the ethical standards of the institutional and/or national research committee.

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Table 1: Responses to Knowledge Questions about caries etiology and its prevention (n=118)

Question	n (%)
The frequency and amount of sugary food and drinks should be reduced and limited to mealtimes	
True*	87 (74%)
False	14 (12%)
Do not know	17 (14%)
Only bottle-fed children get early childhood caries	
True	28 (24%)
False*	45 (38%)
Do not know	45 (38%)
Caries-causing bacteria can be transmitted between mother and child	
True*	38 (32%)
False	31 (26%)
Do not know	49 (42%)
Brushing should begin with the appearance of the first baby tooth	
True*	54 (46%)
False	38 (32%)
Do not know	26 (22%)
Children toothpaste (containing 500 ppm fluoride or less) is the best option for all children below 6 years of age	
True	50 (42%)
False*	13 (11%)
Do not know	55 (47%)

The amount of toothpaste on the toothbrush is not important	
True	31 (26%)
False*	66 (56%)
I don't know	21 (18%)
Fissure sealants are applied on permanent molars to prevent caries	
True*	27 (23%)
False	14 (12)
Do not know	77 (65%)
Brushing should be supervised by an adult up to age 7 years	
True*	54 (46%)
False	38 (32%)
Do not know	26 (22%)
Prevention of dental caries in children begins during the prenatal or perinatal period	
True*	35 (30%)
False	27 (23%)
Do not know	56 (48%)
Weaning a child from a bottle to a cup is recommended by age	
12 months*	35 (30%)*
18 months	40 (34%)
2 years	38 (32%)
No specific age recommended	5 (4%)
Establishing a dental home (see a dentist) is recommended by age	
12 months*	18 (15%)*
2 years	41 (35%)
6 years	47 (40%)
No specific age recommended	12 (10%)
Thumb sucking or non-nutritive sucking habits are recommended to be stopped by age	
12 months	40 (34%)
2 years*	36 (30%)*
3 years	10 (8.5%)
5 years	10 (8.5%)
No specific age recommended	22(19%)

*Correct answer (Evidence source for correct answers[12, 20, 21])

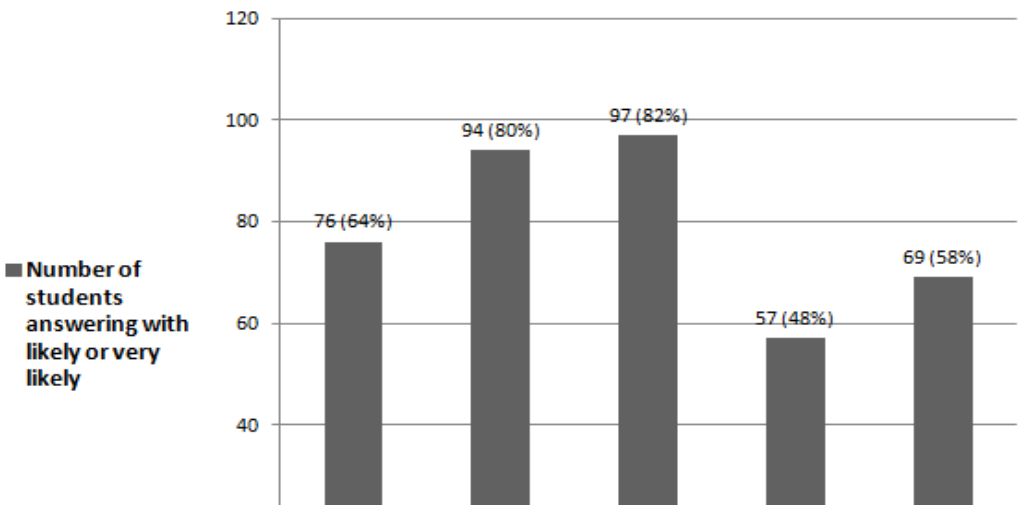

Figure 1: Attitudes towards promoting oral health (n=118)

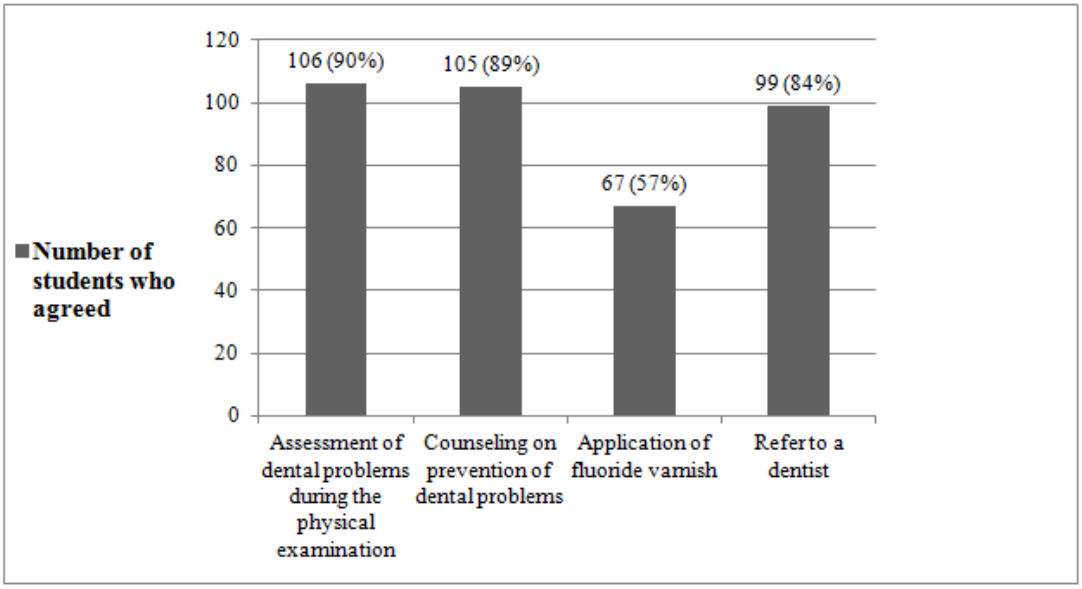

Figure 2: Opinion on promoting oral health as part of child care (n=118)

معرفة طلبة الطب وآرائهم بتسوس أسنان الأطفال المبكر وكيفية الوقاية منه

هوازن سنبل[1]، روان الكرمي[1]، سهى أبو غزالة[1]، أحمد الجعفري[1]، درويش بدران[2]

1 الجامعة الأردنية، كلية طب الأسنان، قسم طب أسنان الأطفال والتقويم، عمان، الأردن.
2 الجامعة الأردنية، كلية الطب،عمان، الأردن.

الملخص

الأهداف:

تهدف الدراسة إلى تحديد مدى معرفة طلبة الطب الخريجين في الجامعة الأردنية وآرائهم حول أسباب تسوس أسنان الأطفال المبكر و كيفية الوقاية منه.

طريقة البحث:

تم توزيع استبيان على طلبة الطب الخريجين في الجامعة الأردنية يحتوي على 21 سؤال، ويبحث في مدى معرفتهم وآرائهم حول تسوس أسنان الأطفال المبكر و كيفية الوقاية منه.

النتائج:

تم استكمال 118 استبيان من أصل 186 استبيان تم توزيعها على الطلبة مما يقدم نسبة استجابة 63% مستوى معرفة الطلبة بصحة الفم و الأسنان كان متدنياً بشكل عام، وأقل من نصف الطلبة علموا أن تفريش الأسنان يجب أن يبدأ مع بروز السن اللبني الأول و فقط 15% علموا أن الزيارة الأولى لطبيب الأسنان يجب أن تكون على عمر السنة، أكثر من نصف الطلبة لم يكونوا على علم بطلاء الفلورايد و دوره في الوقاية من التسوس و 81% من الطلبة لم يعرفوا كيفية تطبيق طلاء الفلورايد على الأسنان.

الخاتمة:

المعرفة الإجمالية لخريجي كلية الطب في الجامعة الأردنية كانت ضعيفة، ومن المهم تحسين قدرة طلبة الطب على تشخيص تسوس الأسنان و فهم مسبباته و إعطاء النصائح اللازمة للوقاية منه.

الكلمات الدّالّة:طلبة الطب، تسوس الأسنان المبكر،الوقاية من تسوس الأسنان.