

Awareness and Knowledge of the Prevention of Early Childhood Caries amongst Dental Students: A Cross-Sectional Study

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Abstract:

Background: Early childhood caries (ECC) is a serious public health issue that can start early in life, progresses quickly in those at high risk, and often goes untreated. Its consequences can have an immediate and long-term impact on the child and family's quality of life, as well as significant social and economic consequences beyond the immediate family. The aim of this study was to investigate the awareness and knowledge of dental students in measures to prevent early childhood caries (ECC).

Materials and Methods: A questionnaire describing interventions to prevent and manage ECC was distributed amongst 280 dental students and interns at the Gulf Medical University (Ajman) at year 2-5 of their study program. They completed 20 questions on sociodemographic characteristics, knowledge of care visits, teeth affected by ECC, causative factors, when tooth cleaning should be initiated, where to clean in the oral cavity and general attitude to pediatric patients. A score of 1 was assigned for a correct response. A score of 0 was assigned for an incorrect or "not aware" response.

Results: A total of 154 students responded and participated. Knowledge on when a child should first visit the dentist was deemed adequate. Just over half correctly identified the maxillary anterior teeth as the first to be affected by ECC. Reasonable levels of knowledge regarding risk factors for ECC development including bottle feeding, avoiding putting children to bed with juice or milk and prolonged use of a pacifier were demonstrated. A good level of knowledge of when to initiate cleaning a child's teeth, the benefits of fluoride toothpaste, the volume of toothpaste to be administered and dental sealants was also demonstrated. Knowledge of when to wean a baby from a bottle was moderate-to-low.

In summary, Gulf Medical University dental students show acceptable awareness of preventing early childhood caries, and a more focused approach is needed for better preparation in future practice.

Key Word: Early childhood caries; prevention; cross sectional study; teaching; dental students.

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I. Introduction

Early childhood caries (ECC) is defined as the presence of one or more cavitated or non-cavitated lesions in pediatric patients aged less than 71 months of age [1-4]. The main risk factors for ECC include frequent sugar consumption, lack of tooth brushing and enamel hypoplasia [5-7]. Contributing factors include sociopsychological and behavioral traits, including environmental and psychosocial stress [8, 9]. Clinical care and community-based school intervention programs can improve knowledge through preventive oral health care advice. A comprehensive and well-rounded teaching experience in pediatric dentistry is however critical to providing dentists the skills to treat ECC. Benchmarks such as the required number of patient exposures to achieve competency in patient care are however lacking [10-12]. The number and type of pediatric procedures completed by dental students varies depending on institute and location. It is universally accepted that students must develop methods to communicate with young children and their parents to identify risk factors for ECC development [13]. Preventive interventions such as fluoride application, dietary counselling and restorative treatments should also be understood [14-16]. Effective prevention strategies involve a combination of patient education and clinical interventions. These should be tailored to the individual needs of young children and their families. Preventive measures for ECC are initiated with prenatal counselling, which should be continued during the perinatal period, and involve both the mother and child [17]. Parents and caregivers should be educated on the causes of ECC and methods to avoid its occurrence. Nurses can offer counselling and support to children with ECC and can perform preventative initiatives for infants, toddlers, and their families. The aim of this study was to explore the level of awareness of infant oral health care and ECC among dental students in the Gulf Medical University. The major

research question was to investigate awareness of the preventive modalities for dental caries and ECC in pediatric patients.

II. Material And Methods

A descriptive cross-sectional study was performed amongst year 3-5 dental students and interns at the Gulf Medical University, UAE in February 2023. All students provided written informed consent form to participate and were informed of the study aims and use of data. The study population was limited to students enrolled in the Bachelor of Dental Surgery (BDS) program and dental interns at Gulf Medical University. Students (n=280) were invited to participate via email and WhatsApp.

Study Design: A descriptive cross-sectional study

Study Location: Restorative Dental Sciences Department/ Gulf Medical University, Ajman, United Arab Emirates.

Study Duration: The study will be conducted over a period of four to six months.

Inclusion Criteria: Students at Gulf Medical University and who have given the consent for the study.

- 1) Students in the 1st, 2nd, 3rd, 4th and 5th year of DMD
- 2) Dental Interns

Exclusion criteria:

- 1) Students pursuing masters
- 2) Diploma students

Sample size: 280 students.

Quality control

Two experts in pediatric and preventive dentistry read and approved the content of the questionnaire. A pre-questionnaire pilot study was performed to examine the feasibility of the approach for larger scale studies. The questionnaire was distributed to ten randomly selected students. Each student completed the survey and provided feedback on rephrasing and restructuring. The questionnaire was then modified according to any comments (Figure 1).

10.	What is the correct time to start cleaning a child's teeth?
A.	After the first dental visit
B.	After the eruption of all teeth
C.	Immediately after eruption of the 1st tooth
D.	When the child is 1 year old
11.	What should be used in cleaning babies' teeth?
A.	Gauze
B.	No need because it's self-cleaning
C.	Soft tooth brush and toothpaste
12.	Should gum pads be cleaned?
A.	Yes
B.	No
C.	Not aware
13.	Do you think fluoride dentifrice will help prevent dental caries?
A.	Yes
B.	No
C.	Not aware
14.	Do you think dental sealants will help prevent dental caries?
A.	Yes
B.	No
C.	Not aware
15.	Do you counsel children and parents about the importance of brushing?
A.	Yes
B.	No
16.	How much toothpaste do you use to brush your child's teeth from 3-6 years?
A.	A smear
B.	Should cover the entire surface of the toothbrush
C.	Pea-sized
17.	Is it acceptable to put a child to bed with juice/ milk?
A.	Yes
B.	No
C.	Not aware
18.	Is consuming sugary substances at once better than frequently through the day?
A.	All at once
B.	Frequent intakes
19.	Prolonged use of a pacifier can affect the normal development of a child's teeth
A.	Agree
B.	Disagree
C.	unsure
D.	Don't know
20.	Weaning from a baby bottle should be planned when the child's is?
A.	3 months
B.	6 months
C.	12-18 months

Figure 1

Study Questionnaire

Participating students completed 20 questions across 4 sections. Section 1 contained information on sociodemographic characteristics (age and gender); Section 2 assessed knowledge of pediatric patients, including care visits, teeth affected by caries and causative factors; Section 3 evaluated knowledge of when tooth cleaning should be initiated, where to clean in the oral cavity, and methods to prevent ECC; Section 4 assessed the students’ attitude to general pediatric patients and ECC. Responses were scaled to agree or disagree or “yes”, “no” or “not aware” answers. The final questionnaire consisted of 17 questions. A score of 1 was assigned for a correct response. A score of 0 was assigned for an incorrect or “not aware” response. A description of the frequency of the correct answers was made for each question. The proportion of correct answers was considered as a descriptor of all the respondents. Correct responses by over 65% of participants were deemed a high level of understanding.

Statistical analysis

Data were analyzed using SPSS (statistical package for social science) version 26.0 using SPSS Inc., Chicago, IL, USA. Qualitative data were recorded as percentages "n (%)." Data were compared using a One-Way ANOVA with Bonferroni’s analysis.

III. Result

Sociodemographic characteristics

A total of 154 students responded and participated. The mean age of the participants was 23 ± 116 6 years. Males accounted for 35.1% of participants, whilst 64.9% were female. Regarding the level of education, the highest proportion of respondents were year 5 (33.8%) and year 3 (32.5%) students (Table 1).

Table no 1: Sociodemographic characteristics of the study cohort.

Characteristics		No.	%	Total
Age	Less than or equal to 23 years	112	73.9%	152
	More than 23 years	40	23.7%	
Gender	Male	54	35.1%	154
	Female	100	64.9%	
Year	First	0	0%	154
	Second	1	0.6%	
	Third	50	32.5%	
	Fourth	34	22.1%	
	Fifth	52	33.8%	
	Interns	15	9.7%	
Program	BDS	137	89%	154
	Interns	15	9.7%	

Assessment of knowledge of pediatric patients, including care visits, teeth first affected by caries and causative factors

Regarding the timing and frequency of dental visits, most participants (42.2%) indicated that the first visit should occur within 12 months (Fig 2A). A large number of participants (70.1%) agreed that children should visit the dentist twice per-year (Fig 2B). A total of 57.8% of students correctly confirmed that maxillary anterior teeth are first affected by ECC (Fig 2C). In total, 73.9% believed that carbohydrates, bacteria, and the tooth itself were important factors during the formation of caries (Fig 2D). Of the participants, 90.3% believed that bottle feeding increases the risk of caries (Fig 2E). A total of 89.6% agreed that the first signs of tooth decay include white lines or spots on the tooth surface (Fig 2F).

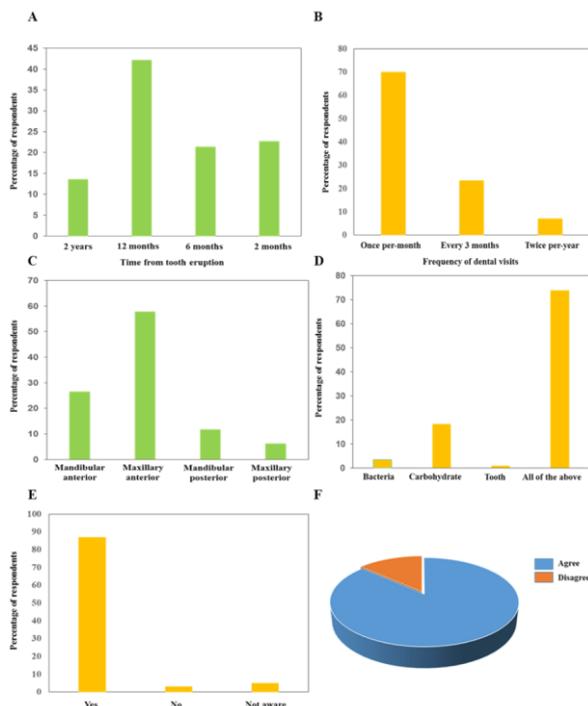


Figure 2

Knowledge of when tooth cleaning should be initiated, where to clean in the oral cavity and methods to prevent ECC

The majority of students showed a good level of knowledge regarding the prevention of ECC, with 70.1% agreeing that the correct time to initiate cleaning a child’s teeth is immediately after eruption of the 1st tooth (Fig 3A). A total of 94.8% agreed that fluoride can prevent caries development (Fig 3B). Most agreed that teeth should be cleaned with a soft toothbrush and toothpaste (61.7%) (Fig 3C). A total of 82.4% agreed that gum pads should be cleaned (Fig 3D). Most agreed that dental sealants can prevent dental caries (87.7%) (Fig 3E). A total of 92.4% correctly confirmed that parents should be counselled regarding the importance of brushing (Fig 3F).

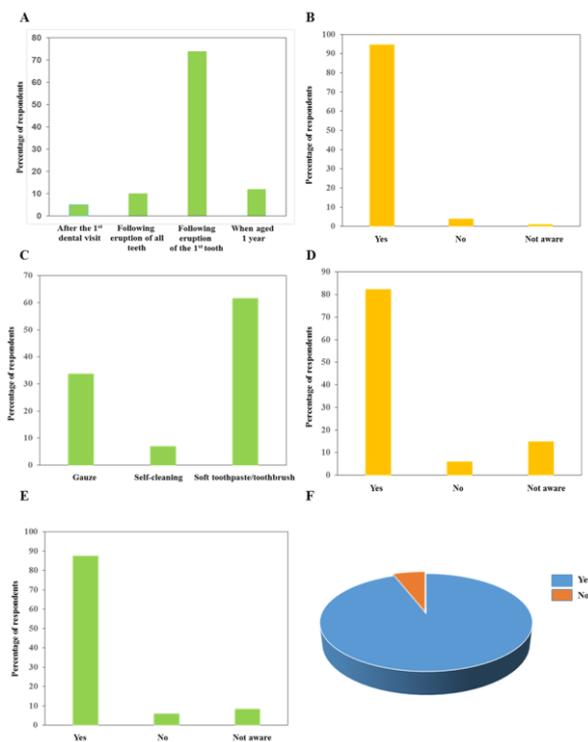


Figure 3

Student’s attitude to general pediatric patients and ECC

The results regarding the importance of brushing for children and parents were overwhelmingly positive. A total of 73.4% agreed that using a pea-sized amount of toothpaste for children aged 3-6 years was appropriate (Fig 4A). A total of 54.9% did not recommend putting a child to bed with juice or milk (Fig 4B). Most believed that consuming sugary substances frequently throughout the day was more detrimental than consuming them at once (81.8%) (Fig 4C). Nearly 85.6% agreed that prolonged pacifier negatively affected the normal development of teeth (Fig 4D). A total of 59.1% agreed that weaning from a bottle to a sipping cup should be planned between the ages of 12-18 months (Fig 4E).

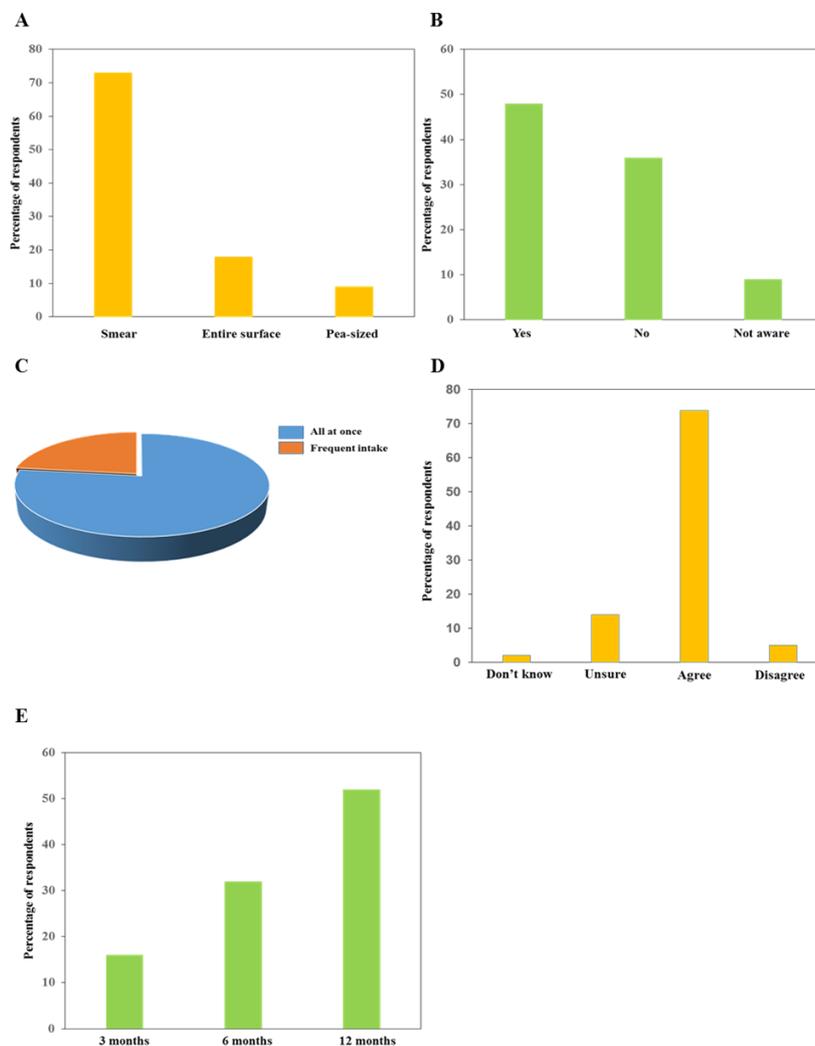


Figure 4

IV. Discussion

Early childhood caries (ECC) is a significant public health issue [12, 18]. The prevention of ECC and the maintenance of oral health represent major challenges in dentistry teaching [19-21]. This study assessed the awareness and knowledge of the prevention of ECC amongst 154 dental students at the Gulf Medical University.

The ADA recommends an initial visit to the dentist by 6 months of age when the first tooth erupts in the mouth, correctly identified by only 42.2% of students [22]. Most participants (70.1%) correctly identified that a child should visit the dentist twice a year and that the correct time to clean teeth in children was immediately after eruption of the 1st tooth.

In ECC, the maxillary incisors are first affected, followed by the maxillary then mandibular molars [23]. Due to the protective nature of the tongue, the mandibular incisors are often spared. Only 57.8% of participants correctly identified maxillary anterior teeth as first afflicted. A total of 89.6% of the participants correctly agreed that the first signs of tooth decay are white lines or spots on the tooth surface. This highlighted high knowledge levels in this area.

Of the students, 73.9% agreed that the most important factors in the formation of caries are carbohydrates and bacteria, collectively [24]. Regarding the contribution of bottle feeding 90.3% of respondents correctly identified its key role during ECC development [25-29]. Children under the age of 3 years should use a smear of fluoridated toothpaste when brushing. Children aged 3-6 years should use a pea-sized amount. Amongst the students, 61.7% agreed with this practice. This was significantly higher than the 17% reported in previous studies. The majority (82.4%) highlighted how gum pads should be cleaned to remove residues of either breast milk or formula to prevent the development of bacterial films. Opinion was divided on whether it is acceptable to allow a child to go to bed with juice or milk. Of the students, 39.2% deemed this acceptable, whilst 54.9% correctly did not recommend this practice. Some parents believe that juice or milk are healthier opinions than water. The majority of students, (81.8%), believed that consuming sugary substances at once was better than doing so frequently throughout the day. Regarding dental sealants, 87.7% agreed that they can prevent dental caries.

A total of 94.2% agreed that it is important to educate children and parents regarding the significance of brushing. Most students (85.6%) correctly identified that the prolonged use of a pacifier affects the normal development of a child's teeth. This aligns with recommendations from both dental and medical professionals [26, 27]. Over half of the respondents (59.1%), believed that weaning a child from a baby bottle to a sipping cup should be planned when the child is aged between 12-18 months. This has been shown to help prevent dental problems [29]. A total of 94.8% of students showed knowledge that fluoride can help in the prevention of caries.

V. Summary and Recommendations

In summary, the present study at the Gulf Medical University study indicates that dental students possess acceptable awareness and knowledge regarding preventing early childhood caries in pediatric patients. However, there is an opportunity to enhance their preparedness for future practice through a more targeted approach. Some limitations should be noted. The study was performed at a single institute which may have affected the generalizability of our findings. Our findings were however comparable to the awareness and knowledge of dental students worldwide and therefore hold importance for the prevention of ECC. The study was cross-sectional and performed in undergraduate dental students and interns predominantly in years 3-5. The different levels of experience and knowledge of these year groups likely led to variability in the data and subgrouping according to the year of study may hold value in identifying when targeted teaching approaches should be introduced into the curriculum.

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