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Knowledge of Infant Oral Health and Early Childhood Caries Among Undergraduate Dental Students in Penang, Malaysia

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Abstract

Aim: The purpose of this study was to assess the knowledge possessed by dental students of Year 3, 4 and 5 at Penang International Dental college, regarding early childhood caries and infant oral health.

Methodology: Two hundred and twenty-three students were evaluated. A self-administered validated questionnaire was used to assess the knowledge on infant oral health and early childhood caries among the dental students in 3rd, 4th and 5th year. Data analysis was carried out using the tests in SPSS for comparing the knowledge scores between the 3rd year dental students and 4th and 5th year dental students.

Results: The mean percentage score obtained by the sample was 66 % which the researchers consider satisfactory as per the benchmark set by the researchers. There was significant difference in knowledge between years 3. 4 and 5 pertaining to infant oral health and early childhood caries ($\rho<.05$). There was also a statistically weak and positive correlation between year of study and the level of knowledge pertaining to early childhood caries and infant oral health as the relationship was still found to be significant ($\rho<0.05$).

Conclusions: 4th year students had a comparatively better knowledge of infant oral health and early childhood caries as compared to 5th and 3rd year students.

Keywords: Infant Oral Health; Early Childhood Caries; Undergraduate Dental Students

Introduction

Early childhood caries (ECC) is a significant socio-behavioral and oral health problem that affects infants and toddlers. [1] According to American Academy of Paediatric Dentistry (AAPD), the disease of early childhood caries (ECC) is the presence of 1 or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. In children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC). From ages 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of ≥4 (age 3), ≥5 (age 4), or ≥6 (age 5) surfaces constitutes S-ECC [2].

AAPD recognizes that infant oral health is one of the foundations upon which preventive education and dental care must be built to enhance the opportunity for a lifetime free from preventable oral disease. The AAPD proposes recommendations for preventive strategies, oral health risk assessment, anticipatory guidance, and therapeutic interventions to be followed by dental, medical, nursing, and allied health professional programs [2].

Seow WK, proposed a unifying conceptual model for ECC, showing the connection between social, environmental, maternal and child factors apart from key factors in the development of ECC such as repeated exposure of carbohydrate, duration of feeding habit (frequency, during the day or night and age of the child), microorganisms and the protective factors [3,4].

However, for the purposes of this study, the definition as provided by AAPD will be adopted.

The implications of ECC entail a higher risk of new carious lesions in both primary and permanent dentition. It may require hospitalizations and increased treatment expenditure. There is also the risk of delayed physical growth and development, loss of school days with restricted activity, diminished oral health which may even jeopardize the quality of life and in fact cause psychological distress to the parents [2,3].

It was found that the prevalence of ECC in the South Indian population ranges from 19.2% to 63.2%, with high prevalence as age increases from 2 to 5 years [5,6]. The findings in South India also apply to Malaysia due to dietary similarities particularly in regards to the consumption of carbohydrate and sugary stuff.

Not all dentists are adequately trained to handle children and many general practitioners are not keen to treat young children [7]. Treatment necessitates extensive rehabilitation under general anesthesia and recurrence rates of caries are high, thus requiring retreatment [8].

Hence the dental profession favours a preventive approach towards management of ECC [9]. The earliest form of prevention can be achieved by educating parents and primary caregivers about ECC. Preventive guidelines towards ECC are found in many countries and most have their own individualized programs, which aim at training parents to recognize ECC early and seek treatment. Anticipatory guidance is one of the approaches used at antenatal visits and for new mothers [10]. Pediatricians and family physicians have the opportunity to improve and motivate the oral health of children due to their early and frequent contact during well-child and chronic condition visits [11].

Oral health surveys of 5-year-old and 6-year-old pre-school children in Malaysia showed a high caries prevalence of 76.2% and 74.5% in 2005 and 2007 respectively [12]. With the existence of the preschool program since 1984 [13] and the program for antenatal mothers since early 1970's [14] among other strategies, Malaysia aimed to achieve its objective of 50% caries- free 6-year-olds by 2020. [15] Hence, it is important for general dentists to possess knowledge and sound attitude towards preventing early childhood caries and providing infant oral health care.

Aim:

The purpose of this study was to assess the knowledge possessed by dental students of Year 3, 4 and 5 at Penang International Dental college, regarding early childhood caries and infant oral health.

Research Methodology

All students from Years 3, 4 and 5 were invited to participate in the study. Hence, a total of 233 respondents were included, comprising 86 students from Year 3, 68 from Year 4 and 79 from Year 5. A self-administered validated questionnaire was used to assess the knowledge on infant oral health and early childhood caries among the dental students in 3rd, 4th and 5th year. Google forms were used to administer the questionnaire, which was designed as a case-based format and was validated prior to conducting the study. The data was collected by members of the research team. Implied consent was used to collect data,

i.e., those who wish to participate could proceed to complete the questionnaire. The surveys were anonymous and all the information from the questionnaire was kept confidential.

The questionnaire of this study consisted of a total of 14 questions. The content of the questionnaire was based on the recommendations set by the American Academy of Paediatrics (AAP), and comprised of fourteen questions interspersed among the following domains: Oral Health Index, Feeding, Early Childhood Caries and Fluorides. The questionnaire followed the best answer among three options formats, and responses were measured as correct or incorrect.

Inclusion criteria:

Undergraduate students of year 3, 4 and 5 studying at Penang International Dental College.

Students willing to participate in the study.

Exclusion criteria:

Students unwilling for usage of their data in the study.

Data Analysis & Results:

Data was collected based on the respondents' feedback as shown in the questionnaire. The data collected was analyzed using the Statistical Program for Social Sciences (SPSS) (v.22). Descriptive statistics, ANOVA test and inferential statistics in the form of Correlation Analysis and Regression were used. Significance level was fixed at $p < 0.05$

The mean percentage score obtained by the sample was 66 %, as shown in Table 2, which the researchers consider satisfactory as per the benchmark set by the researchers (60%). There was significant difference in knowledge between years 3. 4 and 5 pertaining to infant oral health and early childhood caries ($\rho<.05$). There was also a statistically weak and positive correlation between year of study and the level of knowledge pertaining to early childhood caries and infant oral health as the relationship was still found to be significant ($\rho<0.05$).

The sample of 233 respondents comprised 86 year 3 students, 68 year 4 students and 79 year 5 students. The respondent rate of our study was 100%, as all students willingly participated in our study.

Table 1: Profile of Respondents

Respondent's Profile		Frequency	Percentage
Year of study	Year 3	86	36.9
	Year 4	68	29.2
	Year 5	79	33.9
	Total	233	100

Table 2: Respondents' Knowledge of Early Childhood Caries and Infant Oral Health

Caries and Infant Oral Health Knowledge	Mean	Maximum Possible Mean	Mean Percentage Against Maximum	Median	Median	Std. Deviation
	92.4	140	66%	100	100	18.2

Table 2 shows the mean score for the respondents' knowledge of early childhood caries and infant oral health. The mean obtained by the sample was 92.4. The mean percentage computed against the maximum is 66%. In this study the mean percentage is considered satisfactory if the mean score obtained exceeds 60%, which is the benchmark fixed by the researchers for the purposes of this study. It is a self-developed definition for the purposes of this study.

In Table 3, the ρ value for all the comparisons is less than 0.05. Therefore, the difference in knowledge between years 3, 4 and 5 pertaining to infant oral health and early childhood caries was found to be significant.

Table 3: ANOVA Readings Showing Significant Differences in Knowledge between Years 3, 4 and 5

α= 0.05				
(I) Year of study	(J) Year of study	Mean Difference (I-J)	Std. Error	Sig. (ρ value)
Year 3	Year 4	-19.72298*	2.66246	.000
	Year 5	-8.07183*	2.55685	.005
Year 4	Year 3	19.72298*	2.66246	.000
	Year 5	11.65115*	2.71404	.000
Year 5	Year 3	8.07183*	2.55685	.005
	Year 4	-11.65115*	2.71404	.000

A*. The mean difference is significant at the 0.05 level

Table 4: Means of Knowledge Score of Years 3, 4 and 5

Year	N	Mean	Std. Deviation
3	86	83.95	17.03
4	68	103.68	14.03
5	79	92.03	17.57

Table 4 shows the following:

The mean of the knowledge score of Year 3 is 83.95. Whereas the mean for those in Year 4 is 103.68. While for those in Year 5, the mean is 92.03. The three means were subjected to ANOVA analysis to find out if there existed significant differences between them.

The data above shows that there is a general increasing trend from year 3 to 5. The mean is highest for those in Year 4, which is probably because Year 4 is when students encounter the subject and are assessed for it, therefore their knowledge of the subject matter would be very fresh.

Discussion

This study was made for the purpose of assessing the level of knowledge regarding early childhood caries and infant oral health among dental students.

The respondent rate was 100%, as all our students willingly participated in the study. This was probably due to the fact that the questionnaire was provided using an online platform in the form of a quiz, which sparked curiosity and excitement, and the anonymity of students was ensured, which made the students comfortable and at ease. The students from each year were asked to fill out the questionnaire using their mobile phones in the time interval between their regular daily lectures. Hence, full participation from all years was recorded.

The subject of Pediatric Dentistry is taught for dental students in Years 3 and 4, with the final assessment conducted in Year 4. The information disseminated to students broadly encompasses the following topics:

Growth & Development, History Taking, Examination, Diagnosis and Treatment Planning, Child Psychology and Behavioral Management, Child Abuse And Neglect, Development Of Occlusion, Dental Caries And Early Childhood Caries, Preventive Dentistry, Preventive And Interceptive Orthodontics, Restorative Dentistry, Pediatric Endodontics, Trauma, Dental Care For The Special Children, Soft Tissue Oral Lesions In Children & Minor Oral Surgical Procedures In Children

It is heartening to note that the level of knowledge regarding early childhood caries and infant oral health among dental students of each year in PIDC was satisfactory. In addition, presence of significant difference between year 3, 4 and 5 regarding early childhood caries and infant oral health was also observed. However, 4th year students were found to possess the highest knowledge among the three years, which is probably due to the lectures being conducted in that particular year.

It is interesting to note that in contrast to our study, Ahamed et. al. (2015) found that oral health knowledge, attitude and behavior including knowledge of infant oral health and early childhood caries was better among the more senior students. Their study showed that there was a gradual improvement in dental undergraduates' knowledge from the 3rd to the 5th year. However, they too suggested that dental knowledge particularly concerning children should be further improved in order to serve the community better.

This study also provides hope in that it shows that the Pediatric Dentistry subject taken during year 4 produced satisfactory results, as the results portrayed a significant difference between the year which included this subject (year 4) and the years which did not (year 3 and 5). These findings indicate relatively important curriculum and pedagogical implications which curriculum planners and institutional heads need to be aware of.

The other implication that this study brought forward was that year 5 students need more attention when it comes to Pediatric Dentistry. It is mandatory that all dental students be well-equipped with knowledge of early childhood caries and infant oral health right from their undergraduate days so that they would prove more useful in doing their part in community dentistry, and also to play an important role in society in maintaining infant oral health and preventing early childhood caries.

The onus is on dental students to equip themselves with essential knowledge on early childhood dental problems in order to play a useful role in ensuring the dental health of children of the community.

Limitation

The study was done in the only dental school in Penang among 233 clinical year students of Year 3, Year 4 and Year 5. So, the findings cannot be generalized to the context of all dental institutions in Malaysia. Results depended on the sincerity and honesty of the participants.

Recommendation

In order to retain the knowledge that students have learnt in Year 3 and 4 regarding infant oral health and early childhood caries, some recommendations are to be made here.

Year 5 students can be asked to take up one pedodontic case each, & a discussion with the parents of pediatric patients can be arranged by the students on ways to care for their child's teeth. This will allow students to refresh their knowledge as they prepare the script.

Conclusion

It is important for the students, especially the soon to be graduating Year 5 students, to be able to retain the knowledge learnt regarding Pediatric Dentistry in Year 4. A dental visit at an early age has potential benefits; young patients and parents will be given positive reinforcement and the correct information so that they will take initiatives to take control of their oral health, rather than being told what to do which will instill positive dental attitude in both the parties. This will greatly affect their oral health status positively as they age. However, this study showed a drop in the knowledge level of the Year 5 students compared to Year 4, which is understandable, as they are not seeing pediatric patients on the regular. This suggests a need for paying attention to the structure of the clinical program, particularly at the point of transition from Year 4 to Year 5 in order to make necessary amendments in reviewing the dental syllabus to improve the retention of early childhood caries and infant oral health care knowledge.

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Questionnaire

1. At what age should the baby be brought to the dentist for the first checkup? *

a) 10 points
b) 3 months after the first birthday
c) 6th-12th month
d) After 5 teeth erupt in the oral cavity

2. When will the baby's first milk tooth usually erupt in the mouth? *

a) 4-6 months
b) 7-9 months
c) 1-3 months

3. Spacing between children's baby teeth is important because: *

a) It allows enough room for the bigger, permanent teeth
b) It allows for easy cleaning of teeth
c) It looks aesthetically pleasing

4. How should an infant's gum pads be cleaned? *

a) With a soft toothbrush and toothpaste
b) Using a finger and toothpaste
c) Soft washcloth or soft toothbrush

5. How much fluoridated toothpaste is advised for children 2-6 years of age? *

a) The entire length of the toothbrush

b) Half the length of the toothbrush

c) Pea sized amount

6. The best way to teach a child to brush unsupervised: *

a) Brush in circular motion on all surfaces of tooth
b) Brush in horizontal motion on all surfaces of tooth
c) Brush in vertical motion on all surfaces of tooth

7. Tooth brushing should be supervised by parents/ caretaker until the child is: *

a) 6 years of age
b) 3 years of age
c) 9 years of age

8. Bottle feeding should be discontinued by the age of: *

a) 5-8 months
b) 9-12 months
c) After 18 months

9. The child should be encouraged to start drinking from a sippy cup by theage of: *

a) 6-7 months
b) 12-14 months
c) 16-18 months

10. The tooth which is generally first affected by dental caries: *

a) Maxillary incisors
b) Mandibular incisors
c) Maxillary canines

11. Children at high risk for caries are all except: *

a) Children whose mother or primary healthcare giver has cavities
b) Children with special healthcare needs
c) Children bottle fed till 12 months of age

12. Which among the following pictures depicts the earliest sign of dental caries? *

a) Option 1

b) Option 2

c) Option 3

13. Fluoride varnish may be applied for children with high caries risk: *

a) Every 6 months
b) Every 3-4 months
c) Once a year

14. Which among the following sentences does not hold true? *

a) Following fluoride varnish application, do not brush the child's teeth till the next day

b) The child can eat and drink immediately after varnish is applied, but should avoid hot liquids

c) Fluoride varnish can be applied to the child's teeth by a parent or caretaker at home