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Dental Caries Scenario among 5, 12 And 15 Years Old Children Attended Universiti Teknologi MARA Dental Clinic: Nine Years Retrospective Study

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***Abstract*—Objective: To identify the dental caries scenario in children age 5, 12 and 15 attended UiTM dental clinic from 2008 – 2016. Methods: Records of patients treated at the clinics during a ten year period were evaluated. Patients with caries records in deciduous teeth were included in the study. A table was prepared in Excel spreadsheet to extract the data. The data was searched for dental caries prevalence in index age group (5, 12 and 15 years old) separately and following data was extracted: age, gender, years and DMFT index. The database was set up in Microsoft Office 2010 Excel, was submitted and analyzed in the Statistical Analysis Systems program (SPSS 23) using Pearson Chi-Square analysis. The significance level for all the analysis was set at P<0.05. Results: There is a significant difference in the prevalence of caries of 9 years data collected (P=0.048). The highest percentage of caries prevalence (68.1%) was observed in year 2010. Meanwhile the lowest percentage of caries prevalence (56.4%) was observed in year 2013. The mean for DMFT in 2010 was 3.62 (σ = 4.019) while in 2013 the mean for DMFT was 2.82 (σ = 3.873). Caries prevalence in 2008 was 60.5% (σ = 2.093); while in 2016, it was 57.6% (σ = 4.360). Conclusion: The results showed that the prevalence of dental caries was fluctuating throughout the years, which would indicate that there is a need for improvement in the oral health service and more strategic preventive measures must be implemented.**

***Index Terms*—Dental caries, prevalence, children.**

I. INTRODUCTION

One of the most prevalent oral diseases is dental caries where there is no evidence of any geographic area in the whole world that is spared from dental caries. It is one of the most common diseases affecting the children[1], both males and females, and cause pain and discomfort. Dental caries is a major health problem in most countries, affecting 60-90% of school aged children.[2].Apart from causing pain and discomfort, untreated dental caries might give negative effects on children's social life such as speaking, playing, eating, sleeping and also school's activities.[3] The prevalence of dental caries among children in Malaysia is 70-90%.[4] In the last couple of years, there has been increased in prevalence of caries among the children. This is contributed by dietary intake, oral health behavior, oral hygiene practices and also lifestyle habits.[4]The frequent intake of sweets and poor oral hygiene increase the chances for cavities to form. Deposition of dental plaque on tooth surfaces plays a big role towards presence of dental caries.[5] This is due to Streptococcus mutans that undergo fermentation after the intake of fermentable carbohydrates.[5] They will produce abundant amount of acids and lower the pH to a level where minerals of enamel and dentine will dissolves.[6]

More than half (55.8%) of the children had 3 or more deciduous teeth affected by caries and more than a quarter (25.3%) had dmft > 10 and dental caries prevalence for the 12-year-olds in Peninsular Malaysia declined from 78.4% (1970/71) to 71.3% (1988) to 57.1 % (1997).[7-8] Oral Health Division, Ministry of Health, Malaysia had formulated the National Oral Health Plan, by the year 2020, 50% of 6-year-olds are caries-free and had dmft ≤ 2; 70% of 12-year-olds are caries-free and had DMFT ≤ 1; 50% of 16-year-olds are caries-free and had DMFT ≤ 2.[9] In an effort to achieve this goals, several oral health preventive programs have been introduced that aims to improve the dental health of the public especially the school aged children.[10] According to annual report in 2015 by Malaysian Ministry of Health, the government continues their effort to educate the public on the oral health by organizing various health campaigns, exhibitions, media slots and also collaborating slots.

II. METHODS

The study started in January 2018 and completed in April 2019. The present cross sectional retrospective studies was reviewed and approved by UiTM Dental Faculty Sg Buloh. Records of patients treated at the clinics during a nine year period (2008-2016) were evaluated. The clinical examination criteria employed was the DMFT Index for caries.

The study population consisted of children age 5, 12 and 15 years old. The data was collected only from the cases presented at UiTM dental clinic. The collected variables were age, gender and DMFT index.

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A table was prepared in Excel spreadsheet to extract the data. The data was searched for dental caries prevalence in index age group (5, 12 and 15 years old) separately and following data was extracted: age, gender, years and DMFT index.

These age group children were presented to the clinic with either primary, mixed or permanent dentition excluding the third molars as it is not erupted yet at this age. This index scores for each children were computed for primary and permanent teeth. Data was verified and subjected to statistical analysis.

A. Statistical Analysis

The studies satisfying the following criteria were included:

• Cases from 2008-2016
• 5, 12 or 15 years old children
• Dental caries assessed by DMFT/dmft index

Data of patient from year 2008-2016 were collected from the system of UiTM dental clinic.

The database was set up in Microsoft Office 2010 Excel, and was submitted to be analysed in the Statistical Analysis Systems program. Descriptive statistical analysis was based on calculating central trend measures – such as mean and median and of variability – standard error and standard deviation for the variables prevalence and severity of dental caries in primary, mixed and permanent teeth and need for treatment, according to age group.

This study is using a single proportion of sample size calculations with formula:

$$n = \left(\frac{z}{\Delta}\right)^2 p(1-p)$$

P = expected proportion of individuals in the sample with the characteristic of interest at the determined 95% confidence interval. It can be obtained from literature / pilot study / preliminary work

Δ = precision (generally at 0.05, but can be adjustable to achieve affordable, feasible & statistically meaningful sample size)

Z = 1.96 when □=0.05

The significance level for all the analysis was set at P<0.05.

Setting and study population:

For convenience purposes, participants in this study were drawn from all children aged 5, 12 and 15 that visited UiTM dental clinic. We particularly focused on this age group as it is the WHO recommended index age.

B. Data Collection

Dental caries experience among the participants was assessed using the Decayed, Missing and Filled Teeth (DMFT) index, which is a measure of life time dental caries experience in permanent dentition. Clinical oral examination of the children was performed by dental officer on duty.

C. Ethical Consideration

The study was reviewed and approved by the University Teknologi MARA, UiTM, Malaysia.

D. Procedure in obtaining patient's folder

In order to gain an access to patients' files and their data, ethics approval letter was obtained from the Ethics and Research Committee of UiTM. To protect the patient's confidentiality, it was decided not to bring the folders out of the faculty and do not disclose any of the patient's information aside from the data that we need.

III. RESULTS

A total of 1079 children information files were checked at the Faculty clinic in this study. Of these, 634 children (58.8%) were girls. All of the children were at age of either 5, 12 or 15 years old. 382 (35.4%), of the data collected were from age 5 years old. 276 (25.6%) were from 12 years old children and the rest were from the age group of 15 years old.

A. Figures and Tables

TABLE 1: Frequency distribution by age

AGE	5 YEARS OLD	12 YEARS OLD	15 YEARS OLD
N	382	276	421
Mean	5.22	1.98	1.78
Standard Deviation	4.861	2.604	2.638
Percentage (%)	72.8	53.6	49.4

TABLE 2: Frequency distribution by year

YEAR	N (Total Attendee)	DMFT Mean (SD)	Percentage N (%)
2008	43	1.95 (2.093)	60.5
2009	27	2.78 (2.819)	66.7
2010	47	3.62 (4.019)	68.1
2011	75	3.07 (3.860)	57.3
2012	107	2.53 (3.263)	57.9
2013	149	2.82 (3.873)	56.4
2014	194	3.51 (4.282)	61.3
2015	265	2.96 (3.912)	57.0
2016	172	3.35 (4.360)	

TABLE 3: Frequency distribution of the study subjects according to dmft/DMFT

NATURE OF TOOTH	FREQUENCY	PERCENTAGE (%)
Decayed	571	52.9
Missing	37	3.4
Filled	214	19.8

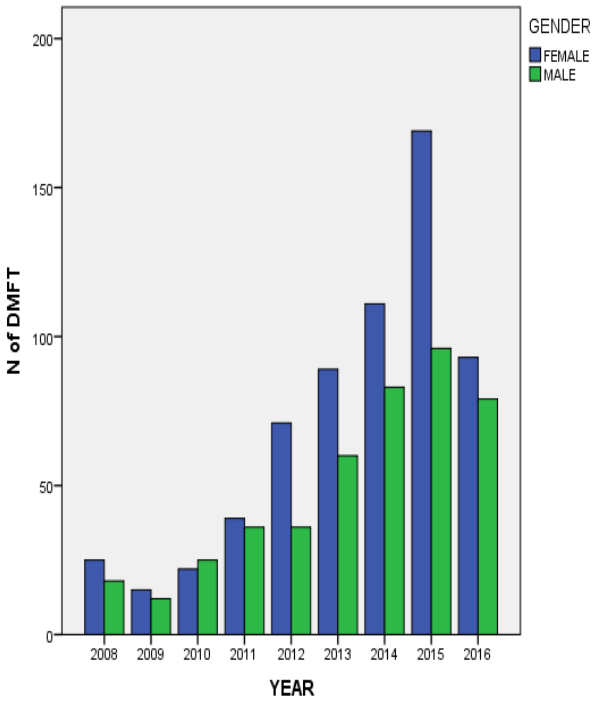

FIGURE 1: Frequency distribution of DMFT by year according to gender.

Table 1 shows the frequency distribution of the subjects. Dental caries prevalence was found to be at 58.8% (634) among all age groups. Based on **Table 1**, the percentage of dental caries was found to be highest at 15 years old compare to 5 and 12 years old. Highest number of children was in 15 years age group.

Table 2 shows 9 years distribution of caries. Prevalence of caries was found to be highest in 2009 (66.7%) whilst lowest at 2016 (45.6%). Highest number of children attended the UiTM Dental Clinic was in year 2015 with 265 children.

Table 3 shows number and percentage of decayed, filled and missing teeth in this study subjects. Out of 1049 children, 571 children (52.9%) present with decayed teeth, 37 children present with missing teeth due to caries while 214 children have filled teeth.

Figure 1 shows that the highest number of children affected with caries for both gender is in year 2015. Female were having higher number of caries in comparison to male in this year.

IV. DISCUSSION

Dental caries is one of most common oral disease affecting the children worldwide. In Malaysia, it continues to be highly prevalent (76.2%) with high caries levels in deciduous teeth (mean dmft of 5.6) and high unmet treatment need. However, with generalized increase of awareness of oral health among the public and with introduction of various preventive measures by the government, there has been a change in the trend of distribution of dental caries among the index age 5, 12 and 15 years old.[1] The present study selected age group 5, 12 and 15 years old based on:

a) At this age, most likely all primary teeth and permanent teeth will be present except the third molars.

b) 5, 12 and 15 years old are considered as global monitoring ages for international comparisons and monitoring. [11]

DMFT/dmft index using WHO diagnostic criteria was used in this study due to:

a) Majority of published literature using WHO criteria in diagnosing the dental caries.

b) WHO excludes initial lesions from diagnostic criteria due to concerns over reliability in diagnosis resulting in unreliable data. [12]

A study on dental caries among 5, 12 and 15 years old for a certain states are already available, but data on dental caries from Universiti Teknologi Mara have not been published before. Hence, this study examined the prevalence of dental caries in children attended clinic in Universiti Teknologi Mara from 2008 to 2016.

It was observed that the dental caries prevalence was the highest at 5 years old with 72.8% in comparisons to other age group. The reason for this could be due to higher sugary diet and inability of the child to properly brush teeth on their own. Lack of dental oral health education and less positive dental attitude in Asian parents and guardians may also contribute to this problem. Poor parental supervision during brushing causes improper brushing and lack in frequency of brushing among the children and lead to increase in the prevalence of dental caries among the children.[4] Besides that, lack of preventive measures could be another reason contributing to the prevalence of caries[13]. Lowest caries prevalence can be seen in children age 15 years old with 49.4%. This may be due to the mature development of children's fine motor skills and they are generally more conscious about the esthetic appearance of their teeth.[14]

In the present study, the prevalence of dental caries was the highest in 2010 (68.1%) with mean 3.62 (SD 4.019). This may be due to economic status around that time. Malaysia experienced a dramatic inflation in 2009 that affect the economic status of the country and the citizens. Approaching to the end of the year, this problem was resolved, however, it can be seen that oral health was not a priority at that moment as the number of attendee decrease tremendously comparing to the previous year. Nevertheless, in the year 2010 the number of attendee increases and this might be due to recovery of the inflation. The number of attendee increases from 27 in 2009 to 47 in 2010.The caries prevalence of 68.1% which is the highest might be affected by the inflation in the previous year where people did not put oral health as a priority and thus do not go for checkup or any definitive treatment. Once they reached recovery phase from inflation, the caries formation may have increases explaining why in the year 2010, the incidence of dental caries is the highest.

56.4% of dental caries prevalence found in the year 2013 with a mean of 2.82 (SD 3.873) showing least caries prevalence recorded in this study. The number of attendee in this year was 149 which show a profound increment compared to the year 2010 with 47 numbers of attendees

proving there was an increase in the oral health awareness among the masses. Increase in dental oral health awareness and other various effectives contributing factors helps in the decreased of the dental caries prevalence.

Increase in the dental oral health awareness causing the parents to bring their children to the dentists for a regular dental check-up. With this awareness, the parents would bring their children to the dentists which are recommended twice a year to protect the child's oral health. Irregular dental visit or visiting dentists only during experiencing pain might give negative impact to the child as it may be already too late to preserve the tooth. Parents who avoided dental appointment due to their children's dental anxiety and behavioral management may cause the children's dental caries prevalence to increase as they do not get adequate dental attention.[4] Systemic water fluoridation with 0.5-0.7ppm was implemented in Malaysia since 1971 give a big impact in the reduction of the dental caries.[9] A study by Shilpa R. showed that over the last two decades, there is a decline in the dental caries prevalence in the developed countries in which there is a widespread use of fluoride.[15]

Oral health professionals felt compelled to educate and motivate the community regarding the preventive measures in an effort to lessen the dental caries prevalence. As an example, dental officer giving talks towards school children, antenatal mother and public of a specified area especially emphasizing on proper tooth-brushing technique. Ministry of Health organized school dental clinic as a way of giving easy access and improve availability of dental services especially to those in need.[9] This also helps to detect any pathological condition or the need of orthodontic treatment at earlier age to provide interceptive treatment. There are geographical boundaries that affect accessibility of certain communities to get the proper treatment needed. In order to overcome this, outreach initiatives were conducted by the government to improve the availability of the dental practice.[9] Oral health behavior has received attention in being a factor that significantly impacts one's quality of life and well-being. We can expect improvement in oral hygiene practices among children aged 15 years old as they were exposed to good oral health behavior such as tooth brushing skills, flossing, amount of toothpaste used, good dietary habits among children at a young age and were likely continue the practices throughout their life.[4]

The percentage for the incidence of caries during nine years retrospective study showed a fluctuant pattern. There are many contributing factors that affect the result of this study. Attendees were community lived around UiTM Dental Faculty in Shah Alam as previously the Faculty of Dentistry, UiTM was situated there. Based on Figure 1, females showed a generally higher caries prevalence throughout the year. There is a significant higher value of caries incidence among females as compared to males. Caries experience was also found higher in females and the trend is in accordant throughout all age groups. [16] Generally, the number of attendees increased from 2008 till 2016. This was a positive response towards the presence of UiTM Dental Clinic which was established in the year 2007. The open concept of the clinic attracted the students and staffs of UiTM Shah Alam from other faculties to attend the clinic and do a routine checkup. Besides them, the community of Shah Alam area also got the pleasant feature of this clinic and it did engage them to be more concern regarding their oral health status. Through this opportunity, oral health awareness was emphasized to all the patients, and surely the awareness was passed by the patients to their inner circle. Presence of easily access dental clinic within the university area definitely became one of the main reasons in addition to the usual place treatment, convenient location and reasonable charges. This is because if the people had freedom to choose without any constraints, many would definitely chose public facility as good facilities and equipment together with convenient location marked the reasons for choice of public facility. [16]

A. Limitations

Regardless of the uplifting results, there are some limitations encountered in this study and the most prominent was the unavailability of data due to system changes from written data to online database. From the charting, whether by symbols or coding, we did not have the information regarding the aetiology of the missing teeth.

B. Recommendations

This study provides baseline data for dental caries prevalence in children who attended UiTM dental clinic. Within the limit of this study, we could conclude that dental caries among 5 years old are higher compare to other age group. This can be contributed by various factors; high sugar diet, inability to brush own teeth properly and lack of preventive measures. Therefore, the authorities should consider this data in planning appropriate strategy in order to decrease the prevalence of dental caries in 5 years old, which in long term would also decrease the prevalence of dental caries in 12 and 15 years old. It is recommended to encourage the oral health promotional activities including teaching and reinforcing appropriate brushing technique and frequency of brushing, demonstrating plaque using disclosing agent and parental awareness and education regarding sugary intake among the children. Cultural habit of brushing teeth once daily should be improved to at least twice a day with the recommended technique and using fluoridated toothpaste. School health programmes involving the dental students in that area should be ameliorated as it can greatly benefit not only the school aged children, also the entire community as this programme allows public involvement. Topical fluoride treatment is available by the professionals to reduce the formation of caries, proving to the guardians the effect of fluoride against caries (after teeth eruption) as well as strengthening the enamel of tooth.

V. CONCLUSIONS

The following findings can be concluded from this study:

1. Dental caries prevalence of 5, 12 and 15 years old was 58.8%.
2. 5 years old children have the highest dental caries prevalence which was 72.8%.
3. 2010 have the highest dental caries prevalence which was 68.1%.
4. Dental caries prevalence oscillated from 2008 to 2016.

Multiple factors involved in the formation of caries as it is a complex process. Oral hygiene practices such as tooth-brushing technique, amount of toothpaste used and various other practices play a vital role in preventing the caries

incidence. Government need to emphasize and educate more on the younger children as they have higher caries experience comparing to other age group. Educating the parents and guardians are also of equal importance as they are needed to supervise the children as they brush their teeth.

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REFERENCES

[1] Kundu H, Patthi B, Singla A, Jankiram C, Jain S, Singh K. Dental Caries Scenario Among 5, 12 and 15-Year-old Children in India- A Retrospective Analysis. Journal of clinical and diagnostic research : JCDR. 2015;9(7):Ze01-5.
[2] Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bulletin of the World Health Organization. 2005;83(9):661-9.
[3] Mafuvadze B, Mahachi L, Mafuvadze B. Dental caries and oral health practice among 12 year old school children from low socio-economic status background in Zimbabwe. Pan African Medical Journal. 2013;14:1-6.
[4] Kaur S, Maykanathan D, Ng K. Factors associated with dental caries among selected urban school children in Kuala Lumpur, Malaysia. Arch Orofac Sci. 2015;10(1):24-33.
[5] Maher R, Khan A, Rahimtoola S, Bratthall D. Prevalence of mutans streptococci and dental caries in Pakistani children. JPMA The Journal of the Pakistan Medical Association. 1992;42(9):213-5
[6] Mulu W, Demilie T, Yimer M, Meshesha K, Abera B. Dental caries and associated factors among primary school children in Bahir Dar city: a cross-sectional study. BMC Research Notes. 2014; 7:949.
[7] Oral Health Division, Ministry Of Health Malaysia: National Oral Health Survey of Preschool Children 2005. (NOHSS '05).
[8] Esa R, Razak I. Dental fluorosis and caries status among 12-13 year-old schoolchildren in Klang district, Malaysia. Annal Dent Univ Malaya. 2001;8:20-4.
[9] Oral Health Division, Ministry of Health: National Oral Health Plan, 2002.
[10] Shah A, Batra M, Kabasi S, Dany S, Rajput P, Ishrat A. Dental caries experience among 6-12 year old school children of Budgam district, Jammu and Kashmir state, India. Asian Pac J Health Sci. 2015;2(1):55-9.
[11] Hobdell M, Petersen P, Clarkson J, Johnson N. Goals for oral health in the year 2000: Cooperation between WHO ,FDI and the national associations. International Dental Journal. 2003;53(5):285–88.
[12] Tarasingh P, Reddy S, Puppal R, Balaji K, Ravigna P. Prevalence of Dental Caries among 5-12 Year Old School Going Children in Urban and Rural Areas of Mahabubnagar District, Telangana, India. Sch Acad J Biosci. 2017;5(3):174-7.
[13] Dash J, Sahoo P, Bhuyan S, Sahoo S. Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). J Indian Soc Pedo Prev Dent. 2002;20(4):139-143.
[14] Rahimah A, Ahmad Tajuddin Y. Experience of Dental Caries among Aboriginal Children in Selangor, Malaysia. J Nihon Univ, Sch Dent. 1990;32:275-80.
[15] Shilpa R. Fluorosis and its relation to Dental Caries:Review. J Pharm Sci & Res. 2017;9(7):1237-9.
[16] Razak IA, Esa RA. A 5-year longitudinal study of caries development in first permanent molars in Malaysia. Dent J Malaysia 1987;10(2):41-3