DENTAL CARIES AND ORAL HYGIENE STATUS AMONG STUDENTS AT VO TRUONG TOAN ELEMENTARY SCHOOL, NINH KIEU DISTRICT, CAN THO CITY IN 2021

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ABSTRACT

Background: *Dental caries is a multifactorial and dynamic disease caused by damage to dental hard tissues. It is known as the most common disease of oral health conditions in school-aged children. Caries can affect children's quality of life, such as studying, recreational activities, and psychosocial well-being. In recent years, some studies done in other provinces of Vietnam reported that the rate of dental caries in primary and permanent dentition was still high.* ***Objectives:*** *To determine the prevalence, indices of dental caries, and oral hygiene status among students from*

Grade 1 to Grade 5 at Vo Truong Toan elementary school, Ninh Kieu District, Can Tho City in 2021. ***Materials and methods:*** *A cross-sectional descriptive study was conducted on students from Grade 1 to Grade 5 at Vo Truong Toan elementary school, Ninh Kieu District, Can Tho City in the 2020 – 2021 academic year.* ***Results:*** *A total of 288 students (6 – 11 years of age) participated in this study with the prevalence of caries in all teeth, deciduous dentition, and permanent dentition were 94.8%, 89.9%, and 44.4%, respectively. The overall mean decayed, missing, and filled teeth index was 6.83 ± 3.96, the overall mean decayed, missing, and filled surfaces index was 11.78 ± 10.08, the overall mean significant caries index was 11.35 ± 2.14, and the overall mean untreated caries index was 0.40 ± 1.06. 78.8% of students had good and fair oral hygiene without statistically significant association with gender or age groups (p > 0.05).* ***Conclusions:*** *This study has shown the high prevalence of caries, so the community should carry out preventive solutions to improve correct perceptions and actions.*

Keywords: *dental caries, index, oral hygiene, students, elementary school*

I. INTRODUCTION

By the estimation of the Global Burden of Disease study from 1990 to 2017, the number of people having oral conditions from all over the world was 3.5 billion, of which 532 million and 2.3 billion had untreated caries in deciduous and permanent teeth, respectively [1]. Dental caries is a multifactorial and dynamic disease caused by damaging dental hard tissues. Children suffering from that can have difficulties in communication, eating, school performance, recreational activities, and psychosocial well-being [5]. In 2020, a systematic review and meta-analysis of children around the globe showed that the high prevalence of dental caries was in Africa, followed by Asia [6]. The cost to treat dental diseases in general, dental caries in particular is a problem that every country's government has to find an appropriate way to solve, which is more challenging in developing countries [10].

In Vietnam, the rate of dental caries in primary and permanent dentition was still highly reported in numerous studies in other provinces of Vietnam in recent years such as Minh Nguyen Thi Hong et al. in Nam Dinh [8], Chuyen Nguyen Hong et al. in Phu Tho [3] and Tai Tran Tan in Thua Thien Hue [14]. For all these reasons, it is crucial to conduct a research study to assess the prevalence, indices of dental caries and oral hygiene status among elementary students in Can Tho.

II. MATERIALS AND METHODS

2.1. Study subjects

The cross-sectional descriptive study was conducted at Vo Truong Toan elementary school, Ninh Kieu District, Can Tho City from January 2021 to May 2021. Students from Grade 1 to Grade 5 in the 2020 – 2021 academic year obtaining permission from their parents were selected whereas those who were uncooperative for oral examination or had an acute or chronic disease were excluded from this study. The sample size was calculated with the following formula:

$$n = Z^2_{1-\frac{\alpha}{2}} \times \frac{p \times (1-p)}{d^2} = 1.96 \times \frac{0.776 \times (1-0.776)}{0.05^2} \approx 267$$

In which:

n: sample size

d: precision for prevalence

Z: confidence level with $\alpha = 0.05$

p: expected prevalence of dental caries based on the previous study done by Tai Tran Tan (77.6%) [14].

The present study used a convenience sampling method, thereby collecting a total of 288 participants.

This study was approved by the Ethics Committee of Can Tho University of Medicine and Pharmacy (No. 283/PCT-HĐĐĐ dated January 5th, 2021).

2.2. Study methods

Students performed a clinical examination using a plane mouth mirror and a probe under natural light at school and assessed dmft/DMFT, dmfs/DMFS, SiC, and pufa/PUFA index using WHO criteria and Monse B. instruction. Oral hygiene status was determined based on the DI-S criteria and classified into three groups, as follows: good (0 – 0.6), fair (0.7 – 1.8), and poor (1.9 – 3.0). Before the examination, all examiners were trained in both theoretical and practical activities by an experienced dentist. The kappa coefficients were 0.830 – 0.842.

2.3. Statistical analysis

Descriptive statistics were summarized for quantitative variables (means and standard deviations) and qualitative variables (frequencies and percentages). Mann-Whitney U-Test was used to assess the differences in mean DI-S index, and Chi-square Test ($\chi 2$) was used to determine the differences in oral health status proportions according to gender and age groups. Data were analyzed using SPSS 22.0 software for Windows (IBM Corp., New York, NY, USA), and significance was set at p-value ≤ 0.05.

III. RESULTS

There were 288 students taking part in this study. Out of the total population, males accounted for 55.2% with 159 students, and the remaining 44.8% with 129 students were females. The average age was 8.10 ± 1.18 years with 63.2% (182 students) in the age group of 6 – 8 and 36.8% (106 students) in the 9 – 11.

3.1. Dental caries status

Figure 1 showed that the overall prevalence of dental caries in primary and permanent teeth was 94.8% with 273 students. The proportion of students with caries and without in primary dentition was 89.9% (259 students) and 10.1% (29 students), respectively. Nearly half of the students (44.4%) had caries in permanent dentition (128 students) while the remaining with caries-free were 55.6% (160 students).

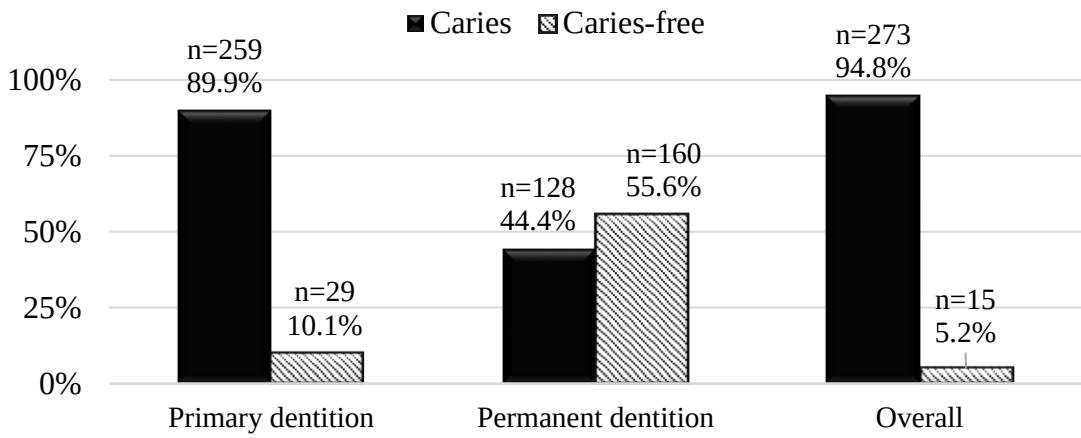

Figure 1. Prevalence of dental caries among the subjects

3.2. Indices of dental caries

The mean and standard deviation of dmft/DMFT, dmfs/DMFS, SiC, pufa/PUFA, and their components are shown in Table 1. Only two cases having ulceration in permanent dentition were found, and there was a difference between dmft/DMFT and SiC.

Table 1. Indices of dental caries among the subjects

Indices	Primary dentition	Permanent dentition	Overall
	$\bar{X}(s)$	$\bar{X}(s)$	$\bar{X}(s)$
dt/DT	5.43 (3.79)	0.85 (1.43)	6.28 (4.02)
mt/MT	0.03 (0.23)	0 (0)	0.03 (0.23)
ft/FT	0.40 (0.93)	0.16 (0.53)	0.57 (1.13)
dmft/DMFT	5.86 (3.82)	1.01 (1.50)	6.87 (3.96)
ds/DS	9.96 (9.69)	1.06 (2.23)	11.02 (10.05)
ms/MS	0.13 (1.12)	0 (0)	0.13 (1.12)
fs/FS	0.46 (1.08)	0.17 (0.54)	0.62 (1.27)
dmfs/DMFS	10.55 (9.81)	1.23 (2.28)	11.78 (10.08)
SiC	10.16 (2.13)	2.70 (1.49)	11.35 (2.14)
p/P	0.16 (0.62)	0 (0)	0.16 (0.62)
u/U	0.14 (0.61)	0.02 (0.30)	0.16 (0.69)
f/F	0.04 (0.23)	0 (0)	0.04 (0.23)
a/A	0.03 (0.20)	0 (0)	0.03 (0.20)
pufa/PUFA	0.37 (1.02)	0.02 (0.30)	0.40 (1.06)

3.3. Oral health status

The overall mean DI-S index was 1.29 ± 0.78, and the majority of students (78.8%) had good and fair oral hygiene. The distribution of the DI-S index and oral health status according to gender and age groups was not statistically significant ($p > 0.05$). These results are presented in Table 2.

Table 2. DI-S index and oral health status according to gender and age groups

Variables		DI-S	*p**	Oral health status			*p***
				Good	Fair	Poor	
		$\bar{X}(s)$		*n (%)*	*n (%)*	*n (%)*	
Gender	Male	1.31 (0.78)	*0.670*	30 (18.9)	94 (59.1)	35 (22.0)	*0.814*
	Female	1.26 (0.79)		28 (21.7)	75 (58.1)	26 (20.2)	
Age groups	6 – 8	1.30 (0.78)	*0.741*	35 (19.2)	108 (59.3)	39 (21.4)	*0.881*
	9 – 11	1.27 (0.80)		23 (21.7)	61 (57.5)	22 (20.8)	
Total		1.29 (0.78)		58 (20.1)	169 (58.7)	61 (21.2)	

** Mann-Whitney U-Test* *** Chi-square Test (χ^2)*

IV. DISCUSSION

According to a systematic review and meta-analysis, the prevalence of dental caries in primary and permanent teeth in children worldwide from 1995 to 2019 was 46.2% and 53.8%, respectively [6]. This study showed high proportions aligned with the study by Chuyen Nguyen Hong et al. in Phu Tho [3] and Minh Nguyen Thi Hong et al. in Nam Dinh [8] with an overall caries prevalence of 96.7% and 92.2%, respectively. Caries' experience of deciduous and permanent dentition in this study was also consistent with a study conducted in Iran by Mohammad S. et al. (96.6%) [9]. The similarity could be due to the same sampling time or the same culture and geographic area.

Nonetheless, the prevalence of dental caries reported in higher-income countries was mainly lower than in this study. 70.5% of children aged 4 – 14 years in a study by Ciannetti S., et al. in Italy had caries [4], and there were 48.7% of children with caries from 5 – 12 years of age in a study by Casanova-Rosado J.F., et al. in Mexico [2]. This may be because socioeconomic conditions were identified as critical factors affecting dental caries as Loc Do Giang's study demonstrated [7].

In the present study, the dmft, dmfs/DMFS, and SiC indices were higher while the DMFT index was lower than some studies. The dmft and DMFT index reported by Tai Tran Tan in Thua Thien Hue [14] and Mohammad S. et al. in Iran [9] were 4.22 and 1.51; 4.16 and 1.96, respectively. A five-year follow-up study among 6- to 12-year-old schoolchildren by Sánchez-Pérez L. et al. in Mexico showed that the dmfs index was 3.80 and the DMFS index was 1.30 [13]. The SiC in primary and permanent dentition reported by Parabakar J. et al. in India was 3.53 and 0.85 [11]. Unlike other indices, the untreated caries index was still unpopular in Vietnam, so it was difficult to find and compare to others in the same age group. In India, Vasavan S.K. et al. presented that pufa was 0.99 and PUFA was 0.06 [15], which is higher than this study's. All variations above could be explained by the difference in sample size, study dates, and investigators' qualifications.

The finding from this study revealed that average DI-S and oral health status in females and the age group of 9 – 11 were not significantly better than those in males and the age group of 6 – 8 ($p > 0.05$). Salim N.A. et al. stated similar results among 5 – 13-year-old children in Jordan with no statistically significant association with gender or age group [12]. It was supposed to be that both boys and girls who got an education with the same curriculum at school, parental and teacher supervision of their children's oral hygiene were less and less strict with growing age.

In the current study, each student at Vo Truong Toan elementary school had nearly seven caries teeth, and twelve caries surfaces on average as well as the ft/FT index recorded with a small number indicated that those did not receive a timely diagnosis or treatment and lack concern. Besides, the difference between dmft/DMFT and SiC index implied the severity of dental caries among high caries risk group students. Thus, implementing concrete oral health education strategies by concentrating on school-based oral health care programs is imperative.

V. CONCLUSIONS

Most students at Vo Truong Toan elementary school had caries affecting many teeth. The results implicated that dental neglect in children and lack of reasonable intervention still existed. Hence, strategies for oral health care prevention should be carried out to improve the community's right perceptions and actions.

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