Current status of oral disease among 3-5 year-old children in some kindergartens in Hue city in 2019

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Abstract

Background: Dental caries is a common disease and is acquired very early in children after teething. Primitive teeth play an important role in chewing, so oral disease will affect the physical development of children. The objective of the study was to investigate the current status of oral disease, the role of the mother and related factors of 3-5 year-old children. **Subjects and methods:** A cross-sectional descriptive study of 524 children in some preschools in Hue city and their mothers. Clinical examination of the children's oral health and interview with the mothers using to a set of questions. **Results:** The rate of caries in 4 schools was 70.6%, plaque was 82.3%, gingivitis was 7.3%. with p>0.05. The average index of decayed, missing, filled teeth is 3.43, 0.19; 0.97, respectively; the decayed, missing, filled teeth index (dmft) was 4.59. The group of mothers with good knowledge and practice had children with lower caries (65.8% versus 75.7%, p<0.05). Dental caries increases in group of children eating sweets by 2.29 times (OR= 2.29; p<0.01), group with habit of sucking food by 1.76 times (OR=1.76; p<0.05), children brushing teeth only in the morning or evening had risks 2.27 times higher than children with the habit of brushing teeth twice (OR=2.27; p<0.001), brushing teeth without toothpaste or with salt had caries risks 4.36 times higher (OR =4.36; p<0.001). **Conclusion:** The rate of dental caries in preschool children in Hue city is still quite high. It is necessary to strengthen the network of dental clinics in the community, strengthen communication and education on oral care.

Keywords: *Oral disease, children 3-5 years old, mother's role.*

1. INTRODUCTION

Oral disease, mainly caries, in children is a common disease and is acquired very early in children after teething. Primitive teeth play an important role in the development of children, when it is decayed, children suffer from pain, poor chewing, anorexia, loss of sleep, affecting the physical development of children, affecting the position of permanent teeth and malocclusion [1]. The World Health Organization (WHO) has recommended that the implementation of early oral disease prevention at preschool age is the most feasible strategy in countries around the world and in the region for many decades until now [2]. In order to determine the state of primitive tooth decay in Vietnamese children in 2019, Nguyen Thi Hong Minh et al conducted a cross-sectional study, recording a very high rate of primitive tooth decay in the 6-8 year-old age group (86.4%), on average, each child has 6.21 decayed teeth and the rate of treated teeth is low [3].

School based oral health programs have developed in all 64 provinces and cities across the country. In Hue city, this program has also been implemented for many years with the content of dental education, fluoride mouthrising, however, it has only been implemented in primary school students. Recently, there has also been a number of research projects on oral diseases in preschool aged 3-5 years old [4]. However, there are very few studies focusing on assessing the relationship between the rate of oral disease and the knowledge and attitudes of mothers.

How to practice oral hygiene as well as prevent tooth decay for children from 3-5 years old depends a lot on knowledge, attitude, practice in instruction, supervision of children's brushing, periodical dental examination for children. At this age, children are not yet able to take care of their teeth independently. Effective oral health care for children must be based on the mother's understanding and educational knowledge. It means learning and choosing the right oral care method in each stage of your child's development [5].

In order to have a basis to evaluate and proactively propose effective measures to improve oral health at preschool age in Hue city, the aim of the study is to survey the current state of oral disease, mother's role and related factors of 3-5 year old children in some kindergartens in Hue city.

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2. MATERIALS AND METHODS

2.1. Research subjects

- Children aged 3-5 years old at some kindergartens in Hue city.

- Mothers of the above study subjects.

2.2. Research Methods

2.2.1. Study design: A cross-sectional descriptive study

2.2.2. Sample size and sample selection: the appropriate sample size formula for a cross-sectional survey is:

$$n = Z^2_{1-\alpha/2}\frac{p(1-p)}{\Delta^2}$$

- We calculated n= 314.4, with p=0.713 according to Vu Van Tam's research in 2017 with the rate of primitive tooth decay was 71.3% (recent studies in Vietnam only recorded the rate of dental caries in children aged 3-5 years old) [6]. This is the minimum sample size, our study surveyed 452 children.

- Sampling method:

+ Randomly selecting two preschools on each side of the Perfume River.

+ Sampling method at each school: Making a list of all classes in each school by grade, in each block conducting a random draw to select a class, making such a draw at each school until the required sample size is achieved.

In selected classes, dental exams and interviews with parents of all students were conducted.

2.2.3. Research steps

- Meeting to unify and train collaborators.

- Developing a plan to carry out the research.

- Preparing work: Contacting the preschools selected for the study and working with school administrators to obtain consent, help and support during the study.

- Implementing examination, investigation and research in order to collect sufficient data in accordance with the research requirements and contents.

2.2.4. Assesing Indicators

- Evaluation of tooth decay and decay index of tooth loss

+ About dental caries: assessed according to WHO 2019 [2].

A subject was diagnosed as having caries when at least 01 tooth was decayed.

+ Decayed–missing-filled teeth index for Primitive teeth (dmft): This index shows the average number of tooth decay (s), missing (extracted) (m), filling (f) of children. Decayed–missing-filled teeth (dmft) were investigated on 20 primitive teeth.

+ Decayed–missing-filled teeth index for Primitive teeth (dmft) are assessed: **dmft (per person) = d + m + f**

+ How to calculate population dmft index:

$$\textbf{dmft of population} = \frac{\textbf{Total of d + m + f}}{\textbf{Total number of examined people}}$$

- Assessing the status of gingivitis

Using the ingival Index (GI) according to the evaluation criteria of Loe and Silness (1963) [7].

+ 0: Normal gingiva

+ 1: Mild inflammation: discoloration, slight swelling on the gums, no bleeding on probing.

+ 2: Moderate inflammation: redness, swollen ulcers, bleeding upon probing.

+ 3: Severe inflammation: marked redness, swelling, ulcers, spontaneous bleeding.

Note: a child's gingival index of 0 means there is no gingivitis and at other levels there is gingivitis.

- Assessing the status of plaque

Plaque identification: Evaluation of the plaque index (PI: Plaque Index) according to the evaluation criteria of Loe and Silness (1964) changed from the Quigley - Hein plaque index [7].

+ 0: Completely clean, no plaque.

+ 1: A thin layer clings to the edge of the gingiva and gingiva.

+ 2: Plaque is found in the gingival pocket, in the interproximal spaces, in the gingival line.

+ 3: Full of plaque in the interdental spaces, full of plaque in the gingiva and with tartar at the cervial area of the teeth.

For children only at levels 0 and 1. Note: individual plaque index of 0 means no plaque and at other levels there is plaque.

- The role of the mother and factors related to oral problems

Assessment of related factors and mothers' knowledge, attitudes and practices about oral health care related to oral diseases through interview forms.

+ Mother's knowledge and practice in oral health care: score 16 points based on the importance of each issue.

Rating:

+ Failed: less than 9 points; + Pass: 9 points or more

+ Related factors: about children's eating habits and dental care.

2.3. Data processing

Research data was processed by medical statistical algorithm, using SPSS 20.0 software.

3. RESULTS

3.1. Situation of oral disease in ages 3-5 years old in some kindergartens

- Regarding the status of oral disease

The rate of primitive tooth caries of 4 schools was 70.6%, subjects have plaque, accounting for 82.3%, subjects with gingivitis accounted for 7.3%. The difference between the schools in the two regions was not statistically significant with p>0.05.

Table 1. Dental status of children by school

Examined Schools	Total	Dental Health Status					
		Caries		Gingivitis		Plaque	
		Number	%	Number	%	Number	%
Schools in the North Bank of Hue City	218	159	72.9	14	6.4	179	82.1
Schools in the South Bank of Hue City	234	160	68.4	19	8.1	193	82.5
Total	452	319	70.6	33	7.3	372	82.3
p		>0.05		>0.05		>0.05	

- Regarding the decayed - missing – filled index

The average indices of decay, missing, filling (d, m, f) in schools were 3.43, 0.19 and 0.97, respectively. The average dmft index was 4.59.

Table 2. The Decayed - missing – filled teeth (dmft) index of children along the North and South banks of Hue City

dmft index		Decay	Missing	Filling	dmft
Schools in the Northbank of Hue City	dmft index (number=218)	718	50	240	1008
	Average for each status (1)	3.29	0.23	1.10	4.62
Schools in the Southbank of Hue City	dmft index (number=234)	832	36	199	1067
	Average for each status (2)	3.55	0.15	0.85	4.56
p1-2 value		>0.05	>0.05	>0.05	>0.05
Average value (number=452)		1550	86	439	2075
Overall average value for each status		3.43	0.19	0.97	4.59

3.2. The role of mothers and factors related to dental problems for children

- Mother's role in dental care

The group of mothers with good knowledge and practice had children with tooth decay lower than the other group of parents (65.8% and 75.7% respectively). There is a relationship between knowledge and practice of parents' oral care with children's dental caries (p<0.05).

Table 3. The relationship between knowledge and practice of mother's oral care and child's dental caries status

Knowledge and practice of mother's oral care	Dental caries status				p
	Caries		No caries		
	Number	%	Number	%	
Passed	154	65.8	80	34.2	
Not passed	165	75.7	53	24.3	**<0.05**
Total	319	70.6	133	29.4	

Table 4. Mother's attitude about dental care for children

The Dental facility that the mother takes the child to for dental care	Number	%
Commune/ward medical station	59	13.1
Public dental institution	143	31.6
Private dental clinic	231	51.1
Self-medication at the pharmacy/no treatment	19	4.2

- Factors associated with tooth decay in children

The results of multivariable logistic regression showed that there is a relationship between the type of food and drink children like, the habit of sucking food, the type of products children use to brush their teeth with the child's tooth decay. The group of children who liked to use artificial sweets had a 2.29 higher risk of tooth decay than the group of children who liked to use natural sweets (OR= 2.29; p<0, 01; 95% CI: 1.35-3.88). Children with the habit of sucking on food have a 1.76 times higher risk of tooth decay than children without this habit (OR=1.76; p<0.05; 95%CI: 1.09- 2.80). Children who only brush their teeth in the morning or evening have a risk of tooth decay 2.27 times higher than those who brush their teeth in both morning and evening (OR=2.27; p<0.001; 95% CI: 1.47 -3.50). Children who use a toothbrush without or with salt water to brush their teeth are 4.36 times more likely to have tooth decay than children who use toothpaste (OR=4.36; p<0.001; 95% CI: 1.90-10.01).

Table 5. Analysis of multivariable logistic regression model to find the relationship between children's habits and behaviors to dental caries

Risk factors associated with dental caries		OR	Confidence interval 95%	p
Children's favourite food, drinks	Natural sweets *	-	-	-
	Artificial sweets (confectionery, soft drinks)	2.29	1.35-3.88	**<0.01**
Habit of sucking food	No *	-	-	-
	Yes	1.76	1.09-2.80	**<0.05**
The habit of brushing teeth in the morning and at night	Yes *	-	-	-
	No	2.27	1.47-3.50	**<0.001**
Product for children to use to brush their teeth	Tooth paste *	-	-	-
	Brushing with/ without salt water	4.36	1.90-10.01	**<0.001**

(*) Reference group *(-) Not applicable*

4. DISCUSSION

4.1. Situation of dental diseases in preschool children

The results of Table 1 show that the rate of primitive tooth decay in 4 schools is 70.6%, for periodontal condition, there is plaque, accounting for 82.3%, evenly distributed in 2 areas of the North and South banks. Subjects with gingivitis accounted for 7.3%, of which, schools in the North bank accounted for 6.4% and the South bank accounted for 8.1%. The difference was not statistically significant with p>0.05.

The rate of tooth decay in our study, compared with other studies in preschool age, is equivalent to Vu Van Tam (2017) which is 71.3% [6], lower than Yen NTH et al (2018) which is 89.1% [8] and lower than the study in Can Tho city of Nguyen Tuyet Nhung et al. (2019) with the early caries rate (ECC) of 92.7% [9] with the average index of decay - missing – filling of primitive teeth is 10.32, increasing with age. When compared with foreign studies, our tooth decay rate is equivalent to Zhou N et al (2019), at 70.4% [10].

Our subjects are preschool children from 3-5 years old, this is the age when children have primitive teeth. Since primitive teeth have a lower tolerance to damaging agents than permanent teeth, especially with chemicals and bacteria that cause tooth decay,

the rate of caries in children with primitive teeth is higher than in children with permanent teeth. This may mean that early detection and treatment for children's primitive teeth have not received much attention, possibly due to parents' perception that primitive teeth are temporary, short-lived teeth and will be replaced without the need of treatment. Children who have had tooth decay due to breastfeeding or in preschool are more likely to have subsequent tooth decay in both their primitive teeth and their permanent teeth later in life. Unlike other infectious diseases, tooth decay is not self-limiting. Cavities require specialized treatment to clean the infection and restore tooth function [11].

Table 2 shows that the dmft index is 4.59, in which the average index of caries is 3.43, missing teeth is 0.19 and filled is 0.97. This result is lower than the result in the research of Nguyen Thuc Quynh Hoa (2003) which is 5.56, the result of author Yen NTH (2018) which is 9.32, Nguyen Tuyet Nhung et al (2019) which is 10, 32 [3, 8, 9]. According to the research by Khodadadi E. (2016), conducted on 384 children from 21 months old to 84 months old in Iran, the dmft is 6, respectively 5, 0.4, 1.2 and the overall index is 8.2 [12]. The above difference may be due to the difference in age of the research subjects, the different economic development between the subjects. According to the results of Table 2, the caries status is very high but the fillings status is quite low, requiring the role of local dental office with the function of treatment and prevention of dental caries at schools and localities, as well as strengthening the role of oral health communication for parents of preschool-aged children.

The results of Table 1 show that the subjects with gingivitis accounted for 7.3%, of which the schools in the North bank accounted for 6.4% and the schools in the South bank accounted for 8.1%, not statistically significant with p>0.05. Subjects had plaque, accounting for 82.3%, evenly distributed in 2 areas of the North and South banks (82.1% and 82.5% respectively). Gingivitis is caused by the accumulation of bacteria around the teeth, especially the gingival gap, which is the trigger and prolongs the inflammatory response (tartar, food stuffing,..). Plaque-associated gingivitis is a chronic inflammatory lesion that occurs in the soft tissues around the teeth, caused by bacteria in dental plaque. The lesion is localized in the gingiva, not affecting the alveolar bone and tooth bone. The disease is reversible. Not brushing or brushing incorrectly combines the risk of plaque buildup and local bacteria that increase the risk of tooth decay and gingivitis [13].

Research by Truong Manh Dung, Vu Manh Tuan (2012) in 5 provinces of Vietnam in 2010 on the status of oral diseases, the cross-sectional study sample included 7.775 children aged 4-8, the results showed that, 90.6% children have plaque, 81.1% children have tartar, 11.9% children have bleeding gums; 4.8% of children at low risk of caries, 23.8% of children at moderate risk of caries, 68.2% of children at high risk of caries and 3.2% of children at risk of very high caries [14].

In the research by Alkhtib A. in 250 preschool children in Qatar in 2018, the rate of tooth decay was 89%, the dmft index was 7.6, the rate of gingivitis was 9% [15].

Thus, we record that the rate of dental diseases related to tooth decay in our country is at a high level. It is usually caused by a combination of acidic foods and poor oral hygiene, which usually occurs in children between the ages of 3 and 5. This form of caries is widespread and involves the entire tooth surface. Acidic products generated from the metabolism of bacteria act on the tooth surface to demineralize. If there is enough demineralization under the enamel surface, it will eventually cause the collapse of the tooth's upper surface and the formation of an empty cavity or cavity. At this time, dental intervention is required [1].

In fact, when examining the oral health of 3-5-year-old children, we discovered poor oral conditions such as: bad breath, dirty gums, teeth with food, loose Primitive teeth that have not been extracted. Therefore, the enhancement of oral disease prevention knowledge for parents and teachers should be promoted as a top priority in primary health care strategies in Vietnam. In parallel, it is investing in training for teachers and school health workers to improve their professional qualifications in school oral health at schools, especially kindergartens.

4.2. The role of mothers and factors related to dental problems in preschool children

- Knowledge, practice and attitude about mother's oral care

In our study, the rate of children's dental caries status in the group of parents with good knowledge and practice of oral care for their children was 65.8% and 75.7%, respectively. The relationship between knowledge and practice of mother's oral care and the status of children's dental caries is statistically significant with p<0.05 (Table 3).

More than half of the study subjects were taken by their mothers to private dental clinics for

oral care, accounting for 51.1%. Following that are state dental facilities and commune/ward health stations, accounting for 31.6% and 13.1% respectively. No treatment or buying drugs at the pharmacy accounted for a low rate of 2.9% and 1.3% (Table 4).

Alkhtib A., Morawala A. (2018) conducted a survey of 248 mothers of 4-5 year old children in kindergartens in Qatar showed that 48% of mothers think that children should brush their teeth from the age of three and more than half (54%) of mothers think that children should not be flossed. Despite good knowledge of oral health care, there are still gaps in the practice of children's oral health [15]. Zhang K et al (2020) studied 1.229 children aged 3 to 5 years old, in Northeast China, and showed that the dmft in children aged 3, 4 and 5 years old was 3.17, 5.13 and 6.07, respectively, the caries rate was 62.16%, 75.89% and 87.28% respectively. Most parents have poor knowledge and practice of dental care for their children's teeth. Therefore, increasing knowledge about oral health is an effective measure to change this situation [16].

When children have dental problems, mothers often take them to private clinics or state institutions (95.8%). Only a small percentage did not receive any treatment or bought it at a drugstore (4.2%) (Table 3). Because our study subjects are in the city, the mother's attitude to dental care for her child is quite good.

Oral hygiene habits and eating habits are established in the pre-school days and parents, especially mothers, act as role models for their children. Thereby, we can see that the knowledge, practice and attitude of mothers to take care of their teeth affect the oral health of their children right from the preschool age.

- Relationship between children's habits and behaviors to tooth decay

Table 5 analysis of multivariable logistic regression model to find the relationship between children's habits and behaviors to caries status shows that there is a relationship between the type of food and drink children like, and the habit of sucking food, the type of product children use to brush their teeth with the child's tooth decay.

According to Nguyen Thi Hoang Yen (2018), breastfeeding, consumption of sweet foods and drinks, thumb sucking habits are risk factors for tooth decay [8].

A study by Liwei Zeng (2018) in 2880 children in Jiangxi province, China, showed a strong association between the incidence of dental caries and the frequency of consumption of fast food and high-sugar drinks ($p< 0.05$), the rate of caries in children who started brushing at 4 years old was higher than those who started at 1 year old ($p<0.001$) [17]. Nota A (2019) survey of pre-school children in Italy also found an association between the consumption of sweets and sweets between meals and tooth decay ($p<0.003$) [18]. The study of Jain M. (2015) showed that the variables significantly associated with early tooth decay in children were the use of sweet pacifiers ($p < 0.001$), the frequency of snacking ($p < 0.05$), brushing frequency ($p < 0.001$) and parental education level ($p < 0.05$) [19].

Bacteria that cause tooth decay in the plaque on the teeth create harmful acids 20 to 40 minutes after the child eats, if the child has a habit of sucking on food, it has created a favorable environment for bacteria to grow. Besides, bacteria use sugar in food and drink to form and develop dental plaque, they digest sugar to create acid, gradually erode inorganic substances in enamel and dentin, causing dental caries [16].

Daily brushing has a great impact on each person's oral health. Regular and proper brushing helps to reduce the rate of tooth decay and related oral disease.

Children who brush with or without salt water are 4.36 times more likely to develop tooth decay than children who brush with toothpaste. Toothpaste makes the process of cleaning plaque on teeth more effective. Besides, it also provides the fluoride element to help prevent tooth decay better than when using an empty brush or physiological saline to clean teeth. According to the American Academy of Pediatric Dentistry (AAPD), when teeth come in, start brushing twice a day with a soft, small-bristled toothbrush and plain water [20].

5. CONCLUSIONS

The rate of dental disease in preschool children in Hue city is still quite high. It is necessary to strengthen the network of dental clinics in the community to meet the treatment needs of the people in general and children in particular. Strengthening communication and education on oral care on the mass media and communicating directly to parents and preschool children in schools. In particular, informing parents and children's parents of the results of the annual dental examination so that parents can take their children to medical facilities for treatment.

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