

PREVALENCE AND FACTORS RELATED TO DENTAL CARIES AMONG 6 YEARS OLD
CHILDREN IN NHA TRANG CITY KHANH HOA PROVINCE VIETNAM



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จุฬาลงกรณ์มหาวิทยาลัย

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บทคัดย่อ

โรคฟันผุในเด็กยังคงมีความชุกสูงและเป็นปัญหาที่สำคัญทางสาธารณสุขในหลายประเทศ ประเทศเวียดนามพบปัญหานี้มาหลายทศวรรษ ข้อมูลทางการศึกษาวิจัยเกี่ยวกับเรื่องนี้ก็ยังมีจำกัด ดังนั้นการศึกษานี้จึงมุ่งศึกษาเพื่อหาความชุกและปัจจัยที่เกี่ยวข้องกับการเกิดโรคฟันผุในเด็กอายุ 6 ปีในเมืองฮาตริง จังหวัดฮานฮัว ประเทศเวียดนามการศึกษานี้ใช้วิธีการสำรวจภาคตัดขวางในช่วงเดือนมกราคมถึงเดือนมีนาคม พ.ศ. 2557 เด็กนักเรียนในระดับประถมศึกษาจะถูกสุ่มตัวอย่างแบบหลายขั้นตอนจากโรงเรียน 3 แห่งในเมืองฮาตริงเป็นจำนวน 248 คน ทำการตรวจสอบสุขภาพช่องปากของเด็กและเก็บข้อมูลจากผู้ปกครองโดยใช้แบบสอบถาม ข้อมูลที่เก็บได้แก่ ปัจจัยทางสังคม โภชนาการ สุขอนามัยในช่องปากของเด็ก ปัจจัยทางสิ่งแวดล้อม เช่น การเข้าถึงสถานทันตภิบาล การมีอยู่ของสถานทันตภิบาล เป็นต้น เมื่อทำการวิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาได้แก่ ไค-สแควร์ แมน-วิทนิเทสและครุสคอล-วอลลิส เทส พบว่าความชุกของการเกิดโรคฟันผุสูงถึงร้อยละ 88.3 โดยพบค่าเฉลี่ยฟันผุ ถอน อุดเท่ากับ 5.04 ± 3.43 ซึ่งต่อคนค่าเฉลี่ยฟันผุเท่ากับ 4.33 ± 3.12 คิดเป็นร้อยละ 85.9 ค่าเฉลี่ยฟันถอนเท่ากับ 0.34 ± 0.69 คิดเป็นร้อยละ 23 และค่าเฉลี่ยฟันอุดเท่ากับ 0.38 ± 0.82 คิดเป็นร้อยละ 23.8 และยังพบความสัมพันธ์ที่มีนัยสำคัญทางสถิติระหว่างการเกิดฟันผุกับหลายปัจจัยดังนี้ ระดับการศึกษาของผู้ปกครอง รายได้ต่อเดือนของครอบครัว ความถี่ของการแปรงฟัน การใช้ยาสีฟันแปรงฟัน ความถี่ของการตรวจฟัน อาหารและเครื่องดื่ม ความรู้และเข้าใจเกี่ยวกับการเกิดฟันผุ ระยะทางระหว่างบ้านและสถานทันตภิบาล และยังพบว่าโครงการทันตกรรมในโรงเรียนและปัจจัยทางสิ่งแวดล้อมมีความสัมพันธ์กับโรคฟันผุโดยมีอัตราส่วนความเสี่ยง (ช่วงเชื่อมั่น 95%) เท่ากับ 27 (6.243, 116.673) จากผลการศึกษานี้จึงเสนอแนะได้ว่าการส่งเสริมความรู้ ความเข้าใจในเรื่องการดูแลสุขภาพอนามัยในช่องปากของเด็กแก่ผู้ปกครอง ครูและตัวเด็กเองให้มากขึ้นมีความจำเป็นอย่างเร่งด่วนเพื่อลดความชุกของโรคฟันผุและควรทำการศึกษาเพิ่มเติมโดยศึกษาแบบระยะยาวเพื่อยืนยันผลการศึกษาคั้งนี้และลดข้อจำกัดของการศึกษาภาคตัดขวาง

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NGUYEN THI HAI YEN: PREVALENCE AND FACTORS RELATED TO DENTAL CARIES AMONG 6 YEARS OLD CHILDREN IN NHA TRANG CITY KHANH HOA PROVINCE VIETNAM. ADVISOR: ASST. PROF. NAOWARAT KANCHANAKHAN, Ph.D., 76 pp.

Abstract

Dental caries prevalence among children is still high and remains a significant public health problem in all nations. Vietnam had confronted this problem for several decades and there are little available published studies about the prevalence of dental caries in children. The aim of this study are (i) to find out the prevalence of dental caries by using the decayed, extracted and filled teeth (deft) index and (ii) to find out the factors related to dental caries among 6 years old children in Nha Trang city, Khanh Hoa province, Vietnam. A cross-sectional survey was conducted during January to March 2014. Multi-stage sampling technique was used to randomly select 248 children from three primary schools in Nha Trang city. Oral hygiene of the children were investigated and the structured questionnaire were sent to children's parents in order to collect informations regarding to characteristics factors, dietary, oral hygiene practice, supporting environment, accessibility to dental clinic and availability of dental clinic. Data was analyzed by descriptive statistics, Chi-square, Kruskal Wallis and Mann Whitney test. The results have shown the high prevalence at 88.3% with the mean of deft score 5.04 ± 3.43 . The proportion of dt, et and ft are 85.9% (4.33 ± 3.12), 23% (0.34 ± 0.69) and 23.8% (0.38 ± 0.82), respectively. There were statistically significant association between dental caries and the education of parents (p-value <0.001); the total income per month of the family (p-value = 0.002); the frequent of tooth brush (p-value<0.001); the use of toothpaste (p=0.006); the frequent to dentist check (p<0.001); the cariogenic food (p<0.024 for the drinks and <0.001 for the snacks); the parental knowledge and perception on dental caries (p-value=0.014); SBDP and supporting environment (p<0.001, OR=27, 95%CI=6.248-116.673) and the distance from home to dentist office (p<0.001). From this finding could be suggested that more education on oral health for parent, teacher and children are urgently needed. Longitudinal study should be performed to confirm the results and minimize the limitation of cross-sectional study.

Field of Study: Public Health

Student's Signature

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Chapter 1

INTRODUCTION

1.1. BACKGROUND AND RATIONALE

Oral health has become one of the most important problems in both individual and community. Oral pathology brings a lot of troubles to our daily lives. Dental diseases can cause pain, affect our ability to chew, smile, or speak properly as well as our feelings of social well-being. According to The World Oral Health Report in 2003, continuous improvement of oral health is one of the aim of the WHO global program in the 21st century (WHO, 2003). In February 2004, a report was released by WHO which stated that both industrialized and developing countries, especially low income countries have problems on oral diseases include dental caries (tooth decay), periodontitis (gum disease) and oral and pharyngeal cancers (WHO, 2004). A number of five billion people worldwide was also estimated to have experienced dental caries in this year by WHO. The report on the State of Oral Health in Europe commissioned by the Platform in 2012 estimated the annual spending in oral care in the EU-27 to be close to €79 billion in 2012, a figure set to reach €93 billion by the year 2020 if adequate action is not taken immediately. The report further highlighted that dental caries remain a problem for many groups in Europe and that trends in the prevalence of periodontal (gum) diseases and oral cancer are worrying. Oral disease should be considered as an important element

that effects seriously to our quality of life because of their high prevalence and burden.

Among many dental diseases, the prevalent of dental caries among children is high and also a significant public health problem (Abdullah, 2008). In April 2012, a fact sheet from Media Center of WHO shows that 60-90% of school children and nearly 100% of adults have dental cavities worldwide (WHO, 2012). Dental caries brings many troubles and make the children's quality of life decrease. Toothache affects to their eating and sleep, makes them experience pain and even miss school days. In The United States, 3.1 days per year are loss per 100 youth age 5-17 years due to acute dental condition, mostly due to dental caries in 1996 (Rockville, 2000). Children's nutrition status, growth and weight gain are also affected by dental caries. Toothache and dental infection influenced the eating, sleeping habits, dietary intake and metabolic processes of 3 years old children and made them 1kg lower than children in control group (Hugoson, 2008).

In recent years, a remarkable decreasing of dental caries prevalence in children in developed industrialized nations. This can be the result of the use of fluorides worldwide, improvement in oral hygiene, changing models of sugar intake, changing in criteria for diagnosing and the efforts of dental health services in preventing and restoring caries. However, the social economic risk factors has become more important and some studies of dental caries reductions have shown

the little effect of dental services on reducing caries prevalence (P. E. Petersen, Hoerup, N., Poomsivet, N., Prommajan, J., Watanapa, A., 2001).

In contrast, the rate of dental caries in developing countries is rising. We can easily see the differences in social economics condition between developed and developing countries can explain the above two trends. However, the magnitude of change is varying from country to country and all of them are reaching to a lower prevalence of dental caries (Marthaler, 2004). Besides, a study done by Bagramian et al. (Bagramian, 2009) showed that the prevalence of dental caries among children in many developed and developing countries had increased. Toothache, abscess, local or systemic infection can be the results of a decay which is not treated (Chu, 2000). This can lead to an important public health problem in many countries.

Moreover, in most developing countries, dental caries status is more severe as more than 90 percent of dental caries is untreated. This can lead to more serious stage and affect more to health.

Vietnam, which is a developing country, is also facing the burden of disease caused by dental caries in all ages. The National Oral Health Survey of Vietnam 2001 showed that about 83.7% children aged 6 years had decayed, missing and filled teeth. A considered point is that the number of missing teeth is 0.2 and the number of filled teeth is 0.0. This means that most of the decayed teeth in 6 years old children are usually left untreated until they become so serious and have to be extracted (Table 1). Another nationwide oral health survey conducted by Ministry of

Health showed that the average of DMFT in The Coastal Southern Center of Vietnam (where Nha Trang city is located) is 6.98 which is the highest number of all regions in the nation (Table 2).

Table 1: The average deft in 6 years old children in 2001.

Year	Age	% affected	Deft	d	M	F
2001	6 years	83.7	6.15	5.9	0.2	0.0

Source: National Oral Health Survey of Vietnam 2001. Medical Publishing House, Hanoi City, Vietnam 2002.

Table 2: The average DMFT by geography, Vietnam, 2002

Region	DMFT			
	DT	MT	FT	DMFT
The Northern Highland	2.68	0.24	0.02	2.94
The Red River Delta	1.15	0.17	0.22	1.54
The Coastal Northern Center	1.46	0.24	0.10	1.80
The Coastal Southern Center	4.92	1.71	0.35	6.98
The Highland Center	1.45	0.35	0.09	1.89
The East South	2.94	1.12	0.42	4.48
The Mekong River Delta	2.17	1.42	0.22	3.81

Source: Nationwide oral health survey 1999-2001 (Tran et al., 2002)

Over the past two decades, School-based Dental Programs (SBDP), which is a part of Primary Oral Health Care (POHC), have established in many countries in the world and worked effectively in preventing dental caries in children. In Vietnam, SBDP stated in 1980 and was generally divided into five stages:

- 1980-1981: developing in some areas

- 1984-1985: in 16 Northern cities
- 1986-1990: in cities in the South
- 1991-1993: in all Southern provinces
- 1994-1997: all of the nation.

The School-based Dental Program includes three components: Oral health care education at school, Rinsing mouth with Sodium Fluoride 0.2%, Regular dental check.

Although dental caries is one of the most severe health problems as mentioned above, there are little available published studies about the prevalence of dental caries in children in Vietnam, especially in 6 years old children. The age of six is such an important dental stage because of the appearance of the first permanent tooth (the sixth tooth). Therefore this is the age that parents should take more of their children's dental status. Besides, this is the first period in their life time that children can receive knowledge actively by themselves, especially dental education.

There is not any previous study related to the prevalence of dental caries and related factors among 6 years old children in Nha Trang, Khanh Hoa. The study will find out the prevalence and give information about risk factors of dental caries among 6 years old children in Nha Trang for further program planning in public dental health. Besides, the finding of the study will give scientific evidences for the ones who can make a better oral health status for children: policy makers, teachers, and parents.

1.1.1. Research questions

- a) What is the prevalence of dental caries among 6 years old children in Nha Trang city Khanh Hoa Province Vietnam?
- b) Is there any relationship between dental caries and gender, social economic status, oral hygiene, dietary reinforcing factors and enabling factors among 6 years old children in Nha Trang city Khanh Hoa Province Vietnam?

1.1.2. Objectives

General objectives:

To figure out the prevalence of dental caries and identify the relationship between dental caries and gender, social economic status, oral hygiene, dietary, reinforcing factors and enabling factors among 6 years old children.

Specific objectives:

- a) To characterize the dental caries status among 6 years old children.
- b) To find out the characteristics of factors related to dental caries among 6 years old children such as General characteristic factors, Oral hygiene practice, Dietary, Reinforcing factors, enabling factors.
- c) To characterize the relationship between related factors and dental caries such as dental caries and general characteristic factors, dental caries and oral hygiene practice, dental caries and dietary, dental caries and reinforcing factors, dental caries and enabling factors.

1.1.3. Study Hypotheses

There is a relationship between gender of the children and the prevalence of dental caries.

There is a relationship between enabling factors and the prevalence of dental caries

Higher dental caries can be the result of low social-economic status

Lower dental caries can be the result of better oral hygiene practices

Lower dental caries can be the result of healthy dietary

Lower dental caries can be the result of better knowledge and perception on dental caries of parents

Lower dental caries can be the result of better school based dental programs

1.1.4. Study variables

a) Independent variables

* General characteristics

Gender of the children

Social economics status of parents:

Age

Education

Average income per month

* Oral hygiene practice

Frequency of tooth-brushing

Actively

Passively

Frequency of oral health screening by dentist

* Dietary

Type of drinks

Type of snacks

* Reinforcing factors

Family factors: knowledge and perception on dental caries of parents

School based dental programs: education on dental caries, place for children to brush teeth, condition of facilities for Sodium Fluoride 0.2% mouth rinsing

* Enabling factors:

Accessibility (Dental service).

Availability (Are there any dental services on the area?)

b) Dependent variable:

The measurement of dental caries status is DMFT/ deft index.

DMFT is used to evaluate permanent teeth status: D = Decayed, M = Missing due to caries (not from trauma, orthodontic extraction, congenitally missing, etc.), F = Filled, T =Teeth.

deft is used to evaluate primary (baby) teeth: d = decayed, e= missing due to caries (not from trauma, orthodontic extraction, congenitally missing, etc.), f =filled, t = teeth. Because of the exfoliation process and not knowing whether such teeth

were carious before they fell out, carried missing teeth will not be calculated.

Principle and rules in recoding:

*DMFT:

- 1- A tooth may have several restorations but it counted as one tooth, F.
- 2- A tooth may have restoration on one surface and caries on the other, it should be counted as decayed D .
- 3- No tooth must be counted more than once, D M F or sound.

Calculation of DMFT:

1- For individual $DMF = D + M + F$

Total DMF

2- For population $mean\ DMF = \frac{\text{Total DMF}}{\text{Total No. of the subjects examined}}$

Total No. of the subjects examined

Minimum score = Zero

Maximum score: DMFT = 32

*DMFT:

Maximum scores: deft = 20

*Mixed dentition:

Each child is given a separate index, one for permanent teeth and another for primary teeth.

1.2. CONCEPTUAL FRAMEWORK

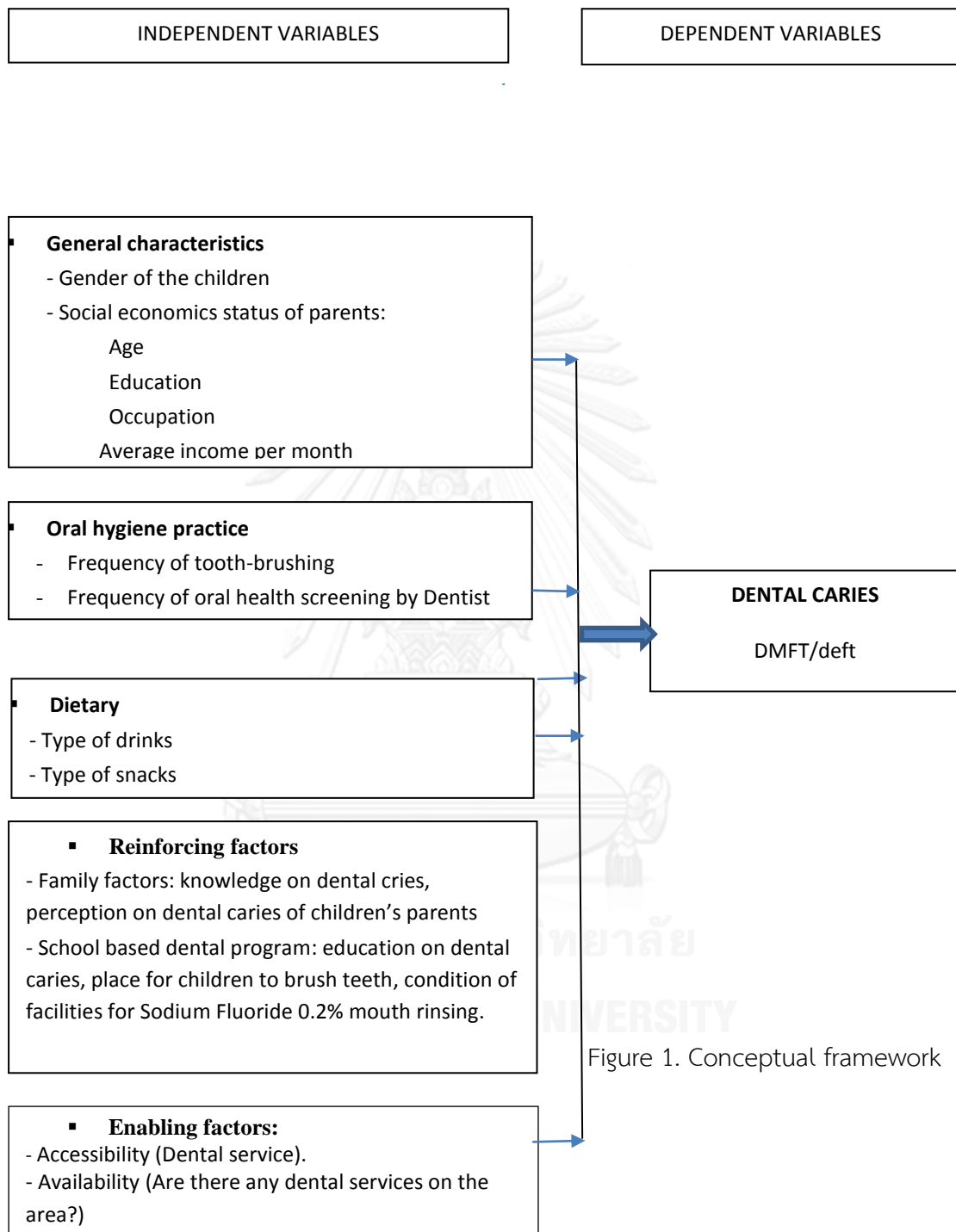


Figure 1. Conceptual framework

1.3. OPERATIONAL DEFINITIONS

- **Six years old children:** children whose birthday from 01/01/2008 to 31/12/2008.
- **Dental caries:** is a “localized, post eruptive, pathological process of external origin involving softening of the hard tooth tissue and proceeding to the formation of a cavity”. (World Health Organization. Oral Health survey basic methods. 4th ed. Geneva;1997.)
- **Gender (sex):** is defined as male and female. In this study, gender refers to the gender of children
- **Socio economics:** is the social economics status of children’s parents.
- **Age:** refers to age of children’s parents.
- **Average income per month:** household’s income which is categorized into 5 groups: Low income (below 3 million VND per month); Low middle income (from 3 million VND (180 USD) to 7 million VND (400 USD); Middle income (from 7 million (400 USD) to 10 million VND (550 USD); High income (from 10 million VND (550 USD), to 20 million VND (1100 USD); Very high income from more than 20 million VND (1100 USD). (Phuong, 2010)
- **Education:** the highest educational levels of children’s parents. This will be categorized into primary school, secondary school, college/university and higher education.
- **Occupation:** the present occupation of children’s parents, which will

include free labor, farmer, worker, officer and other occupations

- **Knowledge, perception in dental caries:** will be calculated by the right answers of children's parents on dental caries.

- **Oral hygiene practice:** refers to the practicing methods of oral hygiene of children, tooth brushing frequency and the way they or their parents brush their teeth, the frequency of dental visit (Dao, 1995).

- **Dietary:** kind of snacks and drinks between meals will be included in dietary.

- **School - based dental program** refer the supply of dental caries information from teachers, water fluoridation and regular dental check.

- **Accessibility (Dental service):** refers to the ability to access and benefit from the dental services, including the distance from children's house to the dentist's offices, the time they have to wait to be examined.

- **Availability** (Are there any dental services on the area?) In this study refers to the dental services that are available in the area where the children are living.

Chapter 2

LITERATURE REVIEW

2.1. DENTAL CARIES OVERVIEW

In 2005, World Health Organization reported 60-90% of schoolchildren have experienced caries worldwide, with the highest prevalence is in Asian and Latin American countries (P. E. Petersen, Bourgeois, D., Ogawa, H., Estupinan, Day. S., Ndiaye, C., 2005). In India, the prevalence of dental caries were reported to be 55.5% and 68% respectively (Shingare, 2012). Saravanan S et al (Saravanna, 2006) reported a caries experience among school going children of Pondicherry, India that showed the prevalence of dental caries was 44.4% in 5 years age group with 47.4% for males (dmft = 1.91 +/- 2.64) and 41.1% for females (dmft = 1.45 +/- 2.18). In Latin-American countries, some studies have done in Brazil about the adolescents and young adults' dental caries prevalence, in which the affected teeth had the mean of 4.5-4.6 and the reported prevalence was 81-82.6 % (Amaral, 2005; Gonçalves, 2002).

An analysis from the WHO Oral Health Country/Area Profile Program in 2006 about the proportional distribution of the deft components of children in low-, middle- and high-income countries (Figure 2) showed that the prevalence of deft is high in all nations with the differences among them is not significant and the highest is in low-income countries. But the considered point is a significant difference in the components of deft between the nations. While the percentage of filled teeth in

high-income countries is 20%, the rate of this is 0% in low-income countries although the percentage of decayed teeth is very high (97%). This shows the influence of social-economics factors on dental caries real situation and urges the community to give more attention on dental health especially on primary teeth.

According to WHO 1997, 80% of the Southeast Asia population get dental caries. DMFT index at the age of 12 is 0.7 – 5.5 (China: 0.7, Lao: 2.4, Cambodia: 4.9, Philippine: 5.5 and Vietnam: 0.8) (WHO, 1997b). In Vietnam, several studies concerned with the prevalence of primary tooth decay in children were done in recent years. In Yen Bai province, the prevalence of dental caries in primary school children is 63% . Among that, 81.82% is distributed by primary tooth decay with dmft=2.67 (Nguyen Ngoc Nghia et al, 2009) (Nghia, 2009).

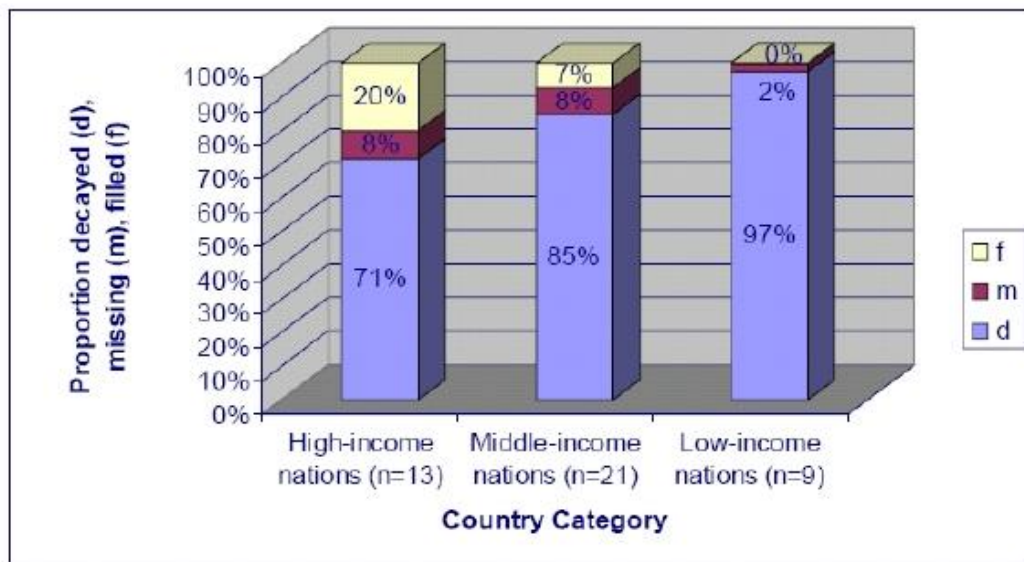


Figure 2. Proportional distribution of the dmft components of children 4-9 years from

1990 to 2004

2.2. DENTAL CARIES – DEFINITION AND RELATED FACTORS:

2.2.1. Definition and causes of dental caries

Dental caries is a decalcification of enamel and dentine by the action of bacteria on particles of carbohydrate (particular sugar) and associated with the time for developing lactic acid dissolving tooth structure. The causes of dental caries can be divided into two parts, the first is like biological factor and the second is social circle. In the oral cavity a microbial deposit will cover most tooth surfaces. The present of this deposit in the mouth is normal. All foods especially sugar are converted and starched into acids by bacteria. A sticky substance called plaque which is made of the combination of bacteria, acid, food debris and saliva in the mouth adheres to the teeth. The acid of the plaque dissolves the enamel of tooth's surface and makes holes in the tooth (cavity).

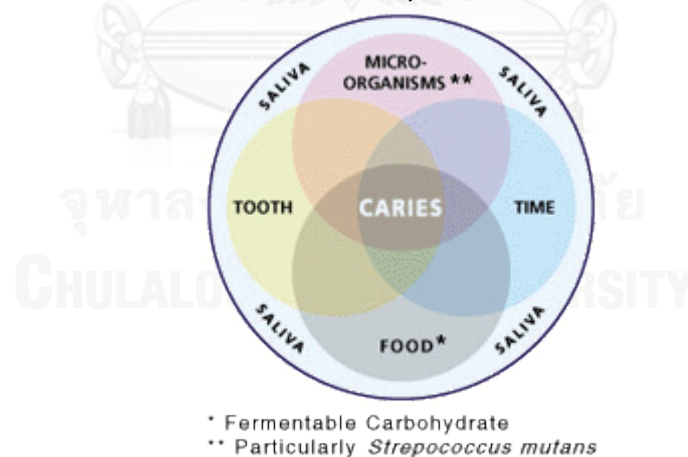


Figure 3 Factors that influence the balance condition among three prerequisites for dental caries process - Keyes and Jordan (WHO, 1997a).

Bacteria begin to accumulate with plaque within 20 minutes after having meals.

Scheie has documented in a study taken on immigrant Vietnamese children that the

prevalence of *S. mutants* was highest in plaque over caries part and from cracks, and lowest in plaque from smooth surfaces (Scheie, 1984). Caufield surmised from his study's results that most of lactobacilli which are important bacteria that cause dental caries are from outside and colonize by chance in the oral cavity, arising by food or other outside supporting elements (Caufield, 2007). Tare of saliva flow, buffer capacity, sugar, diet, fluoride are factors closely related with dental caries. They play the role influencing bacteria to destroy enamel of tooth to become tooth decay. Others important factors at the outer circle as mentioned before is social factors, such as education, knowledge about dental health care, behavior and attitudes of people. They play as potential factors affecting to oral disease in general or dental caries in specialty.

2.2.2. Related factors to dental caries

2.2.2.1. Social-economic status related to dental caries

The socio-behavioral determinants are among the important risk factors that lead to dental caries status in children and adults in all over the world (Peterson, 2005). A study was done to assess the influence of socio-economic status on primary teeth caries of children who were not old enough to go to school in Goiânia-GO, Brazil showed that children at the age of 1 or younger, the mean dmft and the percentage of caries-free were 0.09 (96.4%) , that were 0.40 (87.3%) at 2 years old, 1.14 (69.9%) at 3 years old, 2.18 (49.5%) at 4 years old, 3.18 (36.1%) at 5 years old, and 3.94 (29.4%) at age 6 years old. The prevalence of dental caries in

children was higher in public nursery schools than in private schools ($p < 0.05$) (Freire, 1996).

In Basto's study, statistical evidence showed that dental caries have the relationship with low educational level of mothers and low family income. He found that the children of the mothers who finished eight or less years of study (CI 95% 1.7-5.0) were more likely to have 2.9 times of dental caries compare with children that have mothers with higher education levels. Children were raised in families with the incomes per month are less than six Brazilian minimum wages were also more likely to have high prevalence of dental caries (OR 2.3 : CI95% 1.4-.8) (Roosevelt, 2007).

In Vietnam, the relationship between social-economic status and dental caries in children was documented in few studies. Bui's studied in 25-36 month aged children has indicated that the prevalence of dental caries of those whose mother's occupation is farmers is significant higher than those whose mother are officers. The prevalence is 71.9% for the former and is 42.5% for the latter.

2.2.2.2. Oral hygiene practice relates to dental caries

A number of studies in recent decades have emphasized the positive effects of healthy behavior of individuals on improving oral health in general as well as dental health in specific (Hugoson et al., 2007). Vehkalahti et al. conducted a study in 1988 to find out if there is a relationship between the present of root caries which are untreated and study subjects' habits on dental health, for example the tooth-

brushing frequency, the assumption of sugar, and the frequency of dental visits. The result showed a high frequency of tooth brushing was significantly associated with a low present of root caries for both men (OR = 4.3, $P < 0.001$) and women (OR = 4.1, $P < 0.001$). A low occurrence of root caries was also related to regular dental visits. For those who check-up at least once in two years (OR = .4, p value < 0.001) in women and (OR = 4.5, p value < 0.001) in men (Vehkalahti, 1988). Some dental health programs which focused on improving oral hygiene habit positively results in the improvement of oral cleaning, particularly plaque cleaning (Hugoson et al., 2007).

2.2.2.3. Eating habits related to dental caries

Eating habit refers sweet is a risk factor of dental caries in children was proved by many researches (Goyal et al., 2007; Pitayarangsarit, 1996). While the sugar consumption from soft drinks and foods is rising, the consumption of pure sweet is significantly decreasing. According to Lingstrom, food intake frequency has also associated with the development of dental caries. A high food intake frequency leads to shorter time for the teeth to demineralize and gives longer periods for the teeth to be demineralized.

Bruno-Ambrosius K et al did a cohort study in adolescent girls in Sweden that showed the importance of having a habit to retain main meals regularly, especially breakfast in preventing caries. The results showed statistics significant ($P < 0.05$) relationship between bad eating habits during the study period and diminished regular main meals. The missing of breakfast, irregular main meals and smoking were

also significantly associated with dental caries (decayed, missed and filled surfaces) increment in the eighth grade students with Odds ratio = 4.1-4.9 and p value < 0.05 (Bruno, 2005).

2.2.2.4. Reinforcing factors related to dental caries

Children's health is mostly affected by their parents' or care givers' health knowledge and attitude. Parent's good dental hygiene habits may be an important consideration to improve their children's oral health. A study done on the oral health behavior, knowledge, and perception of children, mothers, and schoolteachers by Petersen PE et al (P. E. Petersen, Danila, I., Samoila, A., 1995) in Romania in 1993 showed that most of the mothers were aware of the importance of tooth brushing, but 33% also recommended the use of salt to prevent dental caries and periodontal disease. The dental health preventive behavior among mothers with children under 6 years of age in Donka Subdistrict, Uthong district, Suphanburi Province, Thailand was studied by Luong Ngoc Khue (Khue, 2003) showed that only 32.7% of the interviewed mothers brought their children to the dentist for necessary clinical examination and 15.3% of the mothers had their children dental checked-up every six month.

A report that evaluated the Children's Dental Health Initiative's School-Based Dental Program stated that the SBDP increased the access to services of dental preventions including dental treatments, the use of fluorides and oral hygiene habits. Parents in focus groups indicated the most important barriers that construct the way

to experience dental care for their children were transportation, financial problem and limited time. At the end of the 1999-2000 school years, 37 percent of the children who were studying at the schools that had SBDP had dental sealants compared to only 15 percent of those who were studying at the non-SBDP schools (Dark, 2007). A cross-sectional survey aimed to assess the effectiveness of a school-based dental program (SBDP) in controlling caries among children of the age 12 in Indonesia showed that the decayed, missed, and filled teeth (DMFT) of children in good SBDPs schools was 2.8 ± 2.4 , lower than that of the schools that had poor SBDP performance (3.8 ± 3.4) (Amalia, 2012).

2.2.2.5. Enabling factors

(a) Accessibility to dental service

One finding performed by Peng B et al (Peng, 1997) found 46 per cent of 12 years old urban schoolchildren had seen a dentist within the past year; and in another descriptive study that covered 200 primary school children, Sulistianingsih W. found that most children dental information they got came from dentists (Sulistianingsih, 2001). In 2003 Zhu L, Pertersen P. E, Wang H.Y, Bian J.Y and Zhang B.X. studied about oral health knowledge, perception and behavior of children and adolescents in China found that the prevalence of 12 years old primary school children who came to visit the dentist during the previous 12 months or two years were 31.3% and 35.3%.

Vigild M et al (Vigild, 1999) showed that children who had visited a dentist within the last 12 months more often claimed frequent tooth brushing than those

with no previous dental visiting experience

(b) Availability (Are there any dental services on the area?)

Information sources are availability of message for children to approach the knowledge and perception about prevention of dental caries. These sources can include mass media with broadcast media (radio, television) as well as printed media (newspaper, books, pamphlets and poster). Interpersonal information can be given through health personnel, teacher, family and friend. A study in Thailand, Luong Ngoc Khue found that: T.V played the most important role as a source of information about dental health (Khue, 2003). The study in Nakhon Pathom province ,Thailand by Hak Sithan, the result showed 40% of respondent got the information from television (Sithan, 2003).

Khanh Hoa , which is one out of 8 provinces of Coastal Southern Center of Vietnam, has 2 cities, 1 commune and 6 districts. Nha Trang is the main city and located in the East of Khanh Hoa province. The area of the city is 251 km² with a total population in 2011 was 584.200 (GSO, 2011).

3.2.2. Study population

Inclusion criteria:

Six years old children who are living in Nha Trang city Khanh Hoa province Vietnam

Studying at primary schools which have the school based dental program in Nha Trang city Khanh Hoa province Vietnam

Children and their parents agree to participate in the study with informed consent

Exclusion criteria:

Participants who satisfy the inclusion criteria but cannot respond the study questionnaire because of being absent on the day that the study will be taken.

3.3. SAMPLE SIZE CALCULATION

$$n = \frac{Z_{(1-\alpha/2)}^2 p (1 - p)}{d^2}$$

n = sample size

α = level of significant

$Z_{(1 - \alpha/2)}$ = reliability of coefficient based on level of significance. With $\alpha = 0.05$

$Z_{(1 - \alpha/2)} = 1.96$

$p = 0.84$: proportion of dental caries of 6-8 years old reported by the Nationwide Oral Health Survey 1999-2001 in Vietnam

$d=0.05$: acceptable difference

Therefore:

$$n = \frac{(1.96)^2 (0.84)(1 - 0.84)}{(0.05)^2} = 207$$

Giving a 20% drop out rate, allowance was made to add to the sampling figures namely to add its sample size.

An increase of 20% was calculated to a sample size of **248**.

3.4. SAMPLING METHOD

Multiple stage sampling will be used in the study with 3 stages:

In 1st stage, purposive sampling technique will be used to select the study area, which is Nha Trang city Khanh Hoa province, Vietnam. Khanh Hoa province is one of the province that belongs to the Coastal Southern Center of Vietnam, where the DMFT index is 6.98, highest in the nation. An important part of this research is to find out the related factors of dental caries include the role of SBDP so Nha Trang

city where there are primary schools with SBDP will be chosen. Besides, Nha Trang city is the place that the researcher is living so that it is convenient to collect data.

In 2nd stage, purposive sampling technique will be used to select three primary schools in the center of the city. Nha Trang city has 41 primary schools; among that 8 primary schools from suburb area will be excluded because they do not have SBDP. In the center area which has 33 primary schools, only 3 schools have SBDP established with the same standard and coverage in all grades includes the first grade. They are Tan Lap, Phuoc Tien and Loc Tho Primary schools. The total pupils in first grade of these three schools are 547 (Tan Lap: 197, Phuoc Tien: 188, Loc Tho: 162). But the sample size is 207 and after added 20% is 248. So that the pupils will be chosen in each school are:

Tan Lap : $(197 * 207/547) + (197 * 207/547) * 20/100 = 75 + 15 = 90$
pupils

Phuoc Tien : $(188 * 207/547) + (188 * 207/547) * 20/100 = 71 + 14 = 85$
pupils

Loc Tho : $(162 * 207/547) + (162 * 207/547) * 20/100 = 61 + 12 = 73$ pupils

In 3rd stage, simple random sampling technique will be done by computer with generated random numbers technique at <http://www.random.org/> will be used to select 248 pupils from those three primary schools.

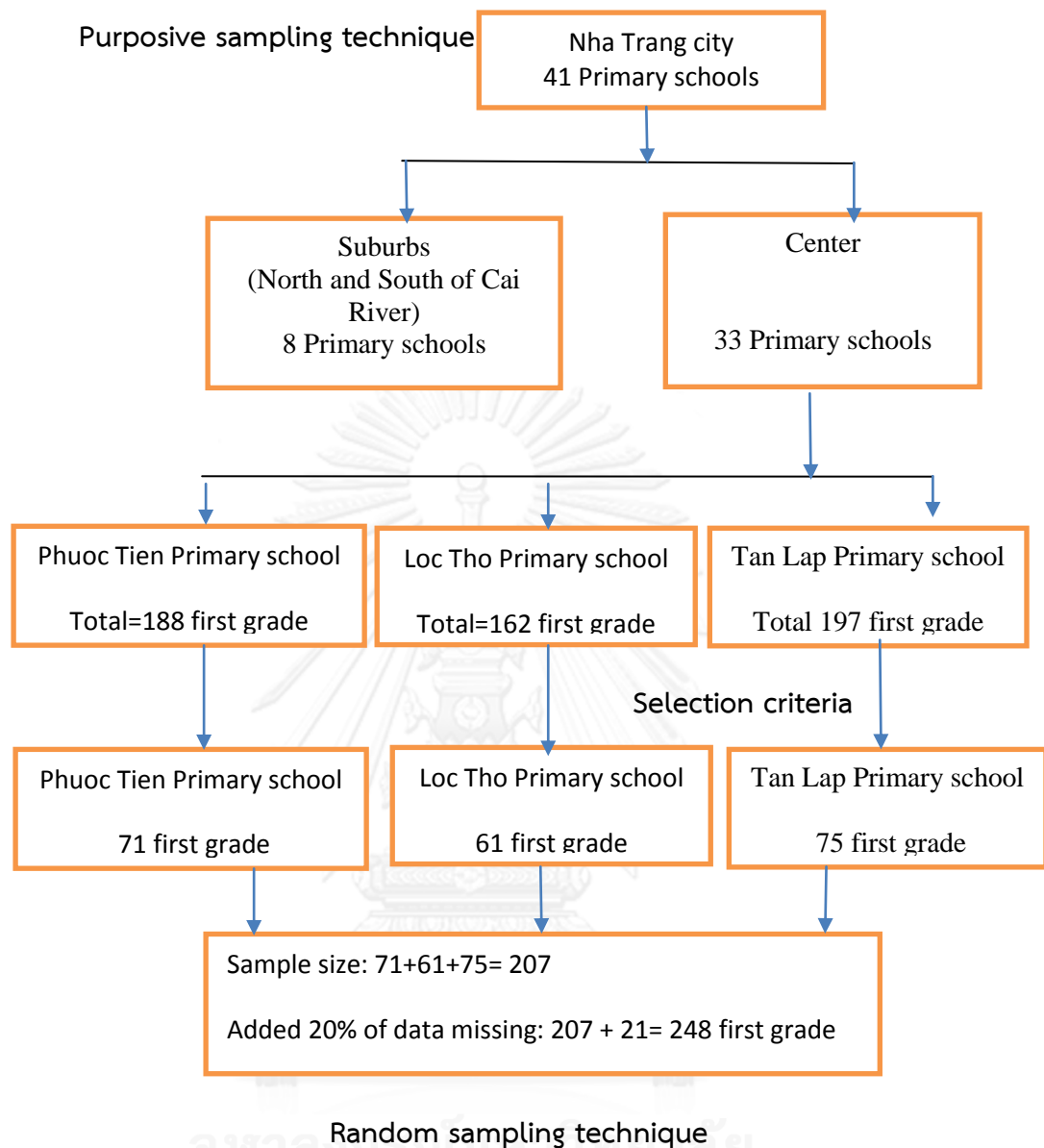


Figure 5. Sampling map

3.5. RESEARCH INSTRUMENTS AND MEASUREMENTS

3.5.1. The data of independent variables will be structured by questionnaire.

The questionnaire is divided into 7 parts:

- 1) *Social economic characteristics*

- 2) *Oral hygiene practice*
- 3) *Dietary*
- 4) *Knowledge and perception on dental caries of children's parents*
- 5) *School based dental programs*
- 6) *Supporting environment*
- 7) *Accessibility and availability to service*

Translation of Questionnaire

Questionnaire and informed consent will be translated into Vietnamese by experts. Questionnaire will be back translated from Vietnamese into English by a second translator; in case of conflict between the two translators, translation process will do again with the third expert translator.

Validity of questionnaire

Three experts in Khanh Hoa Medical College in Vietnam will review content and construct validity of the questionnaire before use.

Pre-test

The pre-test will be organized two weeks before the first day of data collection. The sample of the pre-test is 30 children in Nha Trang city that have similar inclusion criteria as the study sample. The objectives of the test are to determine the response of participants to the questionnaire, validity and clearance of the translation of the study instrument and the appropriateness for the flow of the questions.

The questionnaire will be revised following results of the content validity and pre-test; the responses and suggestions from test takers.

3.5.2. A clinical examination will be used to collect data about dental caries status.

The WHO caries diagnostic criterion for decayed, missing, and filled teeth (DMFT) was used to measure the dental health status. Method of assessing dental caries followed instructions of “Oral Health Surveys - Basic methods, 3rd edition, 1997” (25).

Dental examination will be done with the child seated on an ordinary chair or in a knee to knee position. A mouth mirror and a CPI probe which are sterilized by an autoclave machine will be used to examine children’s teeth. The examiners who will be properly and professionally vested with mask, cap and gloves (the latter were changed at each examination) will use probe very cautiously to prevent damage to the teeth. A tooth is considered present in the mouth when any part of it is visible. Considerable care was taken by examiners while diagnosing tooth-colored fillings, which was extremely difficult to detect. In case of any doubt the tooth will be marked as sound.

Because of the impracticability of using the equipment in all situations, radiography for detection of caries will not recommended. Besides, the use of fiber optics was not recommended also. In this case, in spite of the benefits of both these diagnostic in reducing the underestimation of the need for restorative care, they

cannot defeat the extra complication and frequent objections to exposure to radiation.

Codes for the dentition status of primary and permanent teeth (crowns and roots) are given in the table below:

Code			
Primary teeth	Permanent teeth		Condition/status
Crown	Crown	Root	
A	0	0	Sound
B	1	1	Decayed
C	2	2	Filled, with decay
D	3	3	Filled, no decay
E	4	-	Missing, as a result of caries
-	5	-	Missing, any other reason
F	6	-	Fissure sealant
G	7	7	Bridge abutment, special crown or veneer/implant
-	8	8	Unerupted tooth (crown)/unexposed root
T	T	-	Trauma (fracture)
-	9	9	Not recorded

Decayed, Missing, and Filled Teeth Index (DMFT) or decayed, extracted and filled teeth Index (deft)

The **D (d)**-component includes all teeth with codes 1 or 2. The **M (e)**-component comprises teeth with code 4 in subjects under 30 years of age, and teeth coded 4 or 5 for subjects 30 years and older, i.e. missing due to caries or for any other reason. The **F(f)**-component includes only teeth with code 3. Teeth coded 6 (fissure sealant) or 7 (bridge abutment, special crown or veneer/implant) are not included in calculations of the DMFT.

3.6. DATA COLLECTION:

Data collection process of this research had the details as follow:

The researcher introduce the principal of each primary school the aim of this study and the data collection process in detail as well as asking for the cooperation from schools in collecting data.

The researcher have meeting with teachers and pupils of the first grade and informed the aim of this study and the data collection process in detail as well as asking for the cooperation from teachers and pupils and also give the planning schedule to collect data.

The pupils will be tested by the dentists from Khanh Hoa Medical College and the data will be collected.

The questionnaire will be delivered to the pupils and will be brought back home to their parents. The researcher will collect all the questionnaire papers the day after.

3.7. DATA ANALYSIS

Data analysis will be done by using SPSS 16 software. The missing information is recollected for completion.

Descriptive statistic includes frequency distribution and mean were used to describe dental caries experience (DMFT/deft). Frequency distribution was used to describe the general characteristic, oral hygiene practices, eating habits, and perception of oral problem. Since seven statements in the questionnaire of parental knowledge and perception on oral health were positive statements, 1, 2 and 3 score were assigned for disagree, not sure and agree response. For the parents with the total score of perception and knowledge on dental caries were equal to or above (higher) the median, they were categorized as good score and those with the total score were under the median value, were categorized as poor score. Similarly, SBDP and supporting environment were divided into two groups which were good and poor level. All of the statement were supportive so that positive answer (yes or appropriate) was signed for 1 point and negative answer (no or inappropriate) was signed for zero (0) point for each. Those with score were above or equal to the median value was categorized in the good level group and the other whose score was under the median was categorized in the poor level group.

Chi-square was used to test the association between oral hygiene practices, eating habits and dental caries prevalence when both dependent and independent variables were categorical

To test the deft score and dichotomous variables, the Mann-Whitney tests were employed. The Kruskal-Wallis tests were used, due to the stratification in more than two categories. The choice of non-parametric tests is justifiable, since the caries index utilized (deft) was not present a normal distribution. The findings were reported through p-value, Risk Ratio (RR), and 95% Confidence Interval (CI)

3.8. ETHICAL CONSIDERATIONS

The research proposal will be reviewed and approved by Ethical Review Board of Khanh Hoa Medical College in Nha Trang city, Khanh Hoa province, Vietnam.

All study participants will be provided adequate study information before decision of participation in the study. They can discontinue from the study whenever they want.

All data collected from each individual will be kept private and confidential.

3.9. LIMITATION AND SOLUTION

A cross-sectional study design cannot completely modify the dental caries status because dental caries have a lot of cumulative characteristics. However, the DMFT/deft index is still used to identify epidemiologic data of dental caries and cross-sectional survey still is acceptable to define the dental caries status in population because of feasibility of finance and gathering sample.

The study limited in 6 years old children in some primary schools in Nha Trang city so that the results cannot be applied to all 6 years old children in Khanh

Hoia province as well as to 6 years old children in Vietnam. The results of this study are expected to be useful as baseline data in planning dental caries educational and prevention program for children.

3.10. EXPECTED BENEFITS

The results of this study are expected to be useful as baseline data in planning dental caries educational and prevention program for children. The study findings may be used for promotion health policy makers to design the intervention programs in order to increase awareness of parents or care givers on their children's oral health. Besides, the study will be a suggestion for other scientists to research more deeply in this field.

Chapter 4

RESULT

This chapter will be divided into two parts. The first part is the statistical descriptions of all the independent variables that include general characteristics factors, oral hygiene practice, and dietary, reinforcing factors and enabling factors. This part also includes the general dental status of the participants. The second part shows the associations between dental caries, measured by deft score (continuous variable) and deft category (presence or absence of non-zero deft), and general characteristics, oral hygiene practice, dietary, knowledge and perception of oral health, SBDP and enabling factors. It was originally proposed to use DMFT score also to measure the status of the sixth teeth which are permanent teeth. However, there are 48 participants with two sixth teeth (36 and 46), 30 participants with one sixth tooth (36 or 46), most of them are in the process of dentition and none of them is affected by caries. So that this study is focus on primary tooth status among six years old children with the measurement scale is deft.

4.1. STATISTICAL DESCRIPTIONS

4.1.1. General characteristics of six years old children and their parents

General characteristics of six years old children and their parents are presented in table 3. A total of 248 first grade pupils in three primary schools in Nha Trang city were examined the dental caries status. Among that, 54.4% were male, and 45.96%

were female.

The age of parents or care givers are divided into two groups with the percentage is nearly equal between them. The minimum age is 26, the maximum age is 63, and the mean age is 36.8 with the standard deviation of 6.26. The number of parents or care givers with the age from 26 to 36 is 128 (51.6%) and the one from 37 to 63 is 120 (48.4%).

Most of the parents graduate from university or college with the number is 104 (41.9%) and high school 67(27.0%). Forty parents (16.1%) have the highest education is high school and very few of the parents only graduate primary school (1.6%). None of them cannot read or write and two of them get the master degree (0.8%).

Table 3 : General characteristics of participants and their parents

Characteristics (n=248)	Number of subjects (%)
Gender	
Male	135 (54.4)
Female	113 (45.6)
Age of parents or care givers	
26-36	128 (51.6)
37-63	120 (48.4)

Mean: 36.8 S.D: 6.26 Max: 63 Min: 26

Highest education of parents

Cannot read or write	0 (0)
Primary school	40 (16.1)
Secondary school	35 (14.1)
High school	67 (27.0)
College/ Occupation training/ University	104 (41.9)
Other (master degree)	2 (0.8)

Occupation of parents

Labor	38 (15.3)
Farmer/ Gardener	12 (4.8)
Government employee	92 (37.1)
Factory worker	46 (18.5)
Private business	59 (23.8)
Other (missing, don't know)	1 (.4)

Total family's income

<= 3,000,000 (VND)	31 (12.5)
3,000,001 – 7,000,000 (VND)	94 (37.9)
7,000,001 – 10,000,000 (VND)	86 (34.7)
10,000,001 – 20,000,000 (VND)	36 (14.5)
>20,000,000 (VND)	1 (.4)

Regarding the occupation, one third of the parents are government employee (37.1%), more than one fifth of them generate private business (23.8%). The percentage of occupation as factory worker and free labor is nearly equal (18.5% and 15.3%) and the fewest is farmer or gardener with the number is 12 (4.8%).

The total income of the family of the participants are nearly divided into three groups with the highest total income (>20,000,000 VND) is only one (.4%). The other two groups include two types of income in each that has the nearly equal percentage. The percentage of average income is 37.9% and 34.7%. The percentage of low and high income is 12.5% and 14.5%.

4.1.2. Dental status of the participants

Table 4. Dental status of the participants

Dental status n=248	Frequency % (*)	Mean Score ± SD
deft	219 (88.3)	5.04 ± 3.43
dt	213 (85.9)	4.33 ± 3.12
et	57 (23)	0.34 ± 0.69
ft	59 (23.8)	0.38 ± 0.82

*prevalence of non-zero measurements only, for example 23.8 is prevalence of ft>0

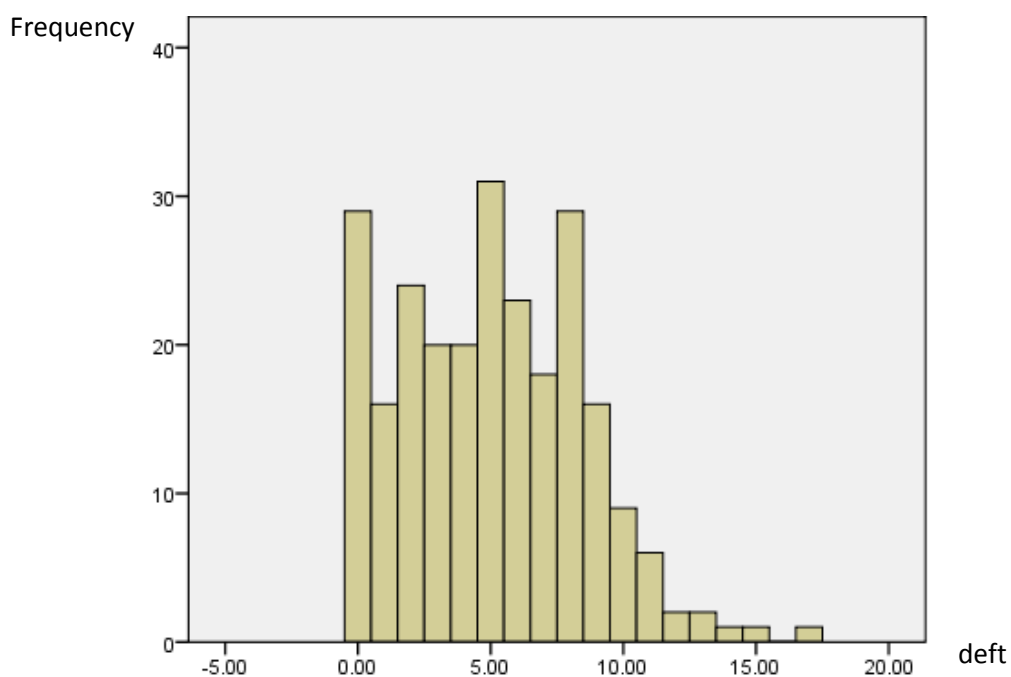
The prevalence of dental caries is the proportion of children with $deft > 0$. From the table 4, the prevalence of 6 years old children affected by caries is 88.3% with the mean score is 5.04. Among that, 85.9% have caries without treatment, 23% were extracted teeth and 23.8% of them have their teeth filled. Mean score of decayed teeth in this population is 4.33 while the means of extracted teeth (presented by et) and filled teeth (concerned with the treatment of caries) are nearly equal, that are 0.34 and 0.38 respectively.

Table 5. Test of Normality of $deft$

	Kolmogorov – Smirnov (a)		
	Statistic	df	p-value
Deft	1.43	248	.33
decayed teeth	1.96	248	.01
extracted teeth	7.22	248	<.001
filled teeth	6.92	248	<.001

According to table 5 and figure 6, the distribution of $deft$ in the population is non-normal. So that, non-parametric tests will be used to measure the relationship between this variable and others variables.

Figure 6. Histogram of deft score



4.1.3. Oral hygiene practice and Dietary description

Table 6. Oral hygiene practice and Dietary description

Oral hygiene practice and Dietary	Frequency	Percentage (%)
Oral hygiene practice		
Brush teeth		
Yes	248	100
No	0	0
Self-brush		
Yes	215	86.7
No	33	13.3

Oral hygiene practice and Dietary	Frequency	Percentage (%)
Oral hygiene practice		
Frequency of brush		
Once every day	91	36.7
Twice every day	128	51.6
More than twice every day	29	11.7
Time of brush		
In the morning (after getting up)	69	27.8
In the evening (before going to bed)	22	8.9
In the morning and in the evening	128	51.6
After meals	29	11.7
Toothpaste use		
Yes	201	81
No	47	19
Method of brush		
Move the brush back and forth	101	40.7
Move the brush up from the bottom and down from the top with circular motion	84	33.9

Move the brush as strongly as possible	42	16.9
Move the brush on the occlusion surface only	21	8.5

Dental visit

Dentist check

Yes	197	79.4
No	51	20.6

Dental visit

Frequency of dentist check (n=197)

Once per six months	74	37.6
Once per year	95	48.2
Other (when having dental problems)	28	14.2

Dietary

Favorite drink between meals

Gas drink	61	24.6
Juice	38	15.3
Water	74	39.8
Milk	75	30.2

Other	0	0
Favorite snack between meals		
Fresh fruit	81	32.7
Biscuits/ Cakes	68	27.4
Potato chip/ Other snack	65	26.2
Candies/ Chocolate	34	13.7

According table 6, there is no children who do not brush teeth and 86.7% brush teeth by themselves. More than half of the children brush their teeth directly or passively by their parents twice a day (51.6%) that are in the morning and in the afternoon. One third of them brush their teeth only once per day with 69 participants (27.8%) do it in the morning and 22 participants (8.9%) choose in the evening before going to bed. The proportion of children who brush their teeth more than twice a day that refers to after every meal is the smallest with 29 participants (11.7%). One fifth of the children (19%) do not use toothpaste or their parents do not apply toothpaste on tooth brush when brushing their children's teeth. Aside, the number of participants who use toothpaste is still high with the percentage of 81% (201 children). Regarding the method of tooth brush, 101 children (40.7%) move the brush back and forth, 84 (33.9%) move the brush up from the bottom and down from the top with circular motion, 42 (16.9%) move the brush as strongly as possible and 21 (8.5%) move the brush on the occlusion surface only.

Almost the children have been brought to dentist at least one time with the percentage is 79.4% (197) respectively. Besides, 51 subjects of the sample have never been to dentist. After excluding 51 subjects, statistical calculation was done with the total number is 197 to find out the frequency of dentist visit. Half of the children were brought to dentists once per year (48.2%) while 37.6% go there quite more often with the frequency is twice per year and the smallest percentage is 14.2% which belongs to the rest who were brought to dentists when they had problems such as toothache.

Regarding the favorite drinks between meals, the largest proportion is 30.2% which presents milk. 29.8% of the participants drink water, 24.6% has gas drinks as the favorite drinks and 38 participants like juice (15.3%). Another element in the category of dietary is favorite snack between meals. One third of them likes fresh fruit (32.7%) while 13.7% of them like candies or chocolate. The percentage of biscuits or cake and potato chip or other snack is nearly equal that are 27.4% and 26.2% respectively.

4.1.4. Perception and knowledge of parents on dental caries

Table7. Number and percentage of parents' perception and knowledge on dental caries.

No	Statement	Agree		Not sure		Disagree	
		n=248	%	n=248	%	n=248	%
1	Six years old children can have permanent tooth/teeth	79	31.9	135	54.4	34	13.7
2	Extracting the tooth is not the best way to reduce the dental pain caused by that tooth.	70	28.2	104	41.9	74	29.8
3	It is necessary to fill a primary decay tooth	93	37.5	92	37.1	63	25.1
4	Brushing teeth in the right way after every meal can prevent tooth decay	180	72.6	47	19.0	21	8.5
5	Food with a lot of sugar composition may increase dental caries	202	81.5	32	12.9	14	5.6
6	Visit the dentist every six months is necessary	187	75.4	53	21.4	8	3.2
7	Dental treatment costs are expensive	174	70.2	60	24.2	14	5.6

Table 7 showed the number and percentage of parents' perception and knowledge on dental caries. 31.9% know that six years old children can have permanent tooth/teeth that refers to the sixth teeth, 28.2% agree that extracting the tooth is not the best way to reduce the dental pain caused by that tooth, 37.5% think that it is necessary to fill a primary tooth when it is decayed, 72.6% agree that tooth decay can be prevented by brushing teeth in the right way after every meal, 81.5% support the opinion that food with a lot of sugar composition may increase dental caries, 75.4% think that it is necessary to visit dentist every six months and 70.2% of the parents agree that dental treatment costs are expensive.

While most of the children's parents agree with the above comments, some of them do not agree. 13.7% do not know that the sixth tooth which is a permanent tooth can present in six years old children , 29.8% want the tooth that is decayed to be extracted to reduce the dental pain caused by that tooth, 25.4% do not agree that it is necessary to fill a primary tooth when it is decayed, 8.5 % do not know that tooth decay can be prevented by brushing teeth in the right way after every meal, few of them (5.6%) do not support the opinion that food with a lot of sugar composition may increase dental caries, only 3.2% do not think that it is necessary to visit dentist every six months and 5.6% of the parents think that dental treatment costs are not expensive.

Since all of seven statements above were good perception and knowledge on dental caries, 1, 2 and 3 score were assigned for disagree, not sure and agree response. The

maximum score was 21, the minimum was 13 and the median was 17 (S.D:2.03). For the parents with the total score of perception and knowledge on dental caries was from 17-21 they were categorized as good level score and those with the total score was from 13-16 was categorized as poor level score.

Table 8. Level of parents' knowledge and perception on dental caries

Level of knowledge and perception	Number n=248	Percentage (%)
Good level score (\geq Median)	150	60.5
Poor level score ($<$ Median)	98	39.5
Min: 13 Max: 21 Median: 17.0 S.D: 2.03		

Score: Good = 17-21

 Poor = 13-16

As from table above, 60.5% of the parents have good knowledge and perception on dental caries while 39.5% of them got the poor level.

4.1.5. School Based Dental Program and supporting environment

Table 9. SBDP and supporting environment description

No	Statement	Yes (Appropriate)		No (Inappropriate)	
		Number	%	Number	%
School Based Dental Program					
1	Does participant's teacher give him/her information about dental caries?	205	82.7	43	17.3
2	Does participant's teacher remind him/her about healthy and cariogenic food?	192	77.4	56	22.6
3	Does participant's teacher give him/her information about tooth brushing technique?	150	60.5	98	39.5
4	Does participant's teacher remind him/her to have his/her oral health examine by school district dentist once every six months?	129	52.0	119	48.0
Supporting environment					
5	Place for participant to brush teeth at his/ her school	140	56.5	108	43.5
6	Condition of participant's tooth	93	37.5	155	62.5

brush at his/her school

Facilities for Sodium Fluoride

7	0.2% mouth rinsing at his/her school	97	39.1	151	60.9
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Concern with School based dental program, 82.5% of the parents said that their children received the information of dental caries from teachers at school, 77.4% agree that the teachers do teach their children the good and unhealthy food for dental health, 60.5% said that the school give information about technique to brush teeth to the children and half of the parents agree that the participants were checked dental status for every six months. Some of the parents gave more detail that their children do not stay at school over noon but they still have comment on the supporting environment questionnaire based on their observation. Totally, 56.5% of them said that the places for their children to brush their teeth are appropriate, 37.5% think that the tooth brushes of their children at school are in good condition and 39.1% said that their children received Sodium Fluoride 0.2% by rinsing their mouths from adequate facilities at school.

Similarly with parental knowledge and perception on dental caries, SBDP and supporting environment were divided into two groups which were good and poor level. All of the statement were supportive so that positive answer (yes or appropriate) will be signed for 1 point and negative answer (no or inappropriate) will be signed for zero (0) point for each. The maximum score was 7, the minimum score was 0 and the median was 4. Those with score were form 5-7 was categorized in the

good level group and the other whose score was from 0-4 was categorized in the poor level group.

Table 10. Level of SBDP and supporting environment

Level of SBDP and supporting environment	Number n=248	Percentage (%)
Good level score (\geq Median)	100	40.3
Poor level score ($<$ Median)	148	59.7
Min: 0 Max: 7 Median: 4.0 S.D: 2.03		
Score: Good = 5-7		
Poor = 0-4		

4.1.6. Accessibility and availability

Table 11. Number and percentage of children by dental services accessibility and availability

No	Statement	Frequency	Percentage (%)
1	Do you know where to take participant to dental service?		
	Yes	248	100
	No	0	0
2	How far is your residence from the place to receive dental service?		

<3km	87	35.1
3-5km	98	39.5
>5km	63	25.4

3 How long does participant wait before receiving dental service?

<30 minutes	72	29.1
30-60 minutes	107	43.1
>60 minutes	69	27.8

4 From which of the following media does participant generally receive information concerning preventive dental caries?

Newspaper/ Magazine	39	15.7
TV	173	69.8
Radio	27	10.9
Other (internet, do not know)	9	3.6

5 From which of the following personnel does participant generally receive information concerning preventive dental caries?

Dentists	59	23.8
Parents	90	36.3
Teachers	98	39.5
Friends	1	.4
Others	0	0

Table 11 showed that 100% of parents said they know where to take their children to when they need dental services. The percentage of distance from their houses to dental offices is nearly equal between the distance of less than 3 km and 3-5 km which are 35.1% and 39.5%. The rest 25.4% reported dental offices are >5km far away from their houses. Most of them (43.1%) said that their children have to wait from 30-60 minutes before being checked at dental offices and the proportion of children who have to wait <30 minutes or >60 minutes are almost equal as 29.1% and 27.8% respectively. The highest percentage of media source which give children information dental caries knowledge is 69.8% that belongs to television. 15.7% children received information from magazine or newspaper through their pictures, 10.9% received from radio on healthy life program and the smallest proportion is 3.6% with 9 participants said that they received information from internet source. Regarding the personnel source, 39.5% were taught dental caries knowledge at school from their teachers, 36.3% got information from their parents, 23.8% received information from their dentists and occasionally, only one reported that the child

was received dental information from his friends.

4.2. RELATIONSHIP BETWEEN DENTAL CARIES AND GENERAL CHARACTERISTICS, ORAL HYGIENE PRACTICE, EATING HABITS, PERCEPTION AND KNOWLEDGE OF PARENTS ON DENTAL CARIES, SBDP, ACCESSIBILITY AND AVAILABILITY FACTORS.

4.2.1. Relationship between general characteristics and deft sore

Table 12. Relationship between deft score and gender, group of parents' age.

	n	Mean rank	Mann-Whitney U Z (p-value)
Gender			-.124 (.901)
Female	113	123.88	
Male	135	125.01	
Age by group			-0.856 (.392)
26-36	128	128.26	
37-63	120	120.49	

Table 12 showed the relationship between deft score and gender, age of parents by groups. There are no deft mean rank significant differences between female and male nor two age of group.

Table13. Relationship between deaf score and parental highest education, occupation, total income per month

Level	N	Mean rank	p-value
Highest education			<.001
Cannot read or write	-	-	
Primary school	40	166.5	
Secondary school	35	135.73	
High school	67	129.91	
College/ Occupation training/ University	104	101.97	
Other(master degree)	2	78.5	
Occupation			.323
Labor	38	135.54	
Farmer/ Gardener	12	144.38	
Government employee	92	114.94	
Factory worker	46	118.23	
Private business	59	134.28	
Other (missing, do not know)	-	-	
Total income per month			.002

<= 3,000,000 (VND)	31	134.03
3,000,001 – 7,000,000 (VND)	94	142.36
7,000,001 – 10,000,000 (VND)	86	116.69
10,000,001 – 20,000,000 (VND)	36	90.19
>20,000,000 (VND)	1	57.50

Kruskal-Wallis test

Table 13 showed that the higher education level of parents, the lower mean rank of deft score of children. Highest education level (master degree) is most likely not to be affected by dental caries while the highest of mean rank of deft score belongs to those whose parents' highest education level is primary school. This association between deft score and level education of parents is significant statistically with the p-value is less than 0.001. The table also shows that the highest mean rank belongs to the children whose parents occupation are farmer or gardener and the lowest belongs to group with parents work as government employee. Children with parents have private business or work as free labors are more likely affected by dental caries than those with parents work as factory workers. Totally, there are no significant association between deft score and the occupation of parents. The last factor of general characteristics is total income per month of family shows strongly statistically significant association with deft score (p-value=.002). The higher total income of the family, the lower deft score of the children. The highest

deft score appeared in the group of children with family total income per vary from 3,000,000 VND to 7,000,000 VND and the lowest deft score can be seen in those whose family total income per month are more than 20,000,000 VND per month.

4.2.2. Relationship between oral hygiene practice and deft category

Table 14. The relationship between deft category and oral hygiene practice

Oral hygiene practice	deft category		Chi-Square p-value
	deft=0	deft>0	
Self- brush			.250 (.617)
Yes	26 (89.7)	189 (86.3)	OR=1.376 95%CI= (.392-4.829)
No	3 (10.3)	30 (13.7)	
Frequency of tooth brush			81.909 (<0.001)
Once every day	2 (6.9)	89 (40.6)	
Twice every day	9 (31.0)	119 (54.3)	
More than twice every day	18 (62.1)	11 (5.0)	
Time of brush			83.061 (<0.001)
In the morning	1 (3.4)	68 (31.1)	
In the evening	0 (0)	22 (10.0)	
In the morning and in the evening	10 (34.5)	118 (53.9)	
After meals	18 (62.1)	11 (5.0)	

Toothpaste use			7.679 (0.006)
Yes	29 (100)	172 (78.5)	OR = .856
No	0 (0)	47 (21.5)	95%CI = (.080-.906)
Dentist check (n=248)			3.756 (.053)
Ever	27 (93.1)	170 (77.6)	OR=3.891
Never	2 (6.9)	49 (22.4)	95%CI=(.89-16.94)
Frequency of dentist check (n=197)			35.183 (<0.001)
Once per six months	24 (88.9)	50 (29.4)	
Once per year	2 (7.4)	93 (54.7)	
Other (having dental problems)	1 (3.7)	27 (15.9)	

All of the categories from oral hygiene practice are significant associated with deft category except for self-brush element. There are significant differences among the proportion of dental caries frequency of tooth brush with the lowest proportion belongs to those whose teeth more than twice every day (5.0%). The same situation can be found in time of brush and method of brush with the smallest proportion of dental caries are distributed to comment brush teeth after every meals (5.0%) and move the brush on the occlusion surface only (9.6%). Frequency, time and method

of brushing are statistically significant associated with deft categories with the p-value are less than 0.001. The association between deft score and toothpaste use is also significant (p-value=0.006) with OR=0.856 (95%CI: 0.808-0.906). There is an inverse situation in dental check category when the percentage of dental caries of children who were brought to dentist is higher (77.6) than the one of children who were not (22.4). The association between dental check and deft category is nearly significant with p-value=0.053. Beside, among those who have ever been taken to dentist, the proportion of dental caries is lower when the frequency is higher. This association is strongly significant with p-value<0.001.

4.2.3. Relationship between dietary and deft score

Table 15. Relationship between dietary and deft score

Dietary	n	Mean rank	Chi-Square p-value
Favorite drink between meals			9.482 (0.024)
Gas drink	61	143.96	
Juice	38	100.07	
Water	74	126.57	
Milk	75	119.01	
Favorite snack between meals			24.492 (<0.001)
Fresh fruit	81	92.8	

Biscuits/ Cakes	68	133.98
Potato chip/ Other snack	65	144.28
Candies/ Chocolate	34	143.25

Kruskal Wallis Test

The significant associations were found between dietary habit and deft score with the p-value is 0.024 in the former and <0.001 in the later. Mean of deft score is least in children who like juice (100.07) and highest in those who like gas drink (143.96). Dental caries status as presented by deft score is lower in children with the habit of having fresh fruit and worse in group who like sweets food.

4.2.4. Relationship between parental knowledge and perception on dental caries level and deft score

Table16. The association between deft score and level of parental knowledge and perception on dental caries

Level score	n	Mean rank	Z (p-value)
Good	150	115.45	-2.470 (0.014)
Poor	98	138.36	

Mann-Whitney U test

Table 16 showed the proportion of deft score in children whose parental knowledge and perception on dental caries is poor is higher than the one who have

good level score on knowledge and perception. This association is statistically significant with p-value=0.014.

4.2.5. Relationship between deft category and SBPD, Supporting environment level

Table17. Relationship between deft category and SBPD, Supporting environment level

Supporting environment and SBPD level	deft category		Chi-Square p-value
	deft=0	deft>0	
			38.019 (<0.001)
Good level	27 (93.1)	73(33.3)	OR=27
Poor level	2 (6.9)	146(66.7)	95%CI=(6.248-116.673)

The proportion of dental caries is nearly double in the group with poor level of SBPD and supporting environment compare with the good level one. This association is strongly significant with the p-value is less than 0.001. Children who received SBPD and supporting environment in poor level tend to get dental caries 27 times compare with those who received the good quality (OR=27, 95%CI=6.248-116.673).

4.2.6. Relationship between accessibility, availability and deft category

Table18. Relationship between accessibility, availability and deft category

Accessibility and availability	Mean	Rank	Chi-square (p-value)
Accessibility			
Distant to dental service			20.207 (<0.001)
<3km	87	109.07	
3-5km	98	133.94	
>5km	63	131.13	
Waiting time			1.850 (0.396)
< 30 minutes	72	121.78	
30- 60 minutes	107	122.78	
> 60 minutes	69	131.13	
Availability			
Media source			0.062 (0.996)
Newspaper	39	123.10	
TV	173	124.66	
Radio	27	125.22	
Other (internet)	9	125.22	

Accessibility and availability	Mean	Rank	Chi-square (p-value)
Personnel source			0.380 (0.944)
Dentists	59	122.19	
Parents	90	125.22	
Teachers	98	125.08	
Friends	1	139.00	

Kruskal Wallis Test

Regarding the relationship between deft category and accessibility to dental service, only the distance from children's houses to dentist offices has the statistically significant association with deft score with p-value less than 0.001. The one whose house is further from the dental service is more likely to have dental caries than the other. Time of waiting before receiving dental service is no significant associated with deft category. Besides, the availability and deft category has no association with the p-value is 0.996 of the former and 0.944 of the later. The difference in mean rank among media sources is not significant while the highest mean rank of deft score in personnel source is attributed by friends.

Chapter 5

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1. DENTAL CARIES PREVALENCE OF PARTICIPANTS

The prevalence of dental caries which was found in this study is 88.3%, higher than the proportion 83.7% of six years old children, who were affected by dental caries from National Oral Health Survey of Vietnam in 2001, the main reference source of this study. However, the deft score of this study was found to be 5.04, lower than the survey in 2001 which is 6.15. The dt component (4.33) is also lower than the survey in 2001 (5.9). This means the number of children in the population affected by dental caries is increased but the number of affected teeth of each participant is decreased. The et and ft score in this research is higher than those in the survey with the number of 0.34 and 0.38 compare with 0.2 and 0.0. It can be explained by the increasing of the use of dental services which was the result of the increasing of living level and the developing of health care system. The higher ft score is a good finding, showing more attention from parents and social support to children's dental health care.

5.2. GENERAL CHARACTERISTICS OF THE PARTICIPANTS, THEIR PARENTS AND THE RELATIONSHIP WITH DENTAL CARIES

Among 248 first grade pupils in three primary schools in Nha Trang city, who

were examined the dental caries status, 54.4% were male, and 45.96% were female. This proportion was expected to be nearly equal but the finding is not. Aside, this finding can be suitable for the situation in Vietnam that the ratio of gender is tending to be higher in male in recent years. However, there was no significant association between gender of children and their parental age group with deft score.

Another finding of this study is that the more educated parents the less children's deft score with a strongly statistical significant association (p-value <0.001). Similarly, higher deft score were found in lower total income per month group. This association is also significant with p-value is 0.002. This is appropriate with Basto's study which has statistical evidence showed that dental caries have the relationship with low educational level of mothers and low income families. He found that the children of the mothers who finished eight or less years of study (CI 95% 1.7-5.0) were more likely to have 2.9 times of dental caries compare with children that have mothers with higher education levels. Children were raised in families with the incomes per month are less than six Brazilian minimum wages were also more likely to have high prevalence of dental caries (OR 2.3: CI95% 1.4-.8) (Bastos et al., 2007). This relationship can be easily explained in every society. The more education people received, the more knowledge they get, including dental knowledge. And since having more money, parents will give more attention on their children's health. This can lead to the decreasing of deft score in the group of children whose parents are more educated and family total income is higher. Besides, there is no significant

association was found between parental occupation and dental caries from this study.

5.3. ORAL HYGIENE PRACTICE OF THE PARTICIPANTS AND RELATIONSHIP WITH DENTAL CARIES

All the respondents said that their children's teeth were brushed every day. Among that only 13.3% did not brush teeth themselves. Six years old is the age that children can manage to do their individual oral hygiene practice. Moreover, most of parental occupation which was found in this study is government worker so that they did not have time to brush their children teeth. It is also good for children to brush themselves so they can do it at school and make it a good habit.

Most of them brush teeth twice a day and 33.9% does it by moving the brush up from the bottom and down from the top with circular motion which is the right way. However the proportion of children who move the brush back and forth is the highest one. It is absolutely not a good way to brush their teeth. This is suited with the finding that 60.5% the participants said that they received the knowledge of tooth brushing from teachers at school. 201 (81%) of the children use toothpaste and 79.4% said that they have been to dentists for dental check. Even though 70.2% respondents agree that dental services are expensive but the proportion of dental visit is still high, that can be explained by the increasing of total income per month of the family and the higher education of parents. All the categories of oral hygiene practice have significant associations with dental caries status with the p-value are

less than 0.005 all, except for the self _brush element. Same conclusion can be found in Vehkalahti et al. study conducted in 1988 that high frequency of tooth brushing was significantly associated with a low present of root caries for both men (OR = 4.3, P < 0.001) and women (OR = 4.1, P < 0.001). A low occurrence of root caries was also related to regular dental visits. For those who check-up at least once in two years (OR =.4, p value < 0.001) in women and (OR = 4.5, p value < 0.001) in men (Vehkalahti & Paunio, 1988).

5.4. DIETARY AND THE RELATIONSHIP WITH DENTAL CARIES

The number of 38/248 and 81/248 of children like juices and fresh fruit which is good for dental health. Most of them would rather use gas drink and snack, sweet things as their snacks between meals. Dental caries status as presented by deft score is lower in children with the habit of having fresh fruit and worse in group who like sweets food. These associations were found significant between dietary habit and deft score with the p-value are 0.024 and <0.001. This is similarly with Lingstrom's study which showed food intake frequency had associated with the development of dental caries. A high food intake frequency leads to shorter time for the teeth to demineralize and gives longer periods for the teeth to be demineralized (Lingstrom, 2006).

5.5. PARENTAL KNOWLEDGE AND PERCEPTION ON DENTAL CARIES AND THE RELATIONSHIP WITH DENTAL CARIES.

High proportion of parents (81.5%) know that food with high sugar consumption can cause dental caries. 72.6% supported the statement that brushing teeth after every meals in the right way can prevent dental caries and 75.4% know that it is necessary to visit dentists every six month. However few of parents (31.9%) know that it can have sixth teeth in children at six years old and the percentage of parents supported extracting teeth to reduce the pain caused by decayed or it is not necessary to fill a primary decayed teeth is still high. This shows an alarm to the oral health communication to give more knowledge to parents about oral health. Sixth teeth are permanent teeth and it is very dangerous if it is decayed in such the early age of six and not to be treated or to be extracted. It also influences the permanent teeth when the primary teeth are extracted too early before the right age.

When dividing into two levels, 60.5% of them have good level score and 39.5% are at poor level score. Children with parental knowledge and perception levels are good have less dental caries than the rest. This association is statistically significant with $p\text{-value}=0.014$. The finding of this study shows the prevalence which are higher than those of the research of Luong Ngoc Khue (16) in Donka Subdistrict, Uthong district, Suphanburi Province, Thailand, showed that only 32.7% of the interviewed mothers brought their children to the dentist for necessary clinical examination and 15.3% of the mothers had their children dental checked-up every

six month.

5.6. SBDP AND SUPPORTING ENVIRONMENT AND THE RELATIONSHIP WITH DENTAL CARIES.

Most of the children received SBDP activities at school and some of the activities were found to be not appropriate enough like place for children to brush their teeth and the Sodium Fluoride 0.2% supplement to rinse their mouths. Also be divided into two level, children who received SBDP and supporting environment in poor level tend to get dental caries 27 times compare with those who received the good quality (OR=27, 95%CI=6.248-116.673). This association is significant with p-value <0.001. It pointed out the important of School based dental program in primary school and the effectiveness of it on preventing dental caries in children.

5.7. ACCESSIBILITY AND AVAILABILITY TO DENTAL SERVICE AND THE ASSOCIATION WITH DENTAL CARIES.

The study found that 100% of respondents know the place of dental service to take their children to when they need. Most of them live not too far from dentist offices with 39.5% have the distance varies between 3 and 5 km and 35.1% live not further than 3km from dentist office. Since Nha Trang city is not big and the number of dental services here is large including government and private sectors, this proportion can be explained. The highest proportion of availability assessment is

69.8% that belongs to television, which is higher than a study in Nakhon Pathom province, Thailand by Hak Sithan, which showed 40% of respondent got the information from television (24). This finding also have same conclusion with a study in Thailand conducted by Luong Ngoc Khue which found that television played the most important role as a source of information about dental health (23). Only 3.6% of children received dental information from internet due to the limited with this source of information at the age of six. Most of them received dental knowledge from the SBDP School by their teachers and only 0.4% received from their friends. It is appropriate for this age since six years old is too young to have effective communication. The relationship between deft category and the distance from children's houses to dentist offices has the statistically significant association with deft score with p-value less than 0.001.

5.8. LIMITATION

This study is a cross-sectional design which has the low strength in research methodology so that it cannot thoroughly explain the dental caries status and the relationship with independent variables. However this kind of study is still acceptable to describe the prevalence as many researchers have done before thanks to its convenience and suitable for small budget. The statistics technique used in this study is rather simple, which not concerned with multivariable regression such as Linear regression, Logistics regression so that it cannot find out all the relationship

between complicated variables. The study limited in 6 years old children in some primary schools in Nha Trang city so that the results cannot be applied to all 6 years old children in Khanh Hoa province as well as to 6 years old children in Vietnam. The results of this study are expected to be useful as baseline data in planning dental caries educational and prevention program for children

5.9. CONCLUSION

This is a cross sectional study which was taken in Nha Trang city, Khanh Hoa province Vietnam with the sample size 248 is six years old children with the aim to find out the prevalence and factors related to dental caries among six years old children.

After being collected, the data is analyzed with SPSS software. Descriptive statistics was used to describe the characteristics of dental caries status and independent variables. Chi square, Mann Whitney U and Kruskal Willis test were used to find the relationship between all the independent variables and deft score and deft category which presented for dental caries status.

The conclusions include:

The prevalence of dental caries among six year old children in Nha Trang city is 88.3% with the mean of deft score is 5.04 ± 3.43 . The proportion of dt, et and ft are 85.9% (4.33 ± 3.12), 23% (0.34 ± 0.69) and 23.8% (0.38 ± 0.82) respectively.

All of the children have their teeth brushed every day. 11.7% brushed teeth

more than twice a day, 33.9% of them brush teeth in the right way, 81% of them use toothpaste. 79.4% of children were brought to dentists at least one time.

15.3% chose juice and 32.7% chose fresh fruit as their favorite snacks between meals.

60.5% of the parents have good knowledge and perception on dental caries while 39.5% of them got the poor level.

40.3% of the children were received SBDP and supporting environment at good level while 59.7% of them were not.

100% of parents know where to take their children to when they need dental services. The percentage of distance from their houses to dental offices is nearly equal between the distance of less than 3 km and 3-5 km which are 35.1% and 39.5%. Most of them (43.1%) said that their children have to wait from 30-60 minutes before being checked at dental offices.

The highest percentage of media and interpersonal source which give children information dental caries knowledge is 69.8% that belongs to television and 39.5% that came from teacher at school.

There were statistically significant association between the more educated parents and the less children's deft score (p -value <0.001); the lower total income per month of the family and the higher prevalence of dental caries (p -value = 0.002); the more frequent of tooth brush and the lower chance to get dental caries (p -value <0.001); the use of toothpaste and the lower deft category ($p=0.006$, $OR=0.856$,

95%CI=0.080-0.906); the more frequent to dentist check, the lower chance to get dental caries ($p<0.001$); the more cariogenic food, the higher dental caries proportion ($p<0.024$ for the drinks and <0.001 for the snacks); the better parental knowledge and perception levels the lower proportion of dental caries ($p\text{-value}=0.014$); SBDP and supporting environment in poor level and higher dental caries prevalence ($p<0.001$, OR=27, 95%CI=6.248-116.673); the further distance from home to dentist office, the more chance to get dental caries ($p<0.001$).

5.10. RECOMMENDATION

5.10.1. Recommendation for parents

Parents should take care more about their children's oral health because of the possible present of the sixth teeth which are permanent teeth. When children have decayed tooth or dental pain, it is necessary to take them to dentists. Decayed tooth even primary tooth should be treated, filled and reserved until the permanent teeth extrude and replace.

Parents should encourage their children not to use much gas drinks and sweetened consumption food that harmful to their oral health. Besides, the use of fruits and juices should be enhanced for children by parents. Children should be encouraged to brush their teeth with fluoride toothpaste containing at least 1,000 ppm F twice a day, in the evening before going to bed and at one other time during

the day. The amount of toothpaste used is recommended to be a small size pea. Moreover, parents should supervise the oral hygiene practice of children as when they brush their teeth and teach children how to spit out toothpaste after rinsing their mouths.

5.10.2. Recommendation for school (SBDP)

Since the price for dental treatment is still high and is not included in health insurance in Vietnam (except for extracting and cleaning teeth), the roles of school based dental program should be emphasized to reduce the treatment fee for children. Each school should have a strategic plan to get the target of SBDP in 2014 recommended by Vietnamese Othodondo Somatology Department which includes 50% children from 5 to 6 years old have caries free, 100% kindergarten children are received dental health knowledge, 100% primary school children rinse their mouths with NaF 0.2%, 100% kindergarten and primary school children brush their teeth at school and 10% of them have their teeth fissure sealant (Nguyet, 2013). The teachers should be received and updated dental health knowledge gradually. They also should be trained the skills to plan dental health-related presentations, lessons and hands-on activities to develop the right attitude and personal skills for children.

There should be association between schools and parents in providing dental health knowledge to children. To get more trust from children's parents and community in SBDP, schools should improve their SBDP operations by increasing the

effectiveness of methods to assess decay and sealant placement techniques in preventing new decay and progression of early decay.

5.10.3. Recommendation for policy makers

Public Health Nurses, practice nurses, General Practitioners and other primary care workers who have regular contact with young children should have training in the identification of high caries risk primary school children. An agreed set of oral health indicators for the planning, targeting and evaluation of dental services should be developed.

Promote the concept of the dental home by educating their personnel as well as the parents on the importance of oral health and providing assistance with establishment of a dental home no later than 12 months of age of the child. Maintain a dental record, starting at age 12 months with yearly updates, as part of the child's health report. It should address the child's oral health needs including any special instructions given to the care givers.

Sponsor on site, age appropriate oral health education programs for the children that will promote good oral hygiene and dietary practices, injury prevention, and the importance of regularly scheduled dental visits. Provide in service training programs or personnel regarding oral hygiene concepts, proper nutrition choices, link between diet and tooth decay, and children's oral health issues including proper initial response to traumatic in-juries along with dental consequences (American, 2011).

The main sources of media that provide dental caries knowledge for children most come from television, and least from newspaper or magazines. It should have more attractive sections on newspaper especially for children such as funny stories that teach them about dental caries since there is recommendation that children should read more and watch less.

5.11. FURTHER STUDIES

Others studies should be done in other area of the country to find out the prevalence of dental caries as well as the related factors, the relationship among them and among different group of children.

Further study should be study inferential statistic different geographical local (such as rural area, mountainous area, etc.) and help policy maker conduct geographical factors intervention.

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APPENDIX

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

APPENDIX A

Informed Consent

Title of Research: Prevalence and factors related to dental caries among 6 years old children in Nha Trang city Khanh Hoa province Vietnam.

Researcher: Nguyen Thi Hai Yen, MPH student, College of Public Health Sciences, Chulalongkorn University

We are doing research on Prevalence and factors related to dental caries among 6 years old children. We would like to identify your dental caries status, your oral hygiene habits, dietary as well as some individual information by giving you some questions and invite you to answer. We will not be sharing information about you to anyone outside of the research team. The information that we collect from this research will be kept confidential. Any information about you will have a number on it instead of your name. Only the researchers will know what your number is and we will lock that information up with a lock and key. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain.

There will be no direct benefit to you, but your participation is likely to help us find out more about dental caries status and some factors related among 6 years old children. You will also not be provided any incentive to take part in the research.

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate all the services you receive from administration will continue and nothing will change.

If you have any questions, you can ask our team now or later. If you wish to ask questions later, you may contact directly to Ms. Nguyen Thi Hai Yen, MPH student, College of Public Health Sciences, Chulalongkorn University, cell phone: +84983315700/+66802223804.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

Name of Participant _____

Signature of Participant _____

Date _____

APPENDIX B

EXAMINATION FORM

Form code : _____

Date : ____ / ____ / ____ (DD/MM/YY)

Examiner : _____

A. Subject information

Gender: Male Female

Date of birth: ____ / ____ / ____ (DD/MM/YY)

B. Dental caries status

16 55 54 53 52 51 61 62 63 64 65 21

Dental status												
Needs of treatment												
Needs of treatment												
Dental status												

46 85 84 83 82 81 71 72 73 74 75 36

d =

m =

f =

deft =

APPENDIX C

DENTAL CARIES RELATED FACTORS QUESTIONNAIRE

Form code : _____

Date : ____ / ____ / ____ (DD/MM/YY)

A. Object (Pupil) information

Gender: Male Female

Date of birth: ____ / ____ / ____ (DD/MM/YY)

B. Social economics characteristics

Please circle one answer's number that you agree for each question

B1. Choose the relationship between you and object:

1. Mother
2. Father
3. Other (specify) _____

B2. How old are you? _____ years

B3. What is your highest level of education?

1. Cannot read or write
2. Primary school

3. Secondary school
4. High school
5. College/ Occupation training/ University
6. Other (specify) _____

B4. What is your occupation?

1. Labor
2. Farmer/ Gardener
3. Government employee
4. Factory worker
5. Private business
6. Other (specify) _____

B5. How much is your family total income per month?

1. $\leq 3,000,000$ (VND)
2. $3,000,001 - 7,000,000$ (VND)
3. $7,000,001 - 10,000,000$ (VND)
4. $10,000,001 - 20,000,000$ (VND)
5. $>20,000,000$ (VND)

C. Oral hygiene practice

Please circle one answer's number that you agree for each question

- C1. Does participant brush his/her teeth?

1. Yes
2. No (skip to C11)

C2. Does participant brush his/her teeth by himself/herself?

1. Yes
2. No (skip to C7)

C3. How often does participant brush his/her teeth?

1. Once every day
2. Twice every day
3. More than twice every day

C4. When does participant brush his/her teeth?

1. In the morning (after getting up)
2. In the evening (before going to bed)
3. In the morning and in the afternoon
4. After meals

C5. Does participant use toothpaste to brush his/her teeth?

1. Yes
2. No

C6. Which method does participant usually use to brush his/her teeth?

1. Move the brush back and forth
2. Move the brush up from the bottom and down from the top with

circular motion

3. Move the brush as strongly as possible

4. Move the brush on the occlusion surface only

C7. How often do you brush participant's teeth?

1. Once every day

2. Twice every day

3. More than twice every day

C8. When do you brush participant's teeth?

1. In the morning (after getting up)

2. In the evening (before going to bed)

3. In the morning and in the afternoon

4. After meals

C9. Do you use toothpaste to brush participant's teeth?

1. Yes

2. No

C10. Which method do you usually use to brush his/her teeth?

1. Move the brush back and forth

2. Move the brush up from the bottom and down from the top with

circular motion

3. Move the brush as strongly as possible

4. Move the brush on the occlusion surface only

C11. Has participant ever been brought to the dentist?

1. Yes
2. No (skip to D1)

C12. How often is him/her brought to the dentist?

Once per six months

Once per year

Other (identify) _____

D. Dietary

Please circle one answer's number that you agree for each question

D1. Which kind of drink does participant usually have in/between meals every day?

1. Gas drink
2. Juice
3. Water
4. Milk
5. Other (specify) _____

D2. What kind of snacks or desserts does participant usually have in/between meals every day?

1. Fresh fruit
2. Biscuits/ Cakes
3. Potato chip/ Other snack

4. Candies/ Chocolate

E. Knowledge and perception on dental caries of children's parents

Please answer the following questions by mark (√) in “Agree”, “Not sure” or “Disagree” column

No	Statement	Agree	Not sure	Disagree
E1	Six years old children can have permanent tooth/teeth			
E2	Extracting the tooth is not the best way to reduce the dental pain caused by that tooth.			
E3	It is necessary to fill a primary decay tooth			
E4	Brushing teeth in the right way after every meal can prevent tooth decay			
E5	Food with a lot of sugar composition may increase dental caries			
E6	Visit the dentist every six months is necessary			
E7	Dental treatment costs are expensive			

F. School based dental programs

Please answer the following questions by mark (√) in “Yes” or “No” column

No	Question	Yes	No
F1	Does participant's teacher give him/her information about dental caries?		
F2	Does participant's teacher remind him/her about healthy and cariogenic food?		

F3	Does participant's teacher give him/her information about tooth brushing technique?		
F4	Does participant's teacher remind him/her to have his/her oral health examine by school district dentist once every six months?		

G. Supporting environment

Please answer the following questions by mark (✓) in "Appropriate" or "Inappropriate" column

N	Items	Appropriate	Inappropriate
G1	Place for participant to brush teeth at his/ her school		
G2	Condition of participant's tooth brush at his/her school		
G3	Facilities for Sodium Fluoride 0.2% mouth rinsing at his/her school		

H. Accessibility and availability to service

H1. Do you know where to take participant to dental service?

1. Yes (skip to H2)
2. No (skip to H4)

H2. How far is your residence from the place to receive dental service?

1. <3km
2. 3-5km

3. >5km

H3. How long does participant wait before receiving dental service?

1. < 30 minutes

2. 30- 60 minutes

3. > 60 minutes

H4. From which of the following media does participant generally receive information concerning preventive dental caries?

1. Newspaper/ Magazine

2. TV

3. Radio

4. Other (specify).....

H5. From which of the following personnel does participant generally receive information concerning preventive dental caries?

1. Dentists

2. Parents

3. Teachers

4. Friends

5. Others (specify).....

APPENDIX D

BUDGET

No	Activities	Unit	Price (baht)	Unit (number)	Total (Baht)
1.	Pre-testing	Quest.	5	30	150
	- Photocopy	Set	300/set	1	300
	- Stationery				
2	Air fare : BKK - HCM - BKK	Trip	7.000/trip	2	14,000
	Re-entry Visa fee	Time	1.200/time	1	1.200
3	Data Collection	Quest.	5	5 x 400	2,000
	- Photocopy	Person	1.000/p/d	4 pr x 5 day	10,000
	- Interviewers per diem	Person	500/p/d	8 pr x 4day	16,000
	- Examination per diem	Person	200/p	2 pr x 10day	4,000
	- Data Processing				
DATA COLLECTING PROCESS					
4	Document Printing	Page	5/page	600 pages	3,000
	- Paper + Printing	Page	0.5/pag	10 x 300	1,500
	- Photocopy	Set	300/set	1 set	300
	- Stationery	Set	100/set	5 set	500
	- Binding Paper (exam)	Set	200/set	5 set	1,000
	- Binding Paper (submit)				
THESIS DOCUMENT PROCESS				6,300	
TOTAL				60,250	

VITA

VITAE

PERSONAL DETAILS

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