ORAL HEALTH STATUS AND RELATED FACTORS AMONG PRIMARY SCHOOL CHILDREN IN SOC SON DISTRICT, HANOI CITY, VIETNAM.

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ORAL HEALTH STATUS AND RELATED FACTORS AMONG PRIMARY SCHOOL CHILDREN IN SOC SON DISTRICT, HANOI CITY, VIETNAM

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ABSTRACT

In Vietnam, oral health is a public health concern to health professionals, the community and governments. Therefore the purpose of this study was to address the oral health status and related factors among primary school children in the Soc son district, Hanoi city, Vietnam. A cross sectional survey was conducted during January, 2008 among primary school children in the district. 228 school children in 3 primary schools who had received the School- Based Dental Program (SBDP) over five years were studied. Their oral health status was examined by a dentist using the WHO recommended DMFT and CPITN index. Details of related factors were obtained by self-administered questionnaire. Statistical descriptive analysis was used and tested by Chi square and multivariable logistic regression was performed.

The prevalence of dental caries was 53.1 % and mean DMFT, 1.5. Forty three per cent of the children studied had unhealthy gums. Seventy two per cent of the children were brought by the parents or care-givers to see the dentist for a normal oral check up. Only 24% of the children were highly knowledgeable about caries, but most had a positive perception (59.6%) of oral health care. Most of the school children (89.5%) brushed their teeth at least twice per day. There was a statistically significant association between poorer education level of the parents or care-givers and better DMFT index (p= 0.04) CPITN index (p = 0.01); between drinking sweetened drinks and eating potato chips between meals with unhealthy CPITN index, p = 0.02 and 0.04, respectively. There was a significant association between those whose source of information was either from magazines or from teachers with good oral health students' (DMFT index= 0) [p = 0.04 in both groups]. Importantly, poor oral health status was best predicted by drinking sweetened drinks and CPITN index (β= 0.7, OR=3.3, 95 %CI= 1.1 - 10.2, p= 0.03).

In conclusion, the SBDP is good, and should be expanded to allow preventive dental services not only for fillings, but also for scaling. There should be a focus on eating, brushing longer, and brushing in the morning.

KEY WORDS: ORAL HEALTH STATUS / PRIMARY SCHOOL CHILDREN / VIETNAM

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LIST OF ABBREVIATIONS

CPITN	:	Community Periodontal Index of Treatment Needs
DMFT	:	Decayed, Missing, Filled Teeth
MOH	:	Ministry of Health
PHC	:	Primary Health Care
POHC	:	Primary Oral Health Care
SBDP	:	School – Based Dental Program
SD	:	Standard Deviation
TV	:	Television
VND	:	Vietnam Dong
WHO	:	World Health Organization

CHAPTER 1
INTRODUCTION

1.1 Rationale and justification

1.1.1 Global situation

Over the past two decades a marked decline in the dental caries experience of children has been observed in many industrialized countries. The widespread use of fluorides, especially in toothpastes, improvements in oral hygiene, changing patterns of sugar consumption, changes in diagnostic criteria, and the preventive and restorative efforts by dental health services are often considered the main reasons for the decline in dental caries. The possible role played by broad socio-economic factors has also been highlighted and studies of caries reductions have shown that dental services as such had little effect on caries prevalence (1).

Nowadays, oral health problem is one of the most important problems among other health problems. In February 2004, the estimated global caries burden of disease by WHO (2) for the age of 12-year-olds expressed using the DMFT index, reported that: Global weighted mean DMFT value for 12 year olds: 1.61 (188 countries) (2). Per cent of countries having 3 DMFT or less: 74% (139 countries). These 139 countries (2) represent 86% of the World population in 2004. Globally, 200,335,280 teeth are either Decayed, Missing due to caries (extracted) or Filled - this is just for one age group - the 12-year-olds (2).

On the contrary, increasing levels of dental caries have been found in some developing countries, especially for countries where preventive programmes have not been established. In Asia, the prevalence of dental caries in children is reported to be low to moderate. For example, in the People's Republic of China the mean caries experience of 12-year-olds has been observed at 1.1-1.9 DMFT (2). It is worth noting, however, that the D-component constitutes most of the caries index.

Moreover, gingival health status and oral hygiene habits of children seem poor (3).

The increases of dmft and DMFT at age 12 years in Vietnam from 1991 to 2001 were similar (2). According to the National Oral Health Survey of Vietnam 2001, about 55.6% children aged 12 years had decay, missing, filled, and 84% of them with gingivitis and periodontitis (Table 1, 2, 3) (4).

Table 1 National Oral Health Survey of Vietnam 2001. Medical Publishing House, Hanoi City, Vietnam 2002 (2).

Year	Age	% affected	dmft	d	m	f
2001	6 years	83.7	6.15	5.9	0.2	0.0

Table 2 Caries level of Vietnam with different age groups (2).

Year	Age Group	% affected	DMFT	D	M	F
2001	12 years	56.6	1.9	1.8	0.01	0.03
2001	15 years	67.6	2.2	2.0	0.12	0.01

Table 3 Caries trends of Vietnam with different age groups (2).

Year	Age Group	DMFT
1991	12 years	1.8
2001		1.9
1991	15 years	2.2
2001		2.2

Several studies had focused on clinically diagnosing plaque and caries as indicators of appropriate oral health behavior (5). From the behavioral point of view, the more important objective is the health behavior itself, how tooth-brushing relates to the individual's lifestyle, and what factors influence an individual's ability to perform these health behaviors (6). Several recent studies concern the oral health

perception and behaviors of young adults and the relation between their perception and behaviors and their dental or oral status (7).

Oliveira et al. (5) reported that children with inadequate oral health knowledge are twice more likely to have caries than children with adequate knowledge. Parental beliefs and perception also play a key role in moderating oral health-related behavior in young children and in determining whether they develop caries. Furthermore, school-based oral health education programs are recently reported to have a positive effect on gingival bleeding score and oral health behavior of children. Oral health and general health status depend on a dynamic interplay of many factors, including the individual's personal characteristics, behaviors, and perceptions. It is widely accepted that self-report is an imperfect predictor of behavior. While somewhat remote, clinical indices for physical signs of compliance have limitations as well. Therefore, the most adequate assessment includes both self-report and clinical indices (5).

1.1.2 Factors related to oral health in primary school children

It is recommended (ADA's policy) that dental health is the responsibility of the community, school health program, the family, and the individual (8). Appropriate health manpower planning is the key to effective primary health care, but also requires participation of parents, schoolteachers and also the appropriate curriculum for dental school programs (9). On the other hand, it is important to note that low income also plays a very important role on the health of the oral cavity (10).

1.1.3 Principle of Primary Oral Health Care

(1) Concept of primary health care (PHC)

The Alma Ata Declaration was a radical break with conventional thinking. For the first time issues like dependence and poverty were linked with health status in an official statement signed by countries and international organizations. Challenges were made for the health sector to supplement individualistic approaches (both in curative and preventive aspects) with wider analyses about health and disease. People's interpretation of Primary Health Care (PHC) ranged from services at

a primary level of care, to a set of health-related activities, to a philosophy out of which will arise socially progressive actions.

The Ottawa Conference (1986) was preceded by the Alma Ata Primary Health Care Conference in 1978 continues to strengthen health promotion principles and practice (Figure 1), (2) such as three basic health promotion strategies (to enable, mediate, and advocate); and recommend the five principles of Primary Health Care (PHC):

- Build healthy public policy
- Create supportive environments for health
- Strengthen community action for health
- Develop personal skills
- Re-orient health services

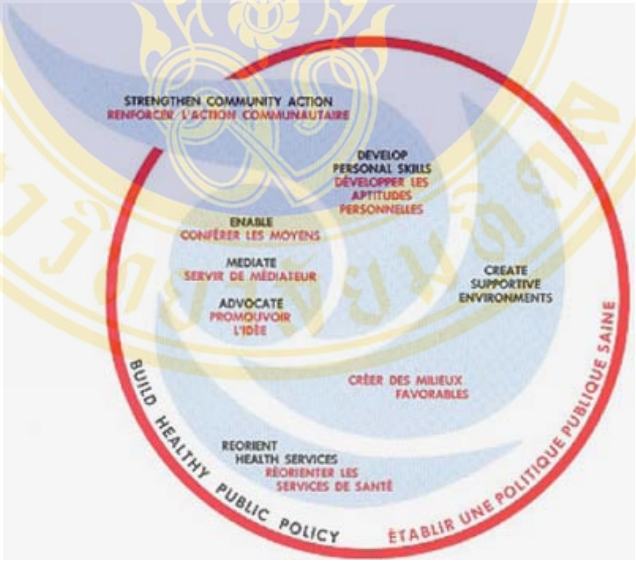

Figure 1 Logo the Ottawa Charter for Health Promotion

(2) Participation and behavior among primary school children

Childhood period is the time to form characteristics of healthy life style, to enhance personality and good health behavior, including monitoring the health hygiene that would lead to good oral health. Philosophically, all children should be entitled to receive maximal primary preventive dental care that includes the

routine application of the five general methods for control of the plaque diseases, use tooth brush, fluoride toothpaste, pit and fissure sealant, sugar discipline, plaque control program and oral health education (6).

(3) Parents influence

Children are most likely dependent on their parents or school-based activities for preventive dentistry and dental treatment programs (6). The parents should not be omitted from a school-based program. Oftentimes, one or both of parents can exert a powerful influence on a child. Ideally, parent education should parallel child education so that the parent could be given the knowledge to improve their own oral health as well as to have the guidelines to aid their children (7).

(4) School Dental Health Program

School-based oral health programs is a part of Primary Oral Health Care (POHC) giving children a chance to practice experience on optimal oral health, but developing relevant programs that address the needs of today's children is a complex task. Our increasingly heterogeneous society poses challenges to the school health program planner. Trends in children's caries patterns and the overwhelming prevalence of gingivitis and periodontitis also shape the objectives of today's school-based dental programs (SBDP) (7).

Schools have been and will continue to be important environments for the dissemination of disease preventive information. Treatment is not the answer for solving children's oral health problems; instead, prevention is the key. Schools serve as institutions that support the adoption and practice of behaviors deemed desirable by society (6).

SBDP in VietNam

After unifying (1975) SBDP in Vietnam was started in some cities. In improving SBDP in Vietnam, they generally divided in to five periods:

- 1980-1981: SBDP developed in some areas
- 1984-1985: SBDP developed in 16 southern cities

- 1986-1990: SBDP developed southern cities
- 1991-1993: SBDP covered all of southern provinces.
- 1993-2007: SBDP covered all of country.

The component parts of the School – Based Dental Program for dental health in schools are: Education of oral health care at school, Rinse with Fluorua Natri 0.2%, Periodic Dental Inspections.

In the last ten years with the effective oral preventive project, the close cooperation with the Ministry of Education, the active response of the provincial administration, regional health and education authorities in various areas, the SBDP has been implemented at a quick tempo. The model of SBDP complete coverage has gradually spread from district to district, province to province, to four million school children who are now covered by this program. However, there remain a large number of school children (seven million) who are waiting for this project. In addition, in some areas there is not yet a common practice of using fluoride-tooth paste, or tooth brushes for oral prevention. In almost all countries in the world, governments show much concern and care for community-oral-dental health. The SBDP in collaboration with the Dental community program introduces effective measures to gradually rule out the dental and periodontal diseases (4).

The aim of this study is to identify the relationship between oral health status and related factors among primary school children aged 11-12 years.

Details of knowledge, perception and oral hygiene practice of school children, socioeconomic status and supporting factors of their parents were obtained by structured questionnaires.

The oral health status was examined by dental personnel by using WHO recommended dental caries status (DMFT index) and Community Periodontal Index of Treatment Needs (CPITN).

1.2 Research questions

The questions to be answered in this study are:

(1) What is the situation of oral health status among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam?

(2) What are the factors related to oral health status among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam?

1.3 Research objectives

(1) General objective:

To study oral health status and related factors among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam.

(2) Specific objective:

(a) To study oral health status namely dental caries and Community Periodontal Index of Treatment Needs among primary school children

(b) To study characteristics of factors related to oral health status as the followings:

- Predisposing factors eg. Socio- economic, Knowledge, Perception, Practice, etc.
- Enabling factors eg. Dental service, Source of information on dental health, etc.
- Reinforcing factors eg. Family, School-based dental programs, supporting environment, etc.

(c) To explore the relationship between factors related to oral health status the following :

- Oral health status and predisposing factors eg. oral health status and education of parents or care giver etc.
- Oral health status and enabling factors eg. oral health status and source of information, etc.

- Oral health status and reinforcing factors eg. oral health status and School-based dental programs, etc.

1.4 Study variables

(1) Independent variables in this study include:

Predisposing factors

- Socio-economic supporting factors of their parents or care giver
- Knowledge on oral health
- Perception on oral health
- Oral hygiene practice

Enabling factors

- Accessibility (Dental service).
- Availability (Source of information on dental health)

Reinforcing factors: Community related factors

- Family: factors of their parents
- School-based dental programs and supporting environment

(2) Dependent variable:

In this research refers to oral health status which is the record of oral examination by dental personnel in Viet nam- Cu ba Friendship Hospital- Ha noi- Viet Nam.

Oral health examination instruments:

- Planed mouth mirror
- Explorer No.5
- WHO periodontal probe.

Recording oral examination about:

- Dental carriers' status and Periodontal status.
- Index DMFT (Decayed, Missing, Filled Teeth) to measure dental caries status.
- Index CPITN (Community Periodontal Index of Treatment Needs) to measure periodontal disease.

1.5 Conceptual framework

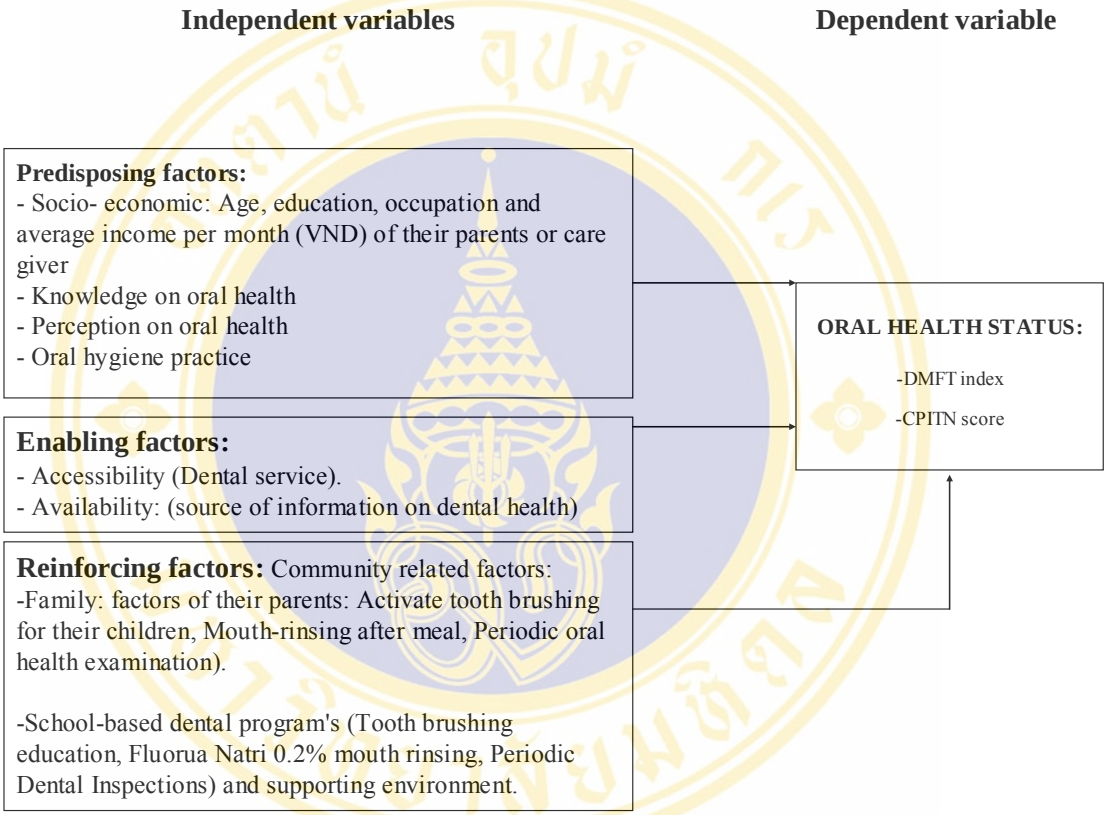

Figure 2 Conceptual framework

1.6 Operational definition of studied variables:

(1) Oral health status

Oral health status means status of teeth, periodontal tissue in term of disease status, there are two common diseases.

(a) Dental caries

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.” (11) DMFT index measurement of dental caries status. Criteria for diagnosis and coding (primary tooth codes within parentheses) are:

1 (B). Caries is recorded as present when a lesion in a pit or fissure, or on a smooth tooth surface, has a detectably softened floor, undermined enamel or softened wall. A tooth with a temporary filling should also be included in this category. On approximal surfaces, the examiner must be certain that the explorer has entered a lesion. Where any doubt exists, caries should not be recorded as present.

2 (C). Filled tooth with decay. A tooth is scored as filled with decay when it contains one or more permanent restorations and one or more areas that are decayed. No distinction is made between primary and secondary caries (i.e., whether or not the carious lesions are in physical association with the restoration(s).

3 (D). Filled tooth with no decay. Teeth are considered filled without decay when one or more permanent restorations are present and there is no secondary (recurrent) caries or other area of the tooth with primary caries. A tooth with a crown placed because of previous decay is recorded in this category. A tooth that has been crowned for reasons other than decay, e.g., trauma or as a bridge abutrnent, is recorded as "bridge abutment or special crown" and coded 7 (G).

4 (E). Tooth missing due to caries. This score is used for permanent or primary teeth that have been extracted because of caries. For missing primary teeth,

this score should be used only if the subject is at an age when normal exfoliation would not be a sufficient explanation for absence.

5. Permanent tooth missing for any other reason. This code is used for permanent teeth judged to be absent congenitally, or extracted for orthodontic reasons or because of trauma, etc. This score is also used for permanent teeth that are judged to have been extracted because of periodontal disease.

As for code 4, two entries of code 5 can be linked by a line in cases of fully edentulous arches.

8. Unerupted tooth. This classification is restricted to permanent teeth and used only for a tooth space with an unerupted permanent tooth but without a primary tooth. Teeth scored as unerupted are, of course, excluded from all calculations concerning dental caries. For differential diagnosis between extracted and unerupted teeth, see code 4 (2).

(b) Dental caries status

The deft/DMFT Index is a general indicator of dental health status of the population (particularly among children), and is considered reliable.

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

deft refers to primary (baby) teeth: d = decayed, e = extracted due to caries, f = filled, t = teeth. Teeth missing for caries are not recorded because of the exfoliation process and not knowing whether such teeth were carious before they fell out.

Method of calculation (2) DMFT score equals the sum of the average number of decayed teeth per person plus the average number of missing teeth due to caries per person plus the average number of filled teeth per person.

DMFT= D+ M+ F

Good oral health means that the children are without caries: DMFT= 0

Poor oral health means that the children have caries: DMFT ≥ 1

(c) Periodontal disease

The index to be used is Community Periodontal Index of Treatment Needs (CPITN)

Indicators: Two indicators of periodontal status are used for this assessment (children 11-12 year):

1. presence or absence of gingival bleeding
2. supra- or subgingival calculus

The criteria and code are as follow:

0: healthy

l: bleeding observed, directly or by using mouth mirror, after sensing

2: calculus felt during probing but all the black area of the visible.

Index teeth:

For young people up to the age of 19 years, only six teeth - 16, 11, 26, 36, 31 and 46 - are examined. If no index tooth is present in a sextant qualifying for examination, single fully erupted incisors or premolars may be substituted (2).

(2) Predisposing factors

(a) Socio- economic

Age of students: refer to age at the last date of birth.

Refer to children aged between 11-12 year old who study in primary school and got knowledge about oral health education.

Select children aged between 11-12 year old because children at this age group seem to be perfect place for setting education, dental caries prevalence in Vietnam has been increasing particularly in children at school age(under 12 years of age) with permanent teeth. 12 years. This age is especially important, as it is generally the age at which children leave primary school, and thus in most countries, is the last age at which a reliable sample may be obtained easily through the school system. For this reason, 12 years has been chosen as the global monitoring age for caries for international comparisons and monitoring of disease trends (2).

Supporting factors of their parents or care giver:

Refers to age, education, occupation and income per month of parents or care giver. These factors can influence how the parents or care giver take care each others to prevent oral disease and how the parents or care giver can manage income for visiting dental clinic, especially daily need for using toothpaste and toothbrush.

Care giver:

A part from parents, including people who have directly taken care of primary school children and used their knowledge, perception, and skills to help the primary school children had knowledge, perception on oral health and oral hygiene practice.

Education:

Referred to highest educational level of parents or care giver. This variable was an ordinal variable, ranging from illiterate, primary school secondary school, higher education.

Occupation:

Referred to present occupation or the job of the parents or care giver, which is categorized into farmer, employed worker and government officer, and other included pupil, student, and other occupations.

Average parents or care giver income per month (VND):

Includes the average amount of money in VND that parents or care giver could earn from their daily work per month.

(b) Knowledge, perception in oral health:

It is based on the number of correct answers concerned with dental caries and periodontal disease tooth-brushing, tooth paste, consumption of sweet/candy.

Knowledge refers to the knowledge of students on oral health which consists about: dental caries and periodontal disease, toothbrushing, tooth paste, consumption of sweet/candy (6, 9)

Perception refers to perception of students especially how to take care and know the important permanent tooth in their life, also can apply to daily activities to get health life. Its mean the students have good perception towards prevention on oral health to do oral health behavior (6, 9).

Oral hygiene practice in this study refers to practice of students on oral hygiene methods used, brushing interval and food/sugar consumption (12).

(c) Enabling factors

Accessibility (Dental service)

In this study refers to the questions on; How far is your residence from the place to receive dental service? How do you perceive about going to dental service? How do you go to the dental service? How long do you wait before receiving dental service? The researcher is basically trying to find out the students financial accessibility dental service easy or not.

Availability (Source of information on dental health)

In this study refers to public mass media (television, radio, magazine, newspaper) and person (dentist, parents, teachers, and friends) which provide

information and influence on knowledge, perception and prevention behavior of primary school children toward dental health.

(d) Reinforcing factors: community related factors

Family

Factors of their parents: The supportive factors are to induce or activate tooth brushing of their children, mouth-rinsing after meal, periodic oral health examination.

School-based dental program's and supporting environment:

- **School-based dental program's**

In this study refer the teacher who has responsible to take the children in the school, about giving information dental health, diet cariogenic snack, tooth brushing practice, water fluoridation, periodic dental inspection.

- **Supporting environment factor**

In this study refer to find out by checking list about environment (for example: place for students to brush teeth, condition of tooth brush or facilities for Fluorua Natri 0.2% mouth rinsing) and activities (for example: oral health screening by teacher, etc.)

1.7 Expected outcome

- Usefulness of the study is to identify relationship between oral health behavior and oral health status among 11-12 years old school children.

- The information will help policy maker to develop appropriate interventions to improve efficiency of the community based (family, School – Based Dental Program and supporting environment).

CHAPTER 2
LITERATURE REVIEW

2.1 Concept of dental caries

2.1.1 Etiology of Dental caries

Dental caries is the most common oral disease. It is a chronic disease, gradually invasive and destroys the tooth structure. At first, there is no symptoms and will cause severe tooth-ache when the disease progress to dental pulp. The factors involved in the caries process, which include the tooth, dental plaque, and diet, were presented in the 1960s in a model of overlapping circles. Since then, the model has been supplemented with the factors of times, fluoride, saliva, and social and demographic factors (Figure 3). At first sight, these circles constitute a simple model to explain caries risk, which is represented by the overlap of the three inner circles. When one of the risk factors increases, the respective circle becomes larger, as does the overlap of the circles, indicating increased caries risk. If there is, for instance, hyposalivation, the saliva circle will tighten the three inner circles, enlarging the overlap, again indicating a greater risk. Inversely, the model explains why reduction in any risk factor decreases caries risk (13).

(a) Social and Demographic Factors

Many studies have shown that, at least in the western world, dental caries is more prevalent in the lower socioeconomic categories, in the less affluent areas, and among some ethnic minorities. Differences related to the socioeconomic status are very clear for the primary dentition and less clear for the permanent dentition, although this pattern may differ in other parts of the world. Studies have shown that for the prediction of caries development, social and demographic factors may b successful in very young children without a long dental history, but for older children, clinical parameters are more predictive (13).

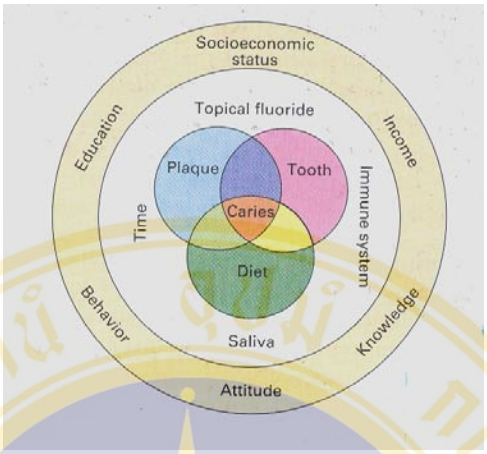

Figure 3 Factors influencing the equilibrium between the three prerequisites for the caries process as first described by Keyes and Jordan (13).

(b) Dental plaque

A highly acid, gelatinous substance that adheres to the teeth, causes decalcification of tooth enamel and appears to be leading factor in tooth decay. Lactobacillus and certain of streptococci have been found in the dental plaque and appear to be he producers of the acid-forming enzymes (9). The oral flora colonizes on teeth continuously, but it take up to several days before the dental plaque contains enough acidogennic bacteria to lower plaque pH to level that cause demineralization (6).

(c) Teeth

Consist of a calcium phosphate mineral that demineralizes when the environmental pH lowers. As the environmental pH recovers, dissolved calcium and phosphate can reprecipitate on remaining mineral crystals. This process is call remineralization. Remineralization is a slower process than demineralization. When remineralization is given enough time, it can eliminate the damage done during demineralization, but in the absence of this the caries process will progress and a lesion will develop. Dentin is more vulnerable than enamel because of structural differences and impurities in the lattice. Fore many years, much emphasis was given

to the pre-eruptive effect of fluoride improving the quality of the dental hard tissues. However, it is clear that posteruptively used fluoride is more protective against caries (13).

(d) Dietary

Carbohydrates are necessary for the bacteria to produce the acids that initiate demineralization. For the bacteria in the plaque to live, they must have the same amino acids, monosaccharides, fatty acids, vitamins, and minerals that are required for all living organisms (6). In general, dietary advice for caries prevention is based on three principles:

(1) The drop in pH lasts for approximately 30 minutes.

(2) The frequency of intake is more important than the quantity.

(3) The stickiness is an important factor in the cariogenicity of foods.

(e) Time

Effects the caries process in several ways. Now we know that caries is not a chronic disease and that its effects can be arrested or completely repaired should enough time be given for remineralization. Finally, it is clear that caries lesion do not develop overnight, but take time; in fact, the development of dental caries is a relatively slow process and clinically visible destruction of the enamel (cavitation) takes up to 4 years to develop (Newbrun, 1983; Pitts 1983) (10). This potentially gives the dentist and the patient ample time for preventive treatment strategies.

(g) Fluoride

Experiments have shown that fluoride protects enamel more effectively when it is present in the ambient solution during acid challenges than when it is incorporated into the enamel lattice. (13) The chemical action of fluorine is thought to be as follows:

(1) Fluorides combine with the inorganic portion of the tooth enamel, thus rendering it less soluble in the organic acids produced in the mouth.

(2) Fluorides inhibit specific bacterial action which forms the acids.

(3) The effect of fluoridated water is thought to continue as long as it is used.

(4) Teeth benefit most from water fluoridation during their period of development.

(5) There is some evidence that the decay rate increase if children who have used fluoridated water in their early years are deprived of it in subsequent years (9).

Because of this, localized caries lesions in the mouth may be related to an insufficient spread of fluoride when subjects use fluoride toothpaste. Certainly when patients use fluoride toothpaste they should be encouraged to spit out any excess rather than to rinse vigorously with water (13).

2.1.2 Classified of dental caries

(a) Classified by tooth morphology:

- Smooth surface caries
- Pit- fissure caries
- Root caries

(b) Classified by stage of invasion

- Acute caries, Active caries
- Chronic caries
- Arrested caries

(c) Classified by characteristic

- Rampant caries
- Nursing bottle caries
- Recurrent caries (6).

2.1.3 Methods of caries controlling and prevention

(a) Cleansing the oral cavity by tooth-brushing clearly and thoroughly in order to reduce micro-organism, food debris, and time that contact to tooth surface.

(b) Strengthen tooth structure by using systemic and topical fluoride.

(c) Swallowed pit and fissure of tooth morphology by using sealant in order to prevent foot impaction and bacterial adherence.

(d) Consumption behaviors; avoid the carious food, e.g. sticky chocolate, candy, snack etc, and reduce the frequency of consumptions (6).

2.2 Periodontal disease

Periodontal disease is actually a group of disease affecting the supporting tissues of the teeth. There seem to be two sets of predisposing factors:

(1) Local disease condition in the mouth
(2) Systemic disease (9).

Gingivitis is the most common of all gingival disease. The major cause is local irritation e.g. dental plaque, material alba and calculus. etc. The gingival is pale pink. When it got gingivitis, the color changed to bluish red, especially in chronic gingivitis, and changed to red color in the case of acute gingivitis. The interdental papillar is the most susceptible area to detect this color changed. A lightly ouch e.g. tooth brushing, oral health examination can get gingival bleeding in the case of gingivitis.

Periodontal disease is now recognized as a public health problem because of the number of persons affected, and as such, it must receive greater emphasis both in the educational phase and in prevention and cure (9).

2.3 Policy of oral health procedure:

According to the WHO (1982), "Oral health is a standard of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well-being" (14).

The Health Ministry of Vietnam aware that oral health problems are important, with high prevalence. Based on the data available from a national survey in 1990, the prevalence of dental caries and DMFT (decayed, missing and filled permanent teeth) at 12 years old is 57% and 1.8 (DMFT) and there is an increasing trend. It seems even higher in the Southern Viet Nam at 76% and 3 DMFT in same age. The situation for periodontal diseases is even more serious than for dental caries. The data show that the percentage of gingivitis and dental calculus (CPI1+CPI2) is 93.6% at 15 years old.

The shortage and the uneven distribution of dental manpower and the lack of financial support to develop the essential oral health care service for the majority of the population are still the major obstacles.

Dental Primary Health Care is the important and valuable way. In Vietnam there are 15 million pupils in primary and secondary schools (6-15 years old). A National programme of school-based oro-dental care has been developed and carried out in all 61 provinces and cities. The programme includes four components:

(1) Oro-dental hygiene education for pupils

(2) Mouth rinsing with 0.2 % fluoride solution once a week

(3) Organization of school dental clinics (2000 children/1 clinic) for early detection and management of oral diseases

(4) Filling pits and fissures on tooth surfaces with resins (fissure sealants)

In Northern provinces there are 800 school dental clinics and 160 clinics in the South. All schools in 32 districts (1 district: 200 000 - 300 000 inhabitants) were covered by the program (15).

2.4 Theorietical Model

(1) The Health Belief Model

Since the early work of Geoffrey Hochbaum (1958), several version of the health belief model (HBM) have appeared. The one that has attracted is that of Marshall Becker and Irwin Rosenstock (Becker and Rosenstock, 1984) (16).

Like all HBM, the one develop by Becker and Rosenstock assumes that beliefs are important contributiors to health-seeking behavior. This model includes five beliefs that should combine to predict health-related behaviors: (1) perceived susceptibility to disease or disability, (2) perceived severity of the disease or disability, (3) perceived benefits of health-enhancing behaviors, (4) perceived barriers to health-enhancing behaviors, including financial costs, and (5) cues to action. (Figure 4)

Each of the factors played a part in student's decision to seek assistance after he has hyperemia his tooth. At first, student did not believe that his hyperemia was serious or that he was vulnerable to disability. Thus, he saw little benefit in going to a dentist, an action that would have taken him away from his study. After two of his friends expressed their belief that his hyperemia might be serious, and after one night he did not sleep because toothache, student changed his beliefs and subsequently sought medical attention. Unlike for most people who seek health care, financial cost was not a serious barrier to student parent, whose most serious obstacle was lack of information about the oral health care system.

Perceived Susceptibility

This construct refers to one's subjective perception of the risk of contracting a health condition. In the case of medically established illness, the dimension has been reformulated to include acceptance of the diagnosis, personal estimates of resusceptibility, and susceptibility to illness in general.

Perceived Severity

Feelings concerning the seriousness of contracting an illness or of leaving it untreated include evaluations of both medical and clinical consequences (for example, death, disability, and pain) and possible social consequences (such as effects of the conditions on work, family life, and social relations). The combination of susceptibility and severity has been labeled the perceived threat.

Perceived Benefits

While acceptance of personal susceptibility to a condition also believed to be serious (perceived threat) produces a force leading to behavior, the particular course of action that will be taken depends on beliefs regarding the effectiveness of the various available actions for reducing the disease threat, termed the perceived benefits of taking health action.

Perceived Barriers

The potential negative aspects of a particular health action, or perceived barriers, may act as impediments to undertaking the recommended behavior. A kind of nonconscious, cost-benefit analysis occurs, wherein the individual weighs the action's expected effectiveness against perception that it may be expensive, dangerous, unpleasant (painful, difficult, upsetting), inconvenient, time-consuming, and so forth. Thus, the combined level of susceptibility and severity provide the energy or force to act and the perception of benefits (fewer barriers) provide a preferred path of action (17).

Cues to Action

Invarious early formulation of the HBM, the concept of cues that trigger action was discussed and may ultimately prove to be important, but they have not been systematically studied. Indeed, while the concept of cues as a trigger mechanism

is appealing, it has been difficult to study in explanatory surveys; a cue can be as fleeting as a sneeze or the barely conscious perception of a poster (17).

Limitations

Pederson et al (1984) illustrates the limitations of the HBM in predicting behavior. Several authors have identified further weaknesses in the use of the HBM in explaining health behavior. An important example concerns the fact that the model makes no assumptions as to how the variables combine to influence the behavior in question. The result has been described as ‘a collection of variables rather than a developed theory’ (Sutton, 1987: 367) and ‘the eclectic nature of the HBM which in its extended form embraces a wide range of factors with no coherent theoretical framework’ (Calnan, 1984: 829) (8).

In summary, the authors conclude that strongest predictive value of the HBM generally used an expanded version of the model, including perceived personal control, perceived risks, intention to behave, perceived social norms, and self-efficacy, or the belief that one is capable of performing those behaviors that will produce desired outcomes. For this reason, some researcher have combined aspects of the HBM with concepts from other models, including the PRECEDE model (16).

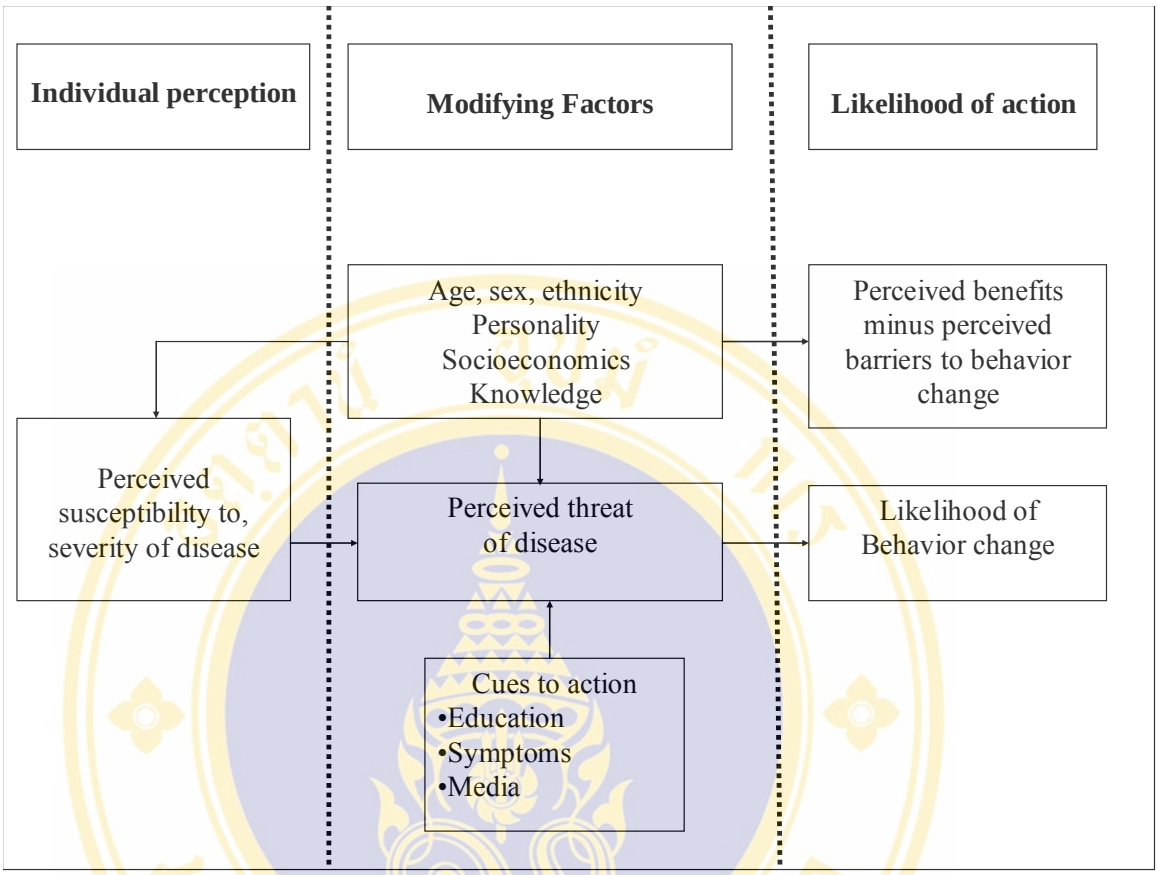

Figure 4 Health Belief Model components and linkages

(2) PRECEDE Model

The PRECEDE model (Predisposing, reinforcing and enabling cause in educational diagnosis and evaluation) (Green, Kreuter, Deeds, & Partridge, 1980) might provide an organizing framework for developing a model of factors. PRECEDE thus provides a generic framework within which more detailed theories might be integrated, rather than a theory of health behaviors. However one part of the model especially relevant in explaining health behaviors in the "educational diagnosis" which is concerned with assessing causes of health behavior. (Figure 5)

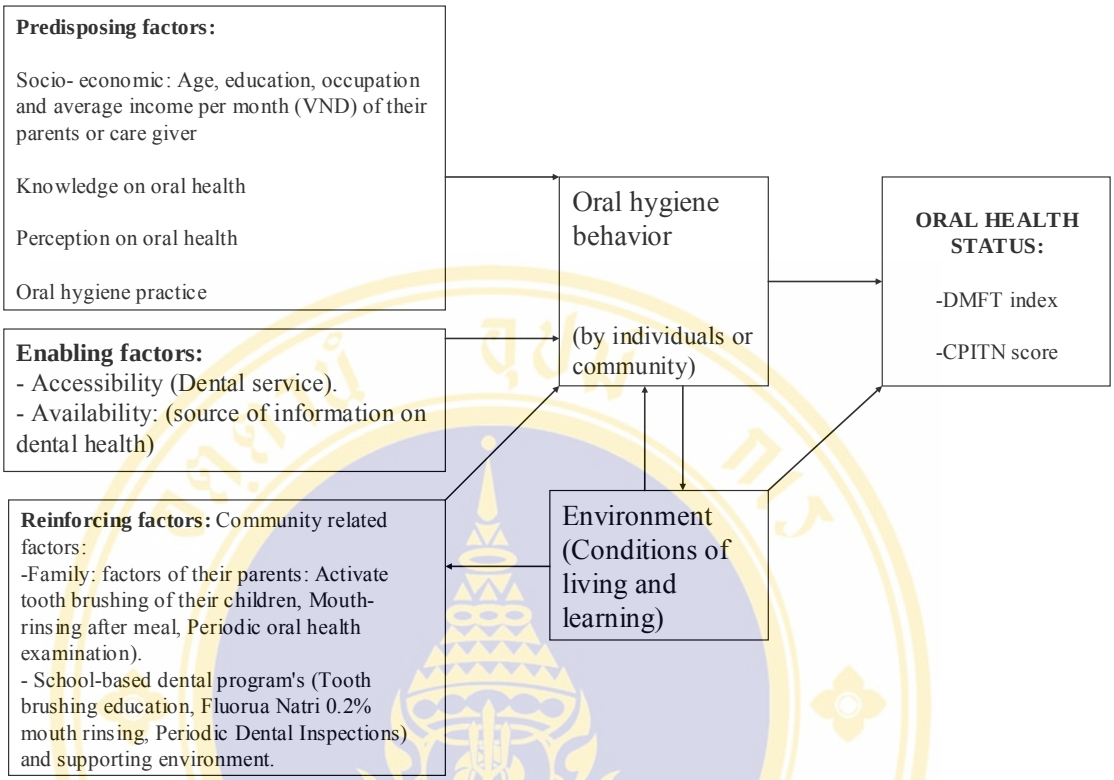

Figure 5 Precede Model

Description of The Model:

Step 1: Social Assessment

The social assessment determines people's perceptions of their own needs and quality of life. For example, the relationship between health and quality of life is reciprocal, with each affecting the other (example living in poverty is associated with poor health and being unhealthy makes it more difficult to escape impoverished living conditions) (17).

Step 2: Epidemiological Assessment

An epidemiological assessment helps determine which health problems (e.g. in this study are dental carriers' status and periodontal status) are most important for

which groups in a community. It helps identify behavioral and environmental factors related to the quality of life issues. The focus of this phase is to identify specific health problem and non health factors which are associated with a poor quality of life. This assessment, when linked with quality of life concerns of the audience, also makes clear that limited resources are being used to address health problems that contribute significantly to larger societal problems. Describing these health problems can:

(1) Help establish relationships between health problems, other health conditions, and the quality of life.

(2) Lead to the setting of priorities which will guide the focus of program development and resources utilization.

(3) Make possible the delineation of responsibilities between involved professionals and organizations and agencies.

From step 1 and 2 program objectives are created that is the goal or goals you hope to achieve as a result of implementing this program.

Step 3: Behavioral and Environmental Assessment

The behavioral and environmental assessment, involves assessing factors that contribute to the health problem under consideration.

Behavioral factors are those behaviors or lifestyle of the individuals at risk that contribute to the occurrence and severity of the health problem.

Environmental factors are those social and physical factors external to the individual, often beyond his or her personal control, that can be modified to support the behavior or influence the health outcome. Modifying environmental factors usually requires strategies other than education (17).

For example, poor oral health status among schoolchildren is a function of poor dietary habits (using a lot decay, etc.) (behavioral factor), which in turn is at least

partly affected by the availability of unhealthy foods in schools (decays, snacks, etc.) (environmental factors). While an education program (example School-based dental program) could effectively teach students about healthy diets, policy and organizational changes at the institutional level would be required to increase the availability of healthy foods in schools. A positive emotional environment includes the dentist who provides a supportive atmosphere; dental auxiliaries who are enthusiastic, warm, and caring; and an appointment schedule that allows a relaxed unhurried approach to patient education.

Another important component of this step is using theory, literature, and the wisdom of the planning group, an inventory made of behavioral and environmental influencing factors. It is critical that selecting the appropriate behavioral and environmental factors for specific educational intervention. Example might be not eating and watching TV at the same time or in the same room, limiting all sugar intake to meal times, arranging a specific time and distraction-free location for studying, or linking oral hygiene procedures to some regularly occurring event like watching the 10 o'clock news.

Step 4: Educational and Ecological Assessment

After selecting the appropriate behavioral and environmental factors for intervention, step 4 identifies the antecedent and reinforcing factors that must be in place to initiate and sustain the change process. These factors are classified as predisposing, enabling, and reinforcing.

- Predisposing factors include relevant knowledge, beliefs, perception, values, and skills that might be influenced by direct communication with the target population. These predisposing factors are antecedent to the behavior and provide the rationale or motivation for the behavior.

- Enabling factors include the availability, accessibility, and acceptability of resources required to perform the behavior. For many health-related behaviors, community organization is required to ensure such resources. Resources and skill

necessary to facilitate health behaviors (e.g. health care facilities, personnel, and schools) are vital in this content. Example of skills can range from the appropriate use of relaxation techniques and physical exercise, to the use of variety of medical instruments and diagnostic procedures frequently required in self-care programmers.

- Reinforcing factors include relevant perception and behaviors of significant others (including parents, peers, teachers, celebrities, and so on) as they are perceived to be important by the target population. Hence, indirect communication (i.e., messages provided by parents, peers, and so on) can be used to augment direct communication. Reinforcement of personal oral hygiene measures should occur at every possible opportunity. It can occur at each visit to the dental office, where prevention should be an integral component of all treatment. It can occur in the home, where parents use and give the children staining tablets to monitor adequacy of tooth cleaning. Or, reinforcement can occur by the dentist sending out monthly mail outs that emphasize some preventive measure. This continual reinforcement is necessary to insure the continuation of lifelong habits. It is especially applicable for those individuals who are willing to cooperate, but whom because of youth or lack of knowledge; do not appreciate the long-range inevitability of plaque disease that habitually accompanies poor oral hygiene.

The critical element of this step is the selection of the factors, which if modified, will be most likely to result in behavior change. This selection process include s identifying and sorting (positive and negative) these factors in appropriate category, prioritizing variables among categories, and prioritizing with categories. Prioritization of factors is based on relative importance and changeability. Learning objectives are then developed which focus on these selected factors. Pinpoints the factors that must be changed to initiate and maintain behavioral change. It is during this step that specific intervention objective are created and the intervention itself will be implemented. Educational and organizational diagnosis looks at the specifics that hinder or promote behaviors related to the health issue.

Step 5: Administrative and Policy Assessment

Delineating the intervention strategies and final planning for their implementation occurs in step 5. Its purpose is to identify policies, resources, and circumstances prevailing in the program's organizational context that could facilitate or in the program implementation. At this stage, intervention strategies are enumerated based on the previous steps and planners must assess the availability of necessary resources (time, people, funding).

Administrative and policy assessment can be informed by community- level theories. Community- organization theories encourage health planner to involve key community members (17).

Because PRECEDE is an integrative planning model that includes constructs from many theories, it has not been systematically evaluated in comparison with other theoretical models of health behavior. Mullen et al. (17) found that PRECEDE could sensitize planners to certain categories of variables, but that it does not specify relationships among variables, especially in the broad class of predisposing variables. While this may be a limitation when one seeks a parsimonious, predictive model of health behavior, the inclusion of multiple types and levels of factors is strength of the model for planning comprehensive, ecologically oriented health promotion programs, as illustrated in the case study that follows (17).

2.5 Application of Health models to the present study

This study would be designed on the basis of the integration of the following two theoretical models: Health Belief Model and Preeced model.

PRECEED model includes the explanatory variables that could be classified as the following:

- Predisposing factors eg. Socio- economic, Knowledge, Perception, Practice, etc.

- Enabling factors eg. Dental service, Source of information on dental health, etc.
- Reinforcing factors eg. Family, School-based dental programs, supporting environment, etc.

In addition to this PRECEED model, HBM was proposed to further describe the possible link between variables such as perceptions, as well as modifying factors; as originally proposed in the theoretical PRECEED model as the following:

- Individual perception eg. perceived susceptibility to disease or disability, perceived severity of the disease or disability, etc.
- Modifying factors eg. Socioeconomics, Knowledge, Cues to action (Education, Symptoms, Media), Perceived threat of disease, etc.
- Likelihood of action eg. Perceived barriers to health-enhancing behaviors, likelihood of behaviour change, etc.

Therefore, the integration of both theories, becoming the conceptual framework for this study would include the independent variables namely the predisposing factors (socio- economic; and knowledge, perception on oral health, oral hygiene practice) from PRECEED framework. Which equivalently refer as modifying factors in the HBM (age, personality knowledge). Moreover, the HBM includes the construct of perceived susceptibility, which would be treated as important predisposing factor for separate four aspects of perception on dental health for primary school children namely perception towards teeth, perception towards dental care, perception towards tooth brushing and tooth paste, perception towards eating sweets and candy. As for enabling factor from PREECED model include: accessibility (dental service) and availability (source of information on dental health), finally, the last group of independent variables (reinforcing factor include: family, SBDP and supporting environment) can be explained by both theory PREECED model and HBM.

When combining with epidemiological point of view, the dependent variables for this proposed study framework would include dental caries experience (DMFT)

with presence versus absence of caries status, as well as CPITN index for assessment of gingival health

2.6 Previous related studies

(1) Some studies related to oral health status and oral health behavior among primary school children

(a) Tran Van Truong (4) had done study on oral health preventive and school based dental program issues, community dental health of 12-year-old Hanoi and Vietnam primary schoolchildren. The finding as follows:

- In Hanoi: 36%12-year-old primary schoolchildren had caries in permanent teeth and 84% had calculus and gingivitis

- In Vietnam: 57.0% 12-year-old primary schoolchildren had caries in permanent teeth, 95% had calculus and gingivitis; the level of DMFT was 1.4.

(b) Petersen PE et al (1) had done study on Oral health status and oral health behaviour of urban and rural schoolchildren in Southern Thailand found that at age 12, 70% had caries in permanent teeth and the level of DMFT was 2.4. Experience of pain during the previous 12 months was reported by 53% of 12-year-olds, 66% saw a dentist within the previous year and 24% reported that visits were due to troubles in teeth. Toothbrushing at least once a day was claimed by 88%. Significant numbers of the children reported having hidden sugar every day: soft drinks (24%), milk with sugar (340; 0), and tea with sugar (260;0). Important predictors of high caries experience were dental visits, consumption of sweets, ethnic group (Muslim) and sex (girls) whereas lower risk was observed in children with positive oral health attitudes.

(2) Previous related studies of independent vari

Predisposing factors

(a) Socio- economic variables

Vigild M, Petersen P.E, Hadi R (1999) studied in oral health behavior of 12- year- old children in Kuwait indicators that children whose parents had higher education levels showed higher percentages of toothbrushing at least daily and sugary drinks and sugary foods less frequently that children whose parents had low level of education (20).

Sulistianingsih W et al (21) found that most of parents' occupation was labor and mostly had income range of 3.001 - 10.000 Bht (61.5%).The data showed high percentage for brushing the teeth everyday, ignoring the amount of income of the family members. this meant that every family knew the importance of toothbrushing and this had already been done as habitual activities and need.

(b) Students Psychosocial factors

(1) Knowledge and perception on dental caries and periodontal disease

The study of “Oral health behavior among primary school children in Nakhon Pathom Province, Thailand” concluded that only 1.5% of the school children had high knowledge about oral health while 63% had knowledge and 35.5% had low knowledge. Students had knowledge about the cause of dental disease (73.5%). Students had high perception (44.0%), low perception (56%) (21).

Freeman R (1993) et al (22) reported female pupils from outer London schools with high educational aspirations tended to have better periodontal health, an increased experience of restorative treatment, a greater dental health knowledge and more good perception than the remaining children. Pupils' dental health perception could be explained by their present self-care practices in addition to the wish to adopt positive dental health behaviours in the future.

(2) Knowledge and perception on dental health and eating candy

In 2003 Zhu L, Pertersen P. E, Wang H.Y, Bian J.Y and Zhang B.X had done descriptive study of oral health knowledge, perception and behaviour of children and adolescents in China. The findings as follows: 44.4% of the respondents known that they need brushed their teeth at least twice a day but only 17% used fluoridated toothpaste; and the risk of dental caries was high in the case of frequent consumption of sweets and dental caries risk was low for participants with use of fluoridated toothpaste (3).

Regarding to the use of fluoridated tooth paste by teachers of primary schoolchildren in Nakhon Pathom province, Thailand, Nguyen Khanh Long found that 81.6% regularly used fluoride toothpaste, 6% regularly used other additional topical fluorides. Most of the teachers had acceptable knowledge and good perception towards fluoride use to students and parents (23).

The result showed by descriptive study on 200 primary school children (6^{th} grade) 11-12 years old, all in Nakhon Pathom province, Thailand (21) the students knew that consuming chocolate was one of the causes of dental caries (83.5%). They knew healthy food for cleaning the teeth (82.5%). Other important factors were parent's support gave information about healthy food for teeth (82.5%).

(3) Oral hygiene practice

S. Kuusela et al (24) reported the children brushed most favorably in Sweden, Denmark, German, Austria, and Norway (83-73% brushed twice a day). More-than-once-a-day toothbrushing was especially uncommon (from 26 to 33%) among boys in Finland, Lithuania, Russia, Estonia, and Latvia. Toothbrushing frequency differed significantly according to school performance in Canada, the Czech Republic, Scotland, Poland, Northern Ireland, and Wales and between different socio-economic groups in Northern Ireland, Wales, the Czech Republic, Scotland, Poland, and Russia. Compared with the previous study by Peng B, Petersen PE, Fan MW, Tai BJ (1997- China) only 40 per cent brushed their teeth at least twice a day (18).

Al-Omiri M.K et al (2006) had done study on oral health perceptions, knowledge, and behavior among school children in North Jordan. The finding as follows: The participants' oral hygiene practice (such as tooth brushing) were found to be irregular, and parents' role in the oral hygiene practice of their children was limited (12).

Enabling factors

(a) Accessibility to dental service

In the table 4 is shown some previous studies related to the study on availability to dental visit among primary school children. One previous finding performed by Peng B et al (18) in 1997 found 46 per cent of 12-year-old urban schoolchildren had seen a dentist within the past year; and another researcher Sulistianingsih W. found in descriptive study with 200 primary school children that most students got information about dental disease from a dentist (21). In 2003 Zhu L, Pertersen P. E, Wang H.Y, Bian J.Y and Zhang B.X. studied about oral health knowledge, perception and behaviour of children and adolescents in China found that primary school children 12-year-olds who saw a dentist during the previous 12 months or two years were 31.3% and 35.3% (3).

Vigild M et al (20) show that children who had visited a dentist within the last 12 months more often claimed frequent toothbrushing than those with no previous dental visiting experience.

(b) Availability (Source of information on dental health)

Information sources are availability of massage for primary school children to approach the knowledge and perception about prevention of oral disease. 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. (25) The study in Nakhon Pathom

province ,Thailand by Hak Sithan, the result showed 40% of respondent got the information from television (26).

Reinforcing factors

(a) Family factors of their parents

Petersen PE et al (27) studied the oral health behavior, knowledge, and perception of children, mothers, and schoolteachers in Romania in 1993 found that most of the mothers were aware of the importance of toothbrushing, but 33% also recommended the use of salt for prevention of periodontal disease.

Luong Ngoc Khue (25) studied the dental health preventive behavior among mothers with children under 6 years of age in Donka Subdistrict, Uthong district, Suphanburi Province, Thailand found that only 32.7% of the mothers brought their child to see dentist for check- up and 15.3% did so at an appropriate time which was every six month.

(b) School-based dental program's and supporting environment

The report of "Evaluation report an evaluation of the Children's Dental Health Initiative's School-Based Dental Program (SBDP)" found that The SBDP increased access to preventive dental services including dental sealants, topical fluorides and oral hygiene instruction. Parent focus groups indicate significant decreases in barriers typically experienced when accessing dental care for children such as transportation, financial and time constraints. At the end of the 1999-2000 school years, 37 percent of the children at the SBDP schools had dental sealants compared to only 15 percent at the non-SBDP schools. The Year 2000 Objective for dental sealants is 50 percent.

If a child had an emergent dental problem, all of the project sites referred the child for dental care. The SBDPs, however, had only a slight impact on treatment urgency. During the 1999-2000 school year, 10 percent of the children at the SBDP schools had an improvement in treatment need compared to seven percent at the comparison schools (28).

(3) Some studies related to oral health status and related factors among primary school children

(a) The purpose of this study "Motivating mother to prevent caries confirming the beneficial effect of counseling" was to compare the effect of a motivational interviewing (MI) counseling visit with traditional health education for mothers of young children at high risk of developing dental caries. After two years, children in the MI group exhibited significantly less new caries (decayed or filled surfaces) than those in the control group (that is, a protective effect of MI) (odds ratio = 0.35, 95 percent confidence interval = 0.15 to 0.83). The study concluded that: MI is a promising approach that warrants further attention in a variety of dental contexts (16).

(b) Tran Van Truong et al. (29) after 8 years had done SBDP at all 25 primary school of Gialoc district, Haiduong city, Vietnam found that the sitation of dental caries reduced. At age 12, the ratio of dental caries reduced 56.05% and DMFT reduced 79.41%.

(c) Regarding the dental status and oral health of patients with Epilepsy: An epidemiologic study, Karolyhazy K, Kovacs E, Kivivics P, and Aranyi Z found that 17% patients with epilepsy visit the dentist on a regular basis (every 6-12 months), the DMFT index is significantly higher compared with the control group. A poor socioeconomic background is usually associated with unsatisfactory general and oral health. It might also explain the significantly lower frequency of dental visits (30).

(d) Adulyanon S, Vourapukjaru J, Sheiham A conducted another study on the oral impacts affecting daily performance in a low dental disease Thai population. The results indicated that the sample had low caries (DMFT = 2.7) and a low utilization of dental services. 73.6% of all subjects had at least one daily performance affected by an oral impact. The highest incidence of performances affected were Eating (49.7%), Emotional stability (46.5%) and Smiling (26.1%) (31). Another study of Gherunpong S, Tsakos G, Sheiham A in U-thong District, Suphan-buri province,

Thailand on the CHILD-OIDP (The Oral Impact on Daily Performance) show that 89.8% of children aged 11-12 years had one or more oral impacts. Most (84.8%) of those with impacts had 1-4 daily performances affected (out of 8 performances). Eating was the most common performance affected (72.9%) (32).

The said previous studies, however, the objectives only reported: (1) to describe the pattern of oral health behavior of 12-year-old children, (2) to analyze this in relation to parental education, dental visiting habits and location, and (3) to establish a baseline for planning and evaluation of an oral health care programmer for primary school children. More importantly, the question regarding the level of oral disease or assess the effect of socio-behavioral factors on dental caries experience among 12-year-old children has not been answered.

The present study, therefore, was designed to describe the situations of oral hygienic practice and oral health status; factors related to oral health status among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam. From this study, some important evidences and implications to indicator relationship between oral health status and related factors in order to enhance the effectiveness of the community based (family,
School–Based Dental Program).

Table 4 Summary of previous related studies

Author or institution/ Year and places	Method	Key variables being studied	Major findings
Tran Van Truong 2000- Vietnam	Descriptive study (n= 688)	Oral health status	In 12-year-olds: - Hanoi: 36% had caries in permanent teeth and 84% had calculus and gingivitis - Vietnam: 57.0% had caries in permanent teeth, 95% had calculus and gingivitis; the level of DMFT was 1.4.
Petersen PE, Hoerup N, Poomviset N, Prommajan J, Watanapa A 2001- Thailand	Descriptive study (n= 2272)	Oral health status and oral health behavior	- In 12-year-olds, 70% had caries in permanent teeth and the level of DMFT was 2.4. - 66% saw a dentist within the previous year - Toothbrushing at least once a day was claimed by 88%. - Significant numbers of the children reported having hidden sugar every day: soft drinks (24%), milk with sugar (34%), and tea with sugar (26%). Important predictors of high caries experience were dental visits, consumption of sweets.
Vigild M, Petersen P.E, Hadi R. 1999- Kuwait	Descriptive study (n= 500)	Predisposing factors: Socio-economic variables: Education	Children who had visited a dentist within the last 12 months and children whose parents had higher education levels more often claimed frequent toothbrushing than those with no previous dental visiting experience and those whose parents had low level of education
Sulistianingsih W 2001- Thailand	Descriptive study (n= 200)	- Eating candy - Accessibility to dental service	- 83.5% the students knew that consuming chocolate was one of the causes of dental caries - Most students got information about dental disease from a dentist

Table 4 Summary of previous related studies (cont.)

Author or institution/ Year and places	Method	Key variables being studied	Major findings
Freeman R, Maizels J, Wyllie M, Sheiham A. 1993- UK	Survey (n= 3.160)	Perception on oral health	- Health perception could reflect feelings of empowerment and this was conductive to the adoption of self-care practices.
Zhu L, Pertersen P. E, Wang H.Y, Bian J.Y and Zhang B.X 2003- China	Descriptive study (n= 4.400 children aged 12 years)	- Enabling factors: Accessibility to dental service - Oral hygiene practice: + Toothbrushing or frequency tooth brushing per day. + Eating candy	- 44.4% of the respondents brushed their teeth at least twice a day but only 17% used fluoridated toothpaste - Subjects who saw a dentist during the previous 12 months or two years were 31.3% and 35.3% for 12-year-olds. - The risk of dental caries was high in the case of frequent consumption of sweets and dental caries risk was low for participants with use of fluoridated toothpaste
S. Kuusela, E. Honkala, L. Kannas, J. Tynjala and B. Wold 1997- 22 European countries and Canada	Cross-National Survey- WHO Collaborative (n= 1.300)	- Oral hygiene practice: Toothbrushing or frequency tooth brushing per day	The children brushed most favorably (83-73% brushed twice a day). More-than-once-a-day toothbrushing was especially uncommon (from 26 to 33%) among boys

Table 4 Summary of previous related studies (cont.)

Author or institution/ Year and places	Method	Key variables being studied	Major findings
Peng B, Petersen PE, Fan MW, Tai BJ 1997- China	Descriptive study (n= 698)	- Oral hygiene practice: Toothbrushing or frequency tooth brushing per day - Dependent variable oral health index: DMFT index and CPITN index	- The mean DMFT of 12-year-old urban schoolchildren was 0.77 - About 65 per cent of the children had CPITN maximum score 2 (gingival bleeding and calculus) - Only 40 per cent brushed their teeth at least twice a day and 46 per cent had seen a dentist within the past year
Petersen PE, Danila I, Samoila A. 1993- Romania	Descriptive study (n= 419)	Reinforcing factors: Family factors of their parents	Most of the mothers were aware of the importance of toothbrushing, but 33% also recommended the use of salt for prevention of periodontal disease. Of the children, 37% brushed their teeth at least twice a day
Dark K, Phipps K 2000- United States	Survey (n= 450)	Reinforcing factors: School-based dental program's	Most of the providers rated each of the school-based services as extremely valuable (73-94%)
Tran Van Truong, Trinh Dinh Hai 2000- Vietnam	Descriptive study (n= 380)	- Reinforcing factors: SBDP - Dependent variable DMFT index	After 8 years had done SBDP, at age 12, the ratio of dental caries reduced 56.05% and DMFT reduced 79.41%.
Wierzbicka M, Petersen PE, Szatko F, Dybizbanska E, Kalo I. 2002 – Poland	Descriptive study (n= 11.053 children aged 12 years)	- Dependent variable: oral health index: DMFT index	The mean DMFT of children aged 12 years was 4.2 in 1995, 4.0 in 1997, 4.0 in 1999 and 3.8 in 2000

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Study design

This survey was conducted as a cross- sectional study.

3.2 Sample description

The study population was school children aged 11-12 years in 3 primary schools: Phu lo A, Phu lo B, Socson central delivered School-Based Dental Program, Soc Son District, Hanoi City, Vietnam.

3.3 Sample size

The sample size was calculated by using the following statistical formulary

$$n = \frac{Z^2_{\alpha/2} pq}{d^2}$$

Where n = number of sample size

Z = Standard normal score set at 1, 96 corresponding 95% confidence interval (α equal to 0.05)

p = the prevalence of dental caries in 11-12 year old children

Base on previous study, the prevalence of gingivitis and periodontitis in 11-12 year old children which was 0.84 (4).

$q = 1 - p$

$= 1 - 0.84$

$= 0.14$

d = degree of accuracy desired, setting at 5%

$$n = \frac{(0.96)^2 .0.84.0.16}{(0.05)^2}$$

$= 207$

Therefore, the minimum sample size required for the study will 207.

In this study, plan to use 228 (because plus 10% for missing data only) who students had been studying at three primary school: Phu lo A, Phu lo B and Scoson central school at that time of data collection were selected by random sampling method such as:

Number of students at Phu lo B 74* 207/302 * 10%≈ 63 students

Number of students at Socson central school 130* 207/302* 10%≈ 107 students

Number of students at Phu lo A 98* 207/302* 10%≈ 58 students

Therefore, the minimum sample size after sampling technique required for the study was: 63 + 107 + 58 = 228 students. (Figure 7)

3.4 Study area and study population

Soc son district was selected with 34 primary schools. It is located 25 km north of Hanoi. There are no ethnic minorities. There are 3 different regions in Soc

son district in terms of geography, health status, and economy: the Hilly region, the Central region, and the River region. Socson has one district health center including 1 hospital and 2 mobile teams. Three dentists in Socson district health center are responsible for School- based dental program and periodic dental inspection planning activity in primary school.

The target population was the 11-12 years old primary school children in Soc Son District, Hanoi City, Vietnam. The total primary school children were about 20.983.

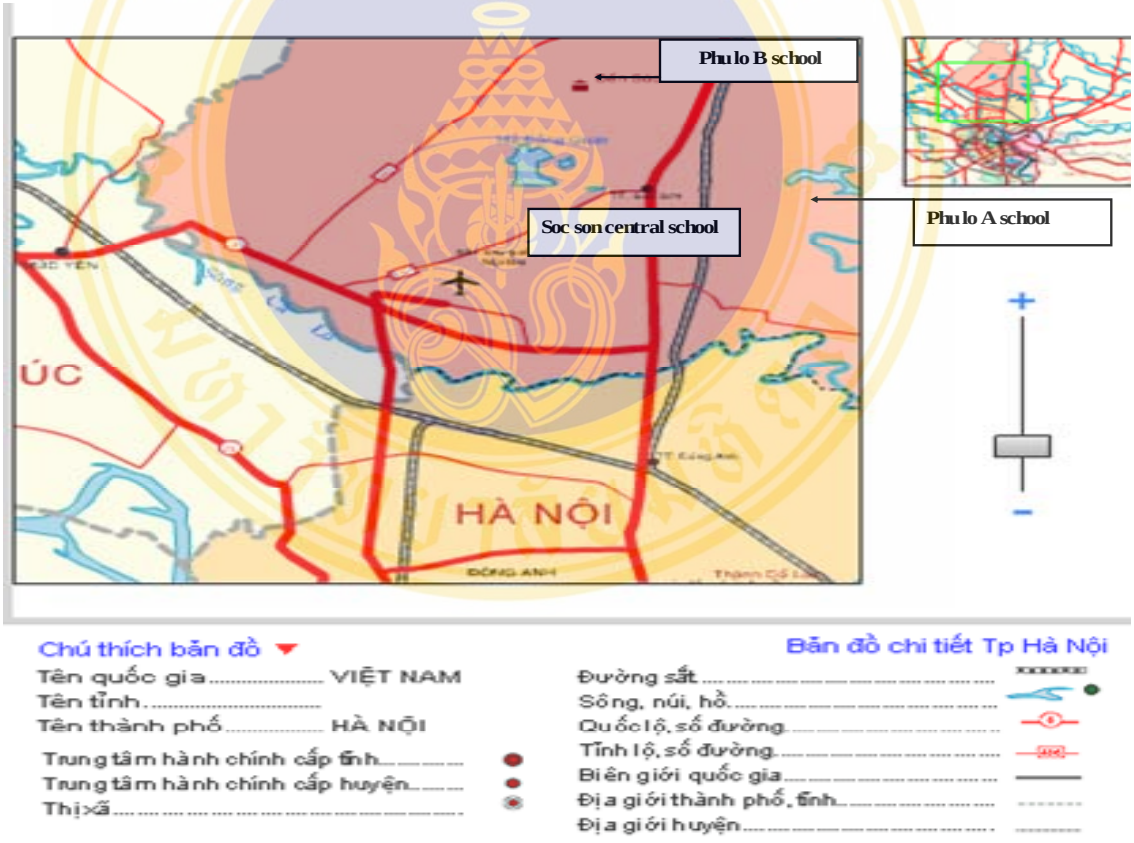

Figure 6 The map of Soc son district

3.5 Sampling technique

There were 34 primary schools in Soc Son District, Hanoi City, Vietnam. From the schools list provided by Department of training and education, school list provide by Socson district health center and school list from SBDP only four school delivery school-based dental program five years. Thirty were excluded from the study because delivery school-based dental program only 3 years. Another school was used for pre-test. This leaves 3 schools which were used as the sample population by selection criteria method:

- Phu lo B from Hilly region.
- Socson central from Central region.
- Phu lo A from River region.

The total number of 11-12 years old students registered were 302 but the sample size for this study need to be at 207 and plus 10% for missing data only, who students had been studying at three primary school: Phu lo A, Phu lo B and Scoson central school at that time of data collection were selected by the simple random sampling method (Figure 7).

Finally 228 school children aged 11-12 years in 3 primary schools: Phu lo A, Phu lo B, Socson central delivered School-Based Dental Program five years, Soc Son District, Hanoi City, Vietnam were selected by the simple randomize sampling technique for conducting this survey.

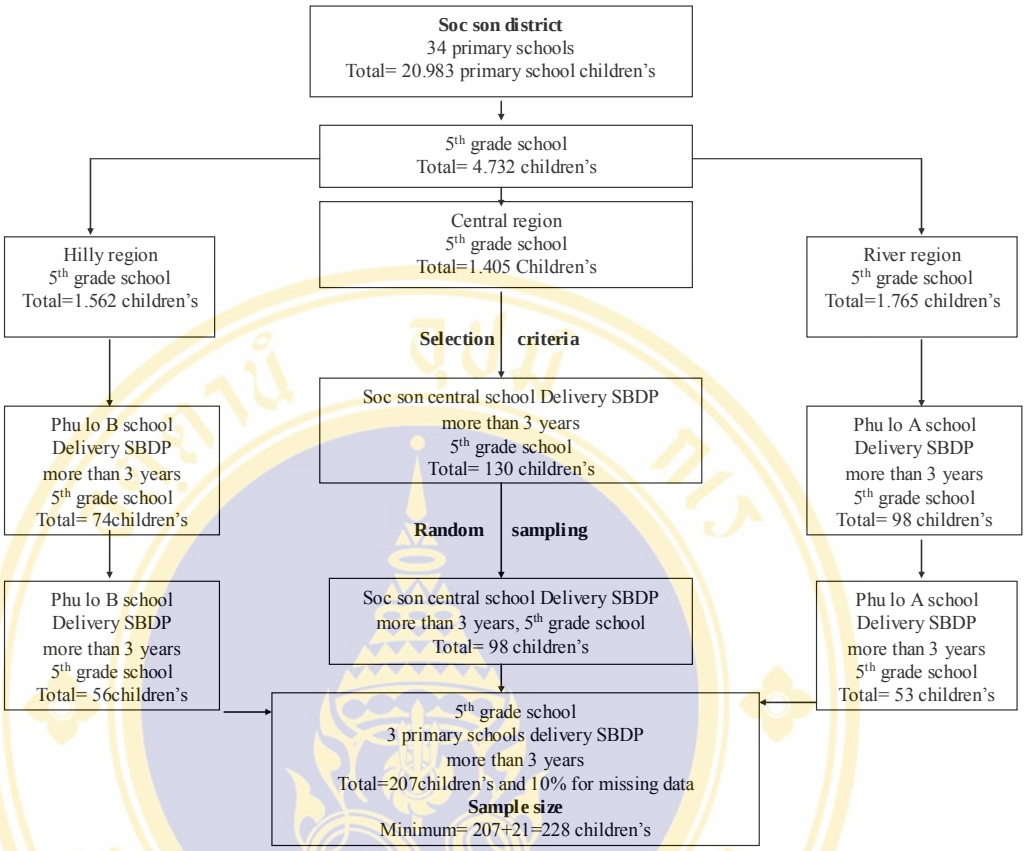

Figure 7 Sampling procedure

3.6 Research instruments for data collection

The survey was conducted among primary school children age 11-12 year old by using the structured self-administered questionnaires (group- approach) and recording oral examination by dental personnel in Viet nam- Cu ba Friendship Hospital-Ha noi-Viet Nam.

3.6.1 Oral health examination instruments:

- Planed mouth mirror
- Explorer No.5
- WHO periodontal probe.

3.6.2 Recording oral examination about:

- Dental carriers' status
- Periodontal status.
- Index DMFT (Decayed, Missing, Filled Teeth) to measure dental caries status (33).
- Index CPITN (Community Periodontal Index of Treatment Needs) to measure periodontal disease (34).

3.6.3 Self-administered questionnaires.

The self-administered questionnaire (group- approach) for the children's concern with three parts base on the objectives, and the conceptual framework of this study:

Part A : Predisposing factors

(1) Socio- economic supporting factors of their parents

Age of student was dividing into 2 levels:

Less than11 years old

11 years old and above

Age of parents or care giver was dividing into 2 levels:

From 28 to 37 years old

38 years old and above

Parents or care giver level of education was dividing into 3 levels:

Low level for who have the highest level of education is primary school and who no education and other

Moderate level for who have the highest level of education is secondary school High level for who have the highest level of education is or high school, college or university

Monthly income (VND) was dividing into 4 levels:

Level 1 for those who earn money ≤ 2,000,000 VND per month.
Level 2 for those who earn money 2,000,001 to 5,000,000 VND per month
Level 3 for those who earn money 5,000,001 to 10,000,000 VND per month
Level 3 for those who earn money >10,000,000 VND per month

(2) Knowledge about oral health, this past consists of 11 questions which start from question number 17 to question number 27. Knowledge score: (on oral health)

Correct answer = 1 score
Incorrect answer = 0 score

Total knowledge score was 11. In this study, the knowledge was dividing in the three categories according to Bloom percentage. For good level of knowledge the score was ≥ 80%, moderate level of knowledge 60-80% and for poor level of knowledge the score was < 60%.

(3) Perception refers to perception of students in this study including 15 questions; 8 positive statements, and 7 negative statements. The scoring criteria (toward oral health) were dividing into three levels. Numeric score of 1, 2, and 3 were assigned to each category of responses. For responses of agree, not sure, and disagree among good perception statement, the value of 3, 2, and 1 were assigned accordingly for those poor perception statements, the value of 1, 2, and 3 were assigned for responses on agree, not sure, and disagree respectively.

Total score was 45. According to the level of student's perception on oral health, it was dividing into two levels. According to median score of perception, for those with perception score were equal to or above (higher) median they were categorized as good score as compared to those poor score which are under median value; that mean Good level of perception score were from 39 to 45, Poor level of perception score were from 25 to 38.

(4) Oral hygiene practice refers to practice of students on oral hygiene methods used, brushing interval and food/sugar consumption in this study including 9 questions which is question 43 to 51.

Part B : Enabling factors include questions on accessibility and availability.

Five questions which is question from 52 to 56 on dental service, the researcher is basically trying to find out the students financial accessibility dental service easy or not; and two questions on availability which is question 57 to 58 the researcher is basically trying to find out the source of information on dental health of primary school children.

Part C : Reinforcing factors include four questions on the community related factors of their parents from question number 49 to question number 62, and seven questions on School-based dental program's (question number 63 to 69). Positive answer such as parents regularly takes care of their children to brush their teeth in the morning and before going to bed, and to have clean after meal was score as 1, and otherwise is 0. Total score of the community related factors from 0 to 11.

Students' social support was categorized into two group/ level. Those with score above or equal to median value were categorized in the good social support group, and those under median value were in poor social support group (community related factors).

Part D : Supporting environment factor

Supporting environment factor in this study refer to find out by checking list with 3 primary schools about environment (for example: place for students to brush teeth, condition of tooth brush or facilities for Fluorua Natri 0.2% mouth rinsing) and activities (for example: oral health screening by teacher, etc.). The scoring criteria (toward items) were dividing into three levels: Appropriate have score 2, Sufficient have score 1, Insufficient have score 0.

Total score was 12. According to mean score of supporting environment, for high level of supporting environment the score was greater than Mean+ SD, for moderate level of supporting environment the score was between Mean- SD and Mean +SD, and for low level supporting environment the score was less than Mean-SD.

3.7 Data collection procedure

- In the first step, pre-test of the questionnaire by sampling a group of 30 school children aged 11-12 years. The pre-test data was analyzed for reliability coefficient for knowledge on oral health, perception on oral health for primary school. The method and result are used by formulas KR20 (0.562) and Cronbach's Alpha coefficient (0.5817). After correcting the content and wording, the researcher did not have time to do the second reliability test because the school children were nearly in vacation (New Year holiday), so that need check reliability again (by random 30 respondents from 228 the students answer sheet after collected data to conducted second pre-test).

- In the second step, training and calibrating dental personnel in Viet nam- Cu ba Frienship Hospital to develop skills in examination of oral health status.

- In the third step, make schedule and contact with the primary school in Soc son, collecting data in January, 2008. The oral health status was examined by dentist by using WHO recommend dental caries status (DMFT index) and Community Periodontal Index of Treatment Needs (CPITN); details of related factors were obtained by interviewed by self-administered questionnaire during January 2008.

3.8 Data analysis procedure and statistics used

The data was cleaned, coded, and analyzed by using Minitab software. The analysis was divided into 3 parts:

Part 1 Unvariate analysis:

To describe the frequency and percentage distribution, mean, standard deviation, maximum and minimum of each independent and dependent variables.

Part 2 Bicariate analysis:

To assess the association between knowledge, perception and DMFT, CPITN by using correlation analysis. For continue variable Pearson Chi-square test was performed to explore the association between categorical variable.

Part 3 Multivariate analysis:

For the assessment of the relative effect of behavioral factors on dental caries experience, multiple dummy regression analysis and logistic regression analysis was performed. Dental caries experience index (DMFT) was the dependent variable in the dummy regression analyses. In the logistic regression model the dependent variable was represented by the dichotomous presence or absence of caries (i.e. DMFT=1 or more, or DMFT=0); thereby the regression coefficient indicates the Odds Ratio (OR=P/1-P) of caries. For the statistical evaluation of the regression coefficients, the t-test was used in the dummy regression whereas the Chi-square test was chosen in the logistic regression.

CHAPTER 4
RESULTS

This study was to study oral health status and the related factors among primary school children in Soc Son District, Hanoi City, Vietnam.

The results are presented in two parts:

Part A:

Descriptive statistic analysis will be presented according to the conceptual framework as the following factors among selected primary school children of Soc Son District, Hanoi City, Vietnam.

1. Oral health status of Dental caries (DMFT)
2. Oral health status of Periodontal disease (CPITN)
3. Socio- demographic characteristics
4. Knowledge of the school children on oral health
5. Level of perception on oral health
6. Oral hygiene practice of Socson primary school children
7. Accessibility to dental service
8. The source of information about dental health preventive behavior
9. Level of social support (parents, teachers and supporting environment)

Part B:

Inferential statistics is demonstrating the relationship between independent variables and dependent variable oral health status with the following factors:

- Predisposing factors: namely education of parents or care giver, type of drink or snacks/desserts, etc.
- Enabling factors, such as, source of information from magazine or teachers, etc.
- Reinforcing factors, such as, level of social support (parents, teachers), etc.

4.1 Descriptive statistics

4.1.1 Oral health status: Dental caries

The status of dental caries consisted of combination of teeth with decay (D), missing (M), and filling (F) as well as its average score (mean) among primary school children in three different regions of Soc Son District, Hanoi City, Vietnam, as shown in table 5.

Table 5 The prevalence proportion rate (PP in pct) and the mean dental caries experience (DMF-T) in Socson primary school children according to three different regions

	Total (N= 228)	**Hilly region (N= 63)**	**Central region (N= 107)**	**River region (N= 58)**
PP (permanent teeth)	53.1	50.79	49.53	62.06
D (decay)- Teeth	1.02	1.03	0.91	1.20
M (missing)- Teeth	0.13	0.19	0.11	0.12
F (filling)- Teeth	0.34	0.35	0.38	0.25
DMF- T: mean	1.5	1.57	1.41	1.58
(DMFT: Min, Max)	(0, 8.0)	(0, 8.0)	(0, 7.0)	(0, 6.0)

The percentage of children with dental caries is shown in table 5. About fifty three per cent of the Socson primary school children had caries in their permanent teeth. The mean number of teeth affected was 1.5 DMFT; the decay teeth component was dominant in three different regions.

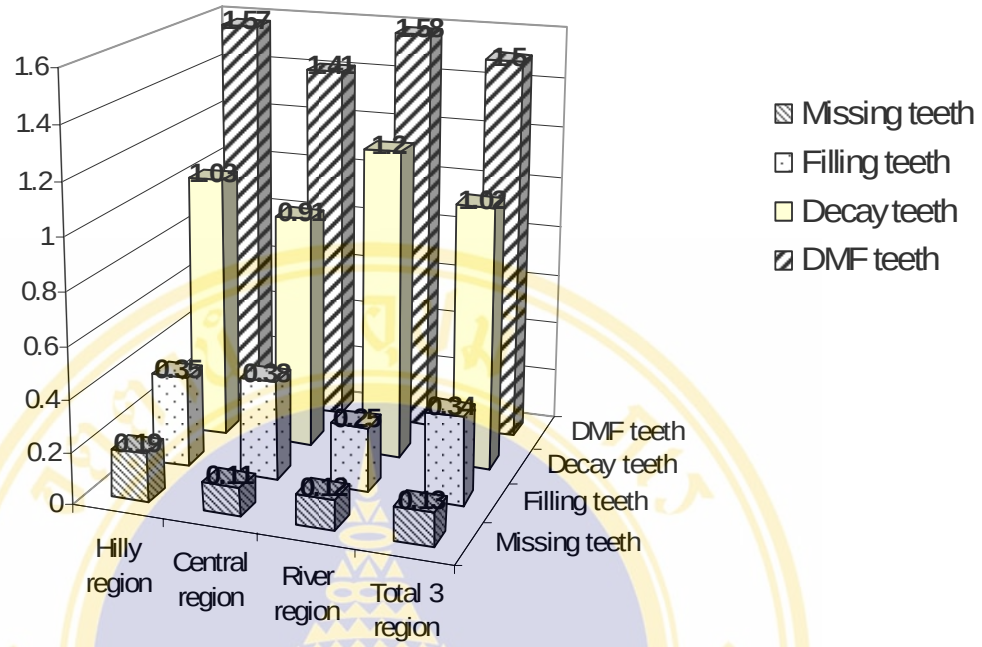

Figure 8 Distribution of the mean dental caries experience (DMF-T) in Socson primary school children according to three different regions

4.1.2 Oral health status: Periodontal disease

As shown in table 6 57.1 % of the Socson primary school children had maximum CPITN average 5.3 sextants had healthy gum (score 0) ; the total of 42.9% of the children had gingival bleeding and calculus (score 1+2).

Data from Table 7 showed upper arch had higher healthy sextants than lower arch; particularly in sextant # 11 (97.8%) and # 31 (98.2%), the most cleanliness sextants, reflecting good oral hygiene. Reversely, the lower arch expressed more calculus, the highest percentage of calculus score were sextant 4(#36 or #37) and 6(#46 or #47) showed 8.8% and 7.5% respectively.

Table 6 The percentage of Socson primary school children with CPITN index for assessment of gingival health and the mean number of sextants with CPITN score 0-2 in relation to three different regions (hilly, central, river regions)

	CPITN index			Mean no. sextants		
	Score 0 (Healthy gum) %	Score 1 (Bleeding gum) %	Score 2 (Calculus gum) %	Score 0 (Healthy gum)	Score 1 (Bleeding gum)	Score 2 (Calculus gum)
Hilly region (N= 63)	57.1 (N= 36)	19.1 (N= 12)	23.8 (N= 15)	5.3	0.3	0.2
Central region (N= 107)	54.2 (N= 58)	29.9 (N= 32)	15.9 (N= 17)	5.2	0.5	0.2
River region (N= 58)	60.3 (N= 35)	27.6 (N= 16)	12.1 (N= 7)	5.2	0.4	0.2
Total (N= 228)	57.6 (N= 129)	26.3 (N= 60)	17.1 (N= 39)	5.2	0.4	0.2

Score 0: Healthy gum

Score 1: Bleeding gum (Unhealthy gum)

Score 2: Calculus gum (Unhealthy gum)

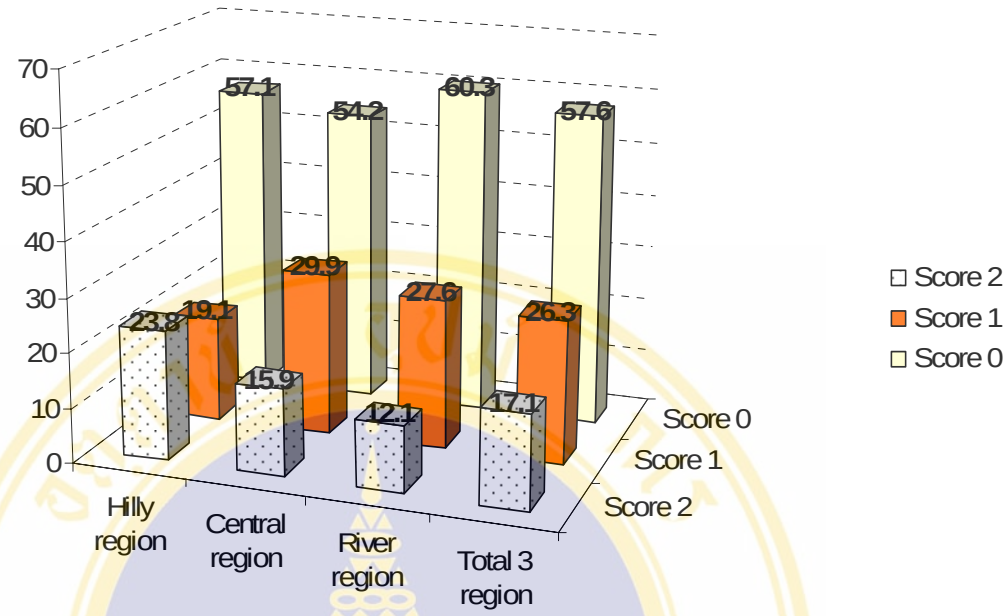

Figure 9 The percentage of Socson primary school children with CPITN index for assessment of gingival health with CPITN score 0-2 in relation to three different regions (hilly, central, river regions)

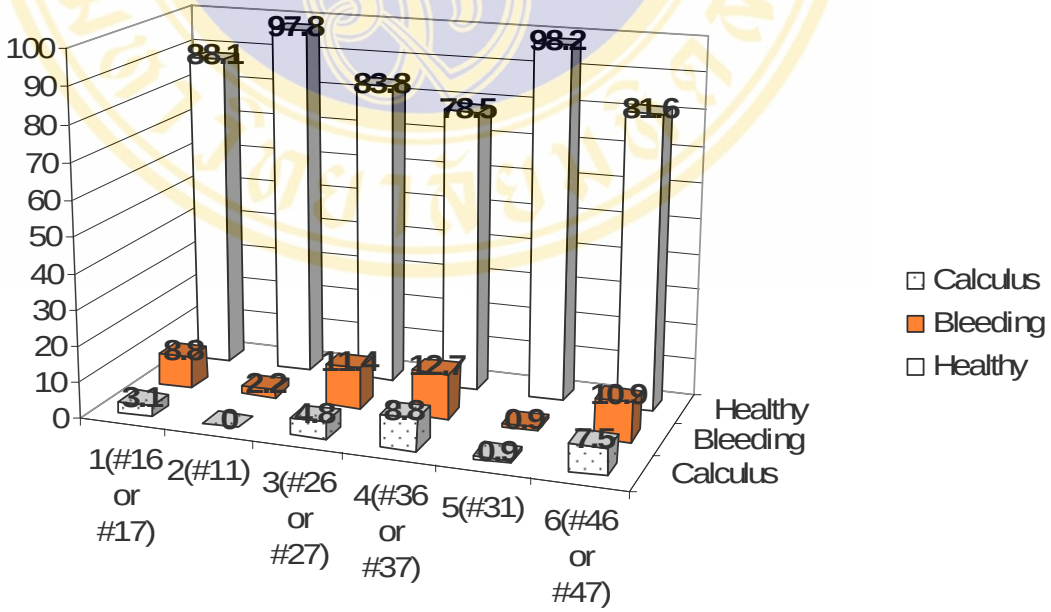

Figure 10 Distribution of CPITN score in each sextant

Table 7 Distribution of CPITN score in each sextant

Sextant (N= 228)	Score	Percentage
Upper arch		
1(#16 or #17)	- Healthy	88.1
	- Bleeding	8.8
	- Calculus	3.1
2(#11)	- Healthy	97.8
	- Bleeding	2.2
	- Calculus	0
3(#26 or #27)	- Healthy	83.8
	- Bleeding	11.4
	- Calculus	4.8
Lower arch		
4(#36 or #37)	- Healthy	78.5
	- Bleeding	12.7
	- Calculus	8.8
5(#31)	- Healthy	98.2
	- Bleeding	0.9
	- Calculus	0.9
6(#46 or #47)	- Healthy	81.6
	- Bleeding	10.9
	- Calculus	7.5

4.1.3 Socio- demographic characteristics

Table 8 Number and percentage of students classified by age

Age of student(yrs)	**Number (N= 228)**	**Percentage**
10	77	33.7
11	149	65.4
12	2	0.9
Mean: 10.67 S.D: 0.49 Mean+ S.D: 11.16 Mean- S.D: 10.18		

The number and percentage of the 228 participants of 5th grade classified by age is shown in table 8, with the age ranged from 10 to 12 year old. According to this table, students aged 11 years old compiled 65.4% (149). Students with 10 years old comprised of 33.7 % (77) and 12 years old was 0.9% of the total participants (2) with the mean and standard deviation of 10.67 and of 0.49 respectively.

Table 9 demonstrates the socio- demographic characteristics of Socson primary school children by number and percentage of parents and care giver of students. The age group of parents or care giver is categorized into 2 groups. The result shows that nearly two third was age group between 28- 39 years with included 144 parents or caregivers (63.166%). The age group above 39 years old was 84 parents or care givers (36.84%). In this study, the minimum age of parents or care giver' was 28 years old and maximum age was 80 years old, the mean of age was 39.2 years with the standard deviation of 7.76.

Table 9 Number and percentage of parents and care giver of students classified by Socio-demographic characteristics

Socio-demographic characteristics	Number	Percentage
Age of parents or care giver (year)	**228**	
28- 39	144	63.16
40- 80	84	36.84
Mean: 39.2 S. D: 7.76 Max: 80 Min: 28		
Father's education	**72**	
No education	0	0
Primary school	4	5.5
Secondary school	18	25.0
High school	16	22.2
College/university	31	43.1
Other (example: missing, don't know, etc.)	3	4.2
Mother's education	**142**	
No education	6	4.2
Primary school	12	8.5
Secondary school	48	33.8
High school	44	31.0
College/university	28	19.7
Other (example: missing, don't know, etc.)	4	2.8
Care giver's education	**14**	
No education	2	14.3
Primary school	1	7.2
Secondary school	3	21.4
High school	3	21.4
College/university	5	35.7
Other (example: missing, etc.)	0	0

Table 9 Number and percentage of parents and care giver of students classified by Socio-demographic characteristics (cont.)

Socio-demographic characteristics	Number	Percentage
Father's occupation	**72**	
Labour	3	4.2
Farmer/Gardening	26	36.1
Government officer	9	12.5
Factory worker	11	15.3
Own business	8	11.1
Other (example: soldier, etc.)	15	20.8
Mother's occupation	**142**	
Labour	2	1.4
Farmer/Gardening	72	50.7
Government officer	11	7.8
Factory worker	14	9.8
Own business	23	16.2
Other (example: missing, soldier, etc.)	20	14.1
Care giver's occupation	**14**	
Labour	2	14.3
Farmer/Gardening	5	35.7
Government officer	0	0
Factory worker	1	7.1
Own business	2	14.3
Other (example: missing, don't know, retired, etc.)	4	28.6
Characteristic of the family	**228**	
Nuclear family	200	87.72
Extended family	23	10.09
Only live with grandparents	5	2.19

Table 9 Number and percentage of parents and care giver of students classified by Socio-demographic characteristics (cont.)

Socio-demographic characteristics	Number	Percentage
No. of sibling	**228**	
1	21	9.2
2	139	61.0
3	52	22.8
4 and above	16	7.0
Mean: 2.28 S. D: 0.75 Max: 5 Min: 1		
Rank of sibling	**228**	
1	23	10.09
2	122	53.51
3 and above	83	36.40
Mean: 1.61 S. D: 0.79 Max: 5 Min: 1		
Family income (VND)	**214**	
≤2,000,000	137	64.0
2,000,001-5,000,000	53	24.8
5,000,001-10,000,000	9	4.2
>10,000,000	15	7.0
Care giver's income (VND)	**14**	
≤2,000,000	11	78.6
2,000,001-5,000,000	1	7.1
5,000,001-10,000,000	1	7.1
>10,000,000	1	7.1

For the educational level of fathers, 25% graduated from secondary school (18), 22.2% graduated from high school (16) and 43.1% graduated from college/university. As for mother's education, 33.8% graduated from secondary school (48), 31.0% graduated from high school (44) and 19.7% graduated from college/university (28). There was 6 mothers (4.2%), 2 care givers (14.3%) with no education background.

About 36% of fathers (n= 26), 35.7% of care givers (n= 5), and 50.7% of mothers (n= 72) were farmer or doing gardening work. Almost 20.8% of father (15); and 16.7%of mothers (23) were soldier and have their own business respectively. Only 1.4% of mothers (2) were labour worker.

With regard to the family type, the nuclear family proportion was greater than proportion of the extended family; there were 87.72% (200) and 10.09% (23) respectively. Nowadays, the traditional multi generation family was shifting toward nuclear family type, event in Vietnam rural area. The biggest percentage of number of siblings was for 2 child family, which contributed to 61% (139) and the smallest percentage for those with 4 children and above in the family contributed to was 7.0% (16). The highest percentage of rank of sibling for this studied group was the second sibling estimated for 53.51% (122) and rank of fist of sibling, was calculated to be 10.09% (23) - the smallest percentage of the sample studied.

As for the family and care giver income, mostly less than 2 million VND constituted 64% (137) and 78.57% (11) respectively of the respondents. Those with income over 10 million VND was 7% (15) and 7.1% (1) for family, and care giver respectively. There were 24.8% (53) of the family income ranged from 2 million VND to 5 million VND.

4.1.4 Knowledge of the school children on oral health

Table 10 Number and percentage of students by correct/true knowledge on oral health

No	Statements	Number (N=228)	Percentage
1	The cause of dental disease	200	87.7
2	The symptoms of tooth decay	194	85.0
3	The mean of gum bleeding	211	92.5
4	The meaning of dental plaque	113	49.6
5	The dental plaque lead to	50	21.9

Table 10 Number and percentage of students by correct/true knowledge on oral health (cont.)

No	Statements	Number (N=228)	Percentage
6	The most effective way prevent dental caries	108	47.4
7	Prevention of dental plaque	75	32.9
8	The correct method of tooth-brushing	162	71.1
9	The best paste for dental health	192	84.2
10	The most harmful food for healthy teeth	196	86.0
11	The most important food for healthy teeth	180	79.0

Table 10 showed that almost of the students had good knowledge about the mean of gum bleeding with 92.5% (211) and the cause of dental disease with 87.7% (200), then the most harmful food for healthy teeth was 86% (196). Aside from this, 85% of the students (194) know the symptoms of tooth decay and 84.2% of the students (192) know the best paste for dental health. 79% of the students (180) knew the most important food for healthy teeth and 71.1% of the students (162) gave correct answer for method of tooth-brushing. Half of them knew the meaning of dental plaque and 47.4% (108) understood about the most effective way to prevent dental caries. Some students 32.9% (75) showed that they had poor knowledge on prevention of dental plaque, as well as 21.9% (50) the periodontal disease (the question about dental plaque lead to).

Cut off points on knowledge level on oral health

Regarding the level of knowledge on oral health, it was divided into three categories according to Bloom percentage. Those with good knowledge the score was ≥ 80%, moderate level of knowledge ranged from 60 to 80% and for poor knowledge the score was < 60%.

Summary on distribution of the number and percentage of 228 students by level of knowledge on oral health in table 11, it was found that those with high

knowledge was 23.7% of students (54), the moderate knowledge was 51.8% (118) and the proportion of students with low level knowledge was 24.5 % (n= 56).

Table 11 Number and percentage of students by level of knowledge on oral health

Level of Knowledge (based on 11 statements)	Number (N =228)	Percentage
Good Knowledge score (≥ 9)	54	23.7
Moderate knowledge score (7- 8)	118	51.8
Poor Knowledge score (≤ 6)	56	24.5
Mean: 7.37 S.D: 1.60 Max: 11 Min: 2		

Score: Good = ≥ 9, Moderate = 7-8, Poor= ≤ 6

4.1.5 Level of perception on oral health

Table 12 showed distribution number and percentage of students by perception level on oral health among Socson primary school children. It was found that 93% students (212) had good perception and understood that brushing teeth every day could prevent tooth decay with, 84.6% of them (193) knew that regular visits to the dentist keeping away dental problems, 81.6% of them (186) agreed that using toothpaste could prevent dental caries, 79.0% of them (180) knew that food with high sugar composition may increase risk dental caries, 73.3% of them (167) knew that front tooth decay can make one look unpleasant, 70.6% of them (161) knew that brushing teeth will keep one from having trouble with gum, 62.7% of them (143) knew that also using toothpaste and tooth brush was not costly.

Some of students answered "disagree", 84.2% of them (192) disagreed that participate dental clinic check up regularly is costly, 79.8% of them (182) disagreed that keeping natural teeth are not that important, 75% of them (171) disagreed that false teeth will be less of a bother than natural teeth, eating and drinking sweet things does not cause tooth decay, 72.4% of them (165) disagreed that visiting the dentist every 6 month/year was not necessary, 64% of them (146) disagreed that taking candy

Table 12 Number and percentage of students perception on oral health by items analysis

No.	Statement	Agree		No sure		Disagree	
		100 %	N (228)	100 %	N (228)	100 %	N (228)
1	Front tooth decay can make one look bad.	73.3	167	19.7	45	7.0	16
2	Keeping natural teeth are not that important.	12.7	29	7.5	17	79.8	182
3	False teeth will be less of a bother than natural teeth.	5.3	12	19.7	45	75.0	171
4	Children afraid of going to the dentist because of possible pain.	14.5	33	15.8	36	69.7	159
5	Regular visits to the dentist keep away dental problems.	84.6	193	7.9	18	7.5	17
6	Participate in regularly check up is costly.	6.6	15	9.2	21	84.2	192
7	Every 6 month/year dental visit is not necessary.	17.5	40	10.1	23	72.4	165
8	Brushing teeth every day can prevent tooth decay.	93.0	212	4.4	10	2.6	6
9	Brushing teeth will keep one from having trouble with gum.	70.6	161	21.1	48	8.3	19
10	Using toothpaste and tooth brush is not costly.	62.7	143	24.1	55	13.2	30
11	Using -flouride toothpaste can prevent dental caries.	81.6	186	17.1	39	1.3	3
12	Eating and drinking sweet things does not cause tooth decay.	18.4	42	6.6	15	75.0	171

Table 12 Number and percentage of students perception on oral health by items analysis (cont.)

No.	Statement	Agree		No sure		Disagree	
		100 %	N (228)	100 %	N (228)	100 %	N (228)
13	Food with high sugar composition may increase risk of having dental caries.	79.0	180	10.1	23	10.9	25
14	Taking candy and chocolate regularly without cleaning teeth (after eating) are not harmful to the teeth.	22.0	50	14.0	32	64.0	146
15	Dental treatment cost is expensive.	46.4	106	26.8	61	26.8	61

and chocolate regularly without cleaning teeth (after eating) are not harmful to the teeth.

Numeric score of 1, 2, and 3 were assigned to each category of responses. For responses of agree, not sure, and disagree among good perception statement, the value of 3, 2, and 1 were assigned accordingly for those poor perception statements, the value of 1, 2, and 3 were assigned for responses on agree, not sure, and disagree respectively.

For those with perception score were equal to or above (higher) median they were categorized as good score as compared to those poor score which are under median value as shown in table 13

Table 13 had summarized number and percentage of students for level of perception on oral health. 59.6% of the students (136) had good level of perception score, and 40.4% (92) were in the low level of perception score.

Table 13 Number and percentage of students by levels of perception score on oral health

Level of Perception	Number (N= 228)	Percentage
Good level of Perception score (≥ Median)	136	59.6
Poor level of Perception score (< Median)	92	40.4
Median: 39 S.D: 4.24 Max: 45 Min: 25		

Score: Good = 39- 45, Poor= 25- 38

4.1.6 Oral hygiene practice of Socson primary school children

4.1.6.1 Tooth brushing habits of Socson primary school children.

Tables 14 to 15 summarise the findings concerning tooth brushing habits of Socson primary school children. Almost 72% (71.5%) of student (163) claimed for having correct tooth brushing technique, by moving the brush up and down with circular motion, as shown in table 14 Sixty- one percent of students (139) claimed that they spent at lest 3 minutes on brushing their teeth.

Table 14 Number and percentage of students by pattern of oral health practice duration of tooth brushing.

Statement	Number (N =228)	Percentage
Method of tooth brushing		
Move the brush back and forth	7	3.0
Move the brush up and down from the gum line with circular motion	163	71.5
Move the brush in circular motion	20	8.8
Move the brush from front to back teeth	38	16.7
Time spent on brushing teeth		
< 3 minutes	46	20.2
≥ 3 minutes	139	61.0
Others, specify (example: missing, do not brushing, etc.)	43	18.8

In all, as shown in table 15, most of the respondent s with 85.5 % (195) brushed their teeth before starting at school. Two hundred and four students (89.5%) claimed to brush their teeth at least twice a day. Nearly half of children, 49.6 % (113), brushed their teeth in the morning and about one- third of the participants brushed their teeth after meals. In general, 207 students 90.8%) used fluoridated toothpaste.

Table 15 The percentages of students according to age at first brushing, frequency of tooth brushing, time of brushing, use of toothpaste.

Statement	Number (N =228)	Percentage
Started brushing teeth		
before schooling	195	85.5
when attending primary school	27	11.8
After completing primary school	6	2.6
Frequency of tooth brushing		
Seldom or no brushing	3	1.3
Brushing once a day	21	9.2
Brushing at least twice per day	204	89.5
Occasion of tooth brushing		
In the morning.	113	49.6
In the evening	21	9.2
After meals	78	34.2
After dessert/sweets	16	7.0
Use of toothpaste		
Fluoridated	207	90.8
Non- fluoridated	21	9.2

4.1.6.2 Pattern of food consumption among students

About the food consumption, the table 16 noted that 65.8 % (150) students ate fresh fruit, 32.5 % (74) students ate potato ship/ starchy snack, and 18.4 % (42) ate candies/ chocolate, then 14 %(32) ate Biscuits/ cakes.

Table 16 Pattern of food consumption among students

Statement	Number (N =228)	Percentage
Types of snacks or desserts usually taken in- between- meals		
Fresh fruit		
- Yes	150	65.8
- No	78	34.2
Biscuits/ cakes		
- Yes	32	14.0
- No	196	86.0
Potato ship/ starchy snack		
- Yes	74	32.5
- No	154	67.5
Candies/ chocolate		
- Yes	42	18.4
- No	186	81.6

From the choices answered about taking a type of drinks taken- between-meals/ day 74.1% (169) was drinking water, the second with 22.4 % (51) drunk sweeten drink was not good choices, and the lowest percentage, was drinking tea with 8.3 % (19).

Table 16 Pattern of food consumption among students (cont.)

Statement	Number (N =228)	Percentage
Type of drinks taken- between- meals/ day		
Soda/ Coca-cola		
- Yes	47	20.6
- No	181	79.4
Sweeten drink		
- Yes	51	22.4
- No	177	77.6
Tea/ coffee with sugar		
- Yes	19	8.3
- No	209	91.7
Water		
- Yes	169	74.1
- No	59	25.9
Frequency of eating sweets		
1-3 times per day	198	86.8
4-6 times per day	17	7.4
7-10 times per day	4	1.8
Every time including bed time	9	4.0

***** Multiple answers

Those who had sweets 1- 3 times/ day were found to be the largest group. 86% children (n= 198). While the smallest proportion that found to had sweet 7- 10 times/ day were 1.8% (n= 4). In addition, 9 students (4%) had their sweets every time including bed time, as shown in table 16 (cont.).

1.4.7 Accessibility to dental services

Table 17 Number and percentage of students by dental services accessibility

Statements	N(228)	Percentage
Don't know location of dental services	**34**	15
- Hilly region	3	8.8
- Central region	14	41.2
- River region	17	50
Know location of dental services	**194**	85
Distance from dental clinic	**194**	
< 3 km	104	53.6
3-5 km	41	21.1
> 5 km	49	25.3
Perceived convenient to dental clinic	**194**	
Very convenient	31	16.0
Convenient	139	71.6
Inconvenient	24	12.4
Mode of traveling to dental clinic	**194**	
Walking	19	9.8
Public vehicle	6	3.1
Private vehicle	156	80.4
Other	13	6.7
Waiting time	**194**	
< 30 minute	146	75.3
30- 60 minute	31	16.0
> 60 minute	17	8.7

Table 17 highlights the utilisation of dental services, with 15 % (34)of the participants reporting that they don't know where to find dental service, most of them live in central and river region with 91.2% (31). 85 % (194) know where to find

dental service; 53.6 %(104) of them reporting that less than 3 km distance from dental clinic, 71.6 %(139) reporting that convenient perceived to dental clinic, 80.4 %(156) used private vehicle went to dental clinic, then 75.3 %(146) had waiting time less than 30 minute.

Table 18 Number and percentage of students acquiring sources of oral health information by types of communication channel

Source of information	Information concerning preventive oral health	
	Number	**Percentage**
Mass media	**228**	
Newspaper*	53	23.3
Magazine*	38	16.7
TV*	176	77.2
Radio*	50	22.0
Others (specify)*	41	18.0
Personnel	**228**	
Dentist*	157	68.9
Parents*	151	66.2
Teachers*	93	40.8
Friends*	19	8.3
Others (specify)*	20	8.8

***** Multiple answers

1.4.8 The source of information about dental health preventive behavior

Regarding the source of information, observed data from table 18 showed that almost students, 77.2 % (176) received information through television, 68.9 % (157) received from dentist, 66.2 %(151) received from parents, 40.8 % (93) teachers. Then newspaper and radio were 23.3 % (53) and 22.0 % (50), whereas,

magazine was 16.7 % (38). Eventually, the lowest percentage distribution of available source of information on preventive dental health was from friends which contributed to 8.3 % (19).

1.4.9 Level of social support (parents, teachers and supporting environment)

Reinforcing factors as the following factors:

- The community related factors include supporting factor of their parents or care giver and supporting factor of School-based dental programs from their teachers.
- Supporting environment (estimated by checking list)

According to table 19 the number and percentage distribution of students by community related factors from family and SBDP, showed; the first group of parent had as high percentage as with 72.4% (165) that always visited the dentist, 21.5 % (49) always reminded for mouth-rinsing, 19.7 % (45) regularly took care of tooth-brushing before bed time, then 18.9 % (43) regularly took care of tooth-brushing in the morning.

The second group is teacher, had high percentage with 92.1% (210) on giving information about dental diseases, 90.8 % (207) gave information about toothbrushing technique, 87.7 % (200) reminded about taking healthy food and remind to used tooth paste for toothbrushing, 82.5 % (188) showed the cariogenic food and reminded to have oral health examine by school district dentist once every months, then 76.3 % (174) give information about Fluorua Natri 0.2% mouth rinsing prevent dental caries.

Table 19 Number and percentage of students by types of specify from family and School based dental program.

Statements	N (228)	Percentage
Reinforcing factors		
Family		
Take care of tooth-brushing regularly in the morning	43	18.9
Take care of tooth-brushing regularly before bed time	45	19.7
Take care of mouth-rinsing	49	21.5
Bring children to see dentist	165	72.4
Teachers (School-based dental program's)		
Give information about dental diseases	210	92.1
Remind children about taking healthy food	200	87.7
Showing the cariogenic food	188	82.5
Remind children to used tooth paste for toothbrushing	200	87.7
Give information about tooth brushing technique	207	90.8
Remind children to have oral health assessment by school district dentist once every months	188	82.5
Give information about prevention of dental caries by use of Fluorua Natri 0.2% mouth rinse	174	76.3

Based on number and percentage of students by social support positive (correct answer) score were as signed as for 1 point, and negative (incorrect answer) score is zero (0) point. Students' social support was categorized into two group/ level. Those with score above or equal to median value were categorized in the good social support group, and those under median value were in poor social support group (community related factors).

Table 20 Number and percentage of students by level of types reinforcing factors from family and School based dental program (community related factors)

Level of community related factors	Number (N =228)	Percentage
Good community related factors (≥Median)	128	56.14
Poor community related factors (< Median)	100	43.86
Median: 8 S.D:2.01 Max: 11 Min: 0		

Score: Good= 8-11, Poor= 0- 7

According to table 20 the result found that highest level of students by community related factors from family and SBDP were the good community related factors with 56.14 % (128).

Table 21 Assessment of schools' supporting environment*

Items	Appropriate		Sufficient		Insufficient	
	N	%	N	%	N	%
Environment						
Place for students to brush teeth	3	100	0	0	0	0
Condition of tooth brush	3	100	0	0	0	0
Facilities for Fluorua Natri 0.2% mouth rinsing	3	100	0	0	0	0
Activities						
Oral health screening by teacher	1	33.3	2	66.7	0	0
Brushing after lunch	1	33.3	2	66.7	0	0
Handbook of oral health care	3	100	0	0	0	0

***** Data from 3 primary schools

Table 21 describes observation checklist, it was found that 100 % (3) primary school had good environment (place for students to brush teeth, condition of tooth

brush, facilities for Fluorua Natri 0.2% mouth rinsing). Observers also indicated that oral health screening by teacher was 33.3 % (1) appropriate, 66.7 % (2) sufficient; About brushing after lunch activity was 33.3 % (1) appropriate, 66.7 % (2) sufficient; 100% (3) primary schools had handbook of oral health care.

4.2 Inferential statistic

4.2.1 Association between the knowledge, perception and oral health status; and practice level

Table 22 Correlation analysis between oral health status and knowledge score by Spearman rank correlation test

Good knowledge score (Range min- max value)	DMFT r	P- value	CPITN r	P- value
- Caries (0- 2)	- 0.013	0.844	- 0.083	0.211
- Periodontal (0- 3)	0.022	0.744	0.064	0.337
- Tooth brushing and Tooth paste (0- 4)	0.015	0.818	0.118	0.076
- Consumption of sweet/candy (0- 2)	-0.008	0.901	0.005	0.936
- Total knowledge score (2- 11)	0.036	0.587	0.114	0.587

To examine the relationship between knowledge of school children and oral health status in term of DMFT and CPITN, table 22 showed that there was no significant association between the knowledge and oral health status.

Table 23 highlights the relationship between perception and oral health status, the results showed non-significant association.

Table 23 Correlation analysis between oral health status and perception score by Spearman rank correlation test

Perception score (Range min- max value)	DMFT r	P- value	CPITN r	P- value
Perception score towards teeth (5- 15)	- 0.061	0.363	- 0.047	0.481
Perception score towards dental care (15- 29)	0.007	0.913	- 0.032	0.628
Perception score towards tooth bursching & tooth paste (4- 10)	- 0.019	0.777	- 0.125	0.059
Perception score towards eating sweet (3- 9)	0.067	0.312	- 0.019	0.778
Perception score towards oral health (18- 36)	0.009	0.888	- 0.094	0.158

Table 24 was formed by comparison between knowledge levels, perception levels and the practice levels (these healthy practices mean correct practice, unhealthy practice mean incorrect practice). The students with good knowledge or good perception on oral health had higher proportion of the healthy oral health practice pattern with 83.33% (45) or 78.68% (107), respectively. The students' with good knowledge and good perception on oral health were found to be significant association with the students' oral health practice with p-value = 0.006 and 0.015 respectively.

Table 24 Association between pattern of oral health practice and level of knowledge and perception among primary school children's

	Practice level				Total	χ^2 df P-Value
	Healthy		Unhealthy			
	n	%	n	%		
Knowledge level						
Good	45	83.33	9	16.67	54	10.370
Moderate	89	75.42	29	24.58	118	2
Poor	32	57.14	24	42.86	56	**0.006****
Perception level						
Good	107	78.68	29	21.32	136	5.865
Poor	59	64.13	33	35.87	92	1
						0.015*

* **P- value< 0.05** ** **P- value< 0.01**

4.2.2 Association between various independent variables of interest and oral health status

Table 25 showed that students with no sweeten drink and no ate potato ship between meals had higher proportion of good (healthy gum) oral health with 61.02% (108) and 61.69 (95) respectively as compared to poor (unhealthy gum) oral health with 38.98% (69) and 38.31% (59) respectively. It was also found that there was significantly association between sweeten drink and ate potato ship between meals with CPITN index, P-value = 0.023 and 0.040, respectively. However, there was no significant association between the practice levels and oral health index namely DMFT index and CPITN index with P-value = 0.360 and 0.084, respectively.

Table 26 was formed by comparison between oral health index and socio- demographic factors for parents or care giver. There was contrary between the parents or care giver education levels of no education and primary school, secondary

school and of higher secondary school. It was also found that there was statistically significant association among education group and oral health index namely DMFT and CPITN with P-value = 0.036 and 0.012, respectively. It was interesting in the no education and primary school group had highest proportion of good oral health status of the parents or care givers with 64% (16) had good DMFT and 80% (20) had healthy gum. However, there was no significant association between occupation and income of parents or care giver with oral health index.

Table 27 showed that, among the students, who knew where to get dental service, 58.08% (115) had healthy gum and among those, who didn't know where to get dental service, 48.28% (14) had healthy gum. However, there was no significant association between place of dental service and oral health status. Regarding distance of the dental clinic, it revealed that among the students who received service from less than 3 km, 50% (n= 52) of them had healthy gum and among the students who received service from greater than 3 km, 62.22% of them (n= 56) had healthy gum. However, the association was not found significant between students with proximity distance from dental clinic and oral health status. Among the students, 41.18% (n= 70) had been closer to dental clinic had good dental health (good dental health means that the children are without caries, poor dental health means that the children have caries) and 55.29% (n= 94) had healthy gum. However, the association was not found significant between perceived convenient to dental clinic and oral health index.

Table 28 showed the association between oral health index and sources information from mass media and personnel, and reinforcing factor from family. Regarding source of information it was found that the students received information from various sources. Among the students who received information from magazine, 55.26% (21) had good dental health and who received information from teachers, 48.39% (45) had good dental health. It was also found that there was statistically significant association among the students received information from magazine and teachers with DMFT index, P-value = 0.040 in both groups. However, the association was not found significant between reinforcing factors from family and school based dental program (community related factors) and oral health index.

Table 25 Association between students with oral health status and oral health practice level, types of drink or snacks /desserts between- meals

	DMFT						CPITN					
	Good oral health (DMFT= 0)		Poor oral health (DMFT≥1)		Total	χ^2 df P-Value	Healthy (Score 0)		Unhealthy (Score 1, 2)		Total	χ^2 df P-Value
	n	%	n	%			n	%	n	%		
Oral health practice level												
Healthy**	70	42.17	96	57.83	166	0.838	96	57.83	37	36.63	166	2.982
Unhealthy**	22	35.48	40	64.52	62	1	34	54.84	61	48.03	62	1
						0.360						0.084
Types of drink: Sweeten drink												
No	75	42.37	102	57.63	177	1.344	108	61.02	69	38.98	177	5.165
Yes	17	33.33	34	66.67	51	1	22	43.14	29	56.86	51	1
						0.246						**0.023***
Types of snacks /desserts: Potato ship/ starchy snack												
No	67	43.51	87	56.49	154	1.963	95	61.69	59	38.31	154	4.244
Yes	25	33,78	49	66.22	74	1	35	47.30	39	52.70	74	1
						0.161						**0.040***

* **P- value< 0.05**

** Healthy practices mean correct practice, unhealthy practice mean incorrect practice.

Table 26 Association between students with oral health status and their socio- demographic factors of parents or care giver

	DMFT						CPITN					
	Good oral health (DMFT= 0)		Poor oral health (DMFT≥1)		Total	χ^2 df P-Value	Healthy (Score 0)		Unhealthy (Score 1, 2)		Total	χ^2 df P-Value
	n	%	n	%			n	%	n	%		
Education of parents or care giver												
≥ Primary	16	64	9	36	25	6.65	20	80.00	5	20.00	25	8.872
Secondary	27	39.13	42	60.87	69	2	43	62.32	26	37.68	69	2
> Secondary	49	36.57	85	63.43	134	**0.036***	67	50.00	67	50.00	25	**0.012***
Occupation of parents or care giver												
Farmer	40	41.56	63	61.44	103	0.729	62	58.73	41	44.27	103	4.113
Officer	9	8.07	11	11.93	20	4	11	11.40	9	8.6	20	4
Factory worker	11	10.49	15	15.51	26	0.948	14	14.82	12	11.18	26	0.391
Business	12	13.32	21	19.68	33		14	18.82	19	14.18	33	
Labour and other	20	18.56	26	27.44	46		29	26.23	17	19.77	46	
Income of parents or care giver												
< 2,000,000 VND	60	43.24	84	56.76	148	1.466	89	60.14	59	39.86	148	1.673
≥ 2,000,000 VND	28	35.00	52	65.00	80	1	41	51.25	39	48.75	80	1
						0.226						0.196

* **P- value< 0.05**

Table 27 Association between students with oral health status and their accessibility to dental services

	DMFT						CPITN					
	Good oral health (DMFT= 0)		Poor oral health (DMFT≥1)		Total	χ^2 df P-Value	Healthy (Score 0)		Unhealthy (Score 1, 2)		Total	χ^2 df P-Value
	n	%	n	%			n	%	n	%		
Knowledge of dental service location												
Yes	80	40.40	118	59.60	198	0.064	115	58.08	83	41.92	198	0.991
No	11	37.93	18	62.07	29	1	14	48.28	15	51.72	29	1
						0.800						0.319
Distance from dental clinic												
< 3 km	41	39.42	63	60.58	104	0.057	52	50.00	52	50.00	104	2.920
> 3 km	37	41.11	53	58.89	90	1	56	62.22	34	37.78	90	1
						0.811						0.087
Perceived convenient to dental clinic												
Convenient	70	41.18	100	58.82	170	0.538	94	55.29	76	44.71	170	0.538
In- Conv.	8	33.33	16	66.67	24	1	14	58.33	10	41.76	24	1
						0.463						

* **P- value< 0.05**

Table 28 Association between students with oral health status and their information sources from mass media and personnel; reinforcing factor from family

	DMFT						CPITN					
	Good oral health (DMFT= 0)		Poor oral health (DMFT≥1)		Total	χ^2 df P-Value	Healthy (Score 0)		Unhealthy (Score 1, 2)		Total	χ^2 df P-Value
	n	%	n	%			n	%	n	%		
Sources information from mass media												
Magazine												
Yes	21	55.26	17	44.74	38	4.213	26	68.42	12	31.58	38	2.420
No	71	37.37	119	62.63	190	1	104	54.74	86	45.26	190	1
						0.040*						0.120
Sources information from personnel												
Teachers												
Yes	45	48.39	48	51.61	93	4.214	55	59.14	38	40.86	93	0.289
No	47	34.81	88	65.19	135	1	75	55.56	60	44.44	135	1
						0.040*						0.591
Reinforcing factor												
Good	10	37.04	17	62.96	27	2.031	14	51.85	13	48.15	27	0.589
Fair	2	20.00	8	80.00	10	2	5	50.00	5	50.00	10	2
Poor	80	41.88	111	58.12	191	0.362	111	58.11	80	41.88	191	0.745

* **P- value< 0.05**

4.2.5 The multivariate analyses of dental caries experience in Socson primary school children

Since the general objective of this study was to study oral health status and its related factors among primary school children in Soc Son District, Hanoi City, Vietnam; in addition, the specific objective was to study the relationship between factors related to oral health status among the following factor: predisposing, enabling and reinforcing factors. Multivariate logistic regression analysis was performed to assess the variables which were potentially significant predictor of oral health status. Oral health status was measured by DMFT index and CPITN index. There were twelve potential variables entered in the stepwise multivariate logistic regression model.

Table 29 presents the results of the multivariable analyses of dental caries experience (DMFT) and CPITN index. Types of snacks /desserts usually eat in-between-meals or every day: Potato ship/ starchy snack of primary school children (beta value= -0. 35 and -0.54, p= 0. 252 and 0.072) was adversely related to the dental caries experience (DMFT) and CPITN index for assessment of gingival health. And knowledge of primary school children on where to get assess to dental service (beta value= -0. 67 and -1.29, p= 0. 474 and 0.187) was adversely related to the dental caries experience (DMFT) and CPITN index for assessment of gingival health. Other independent variable related factors (namely education of parents or care giver, drinking sweetened drinks, sources information from magazine or teachers, oral health practice level) were positively associated with the oral health status (beta value= 0.46 and 0.64, 0.65 and 1.20, 0.60 and 0.53, 0.60 and 0.17, 0.55 and 0.48 respectively).The logistic regression model also showed the strength of association between each independent variable with the dental caries experience (DMFT) and CPITN index for assessment of gingival health. Other factors being equal, significantly higher DMFT index and CPITN index were observed for drinking sweetened drinks, sources information from teachers, education of parents or care giver. The most important factors of the oral health status were drinking sweetened drinks, the odds ratio indicated that the children with high drinking sweetened drinks were 3.33 times higher risk of having unhealthy gum (95 % CI= 1.09- 10.18) (with

CPITN index for assessment of gingival health) greater than those with low drinking sweetened drinks. Similarly, children with sources information from teachers were 1.84 times higher risk of having worse dental caries experience (95 % CI= 1.03, 3.28) (with DMFT index for assessment of dental caries experience) greater than those with had not sources information from teachers . Meanwhile, education of parents or care giver, the odds ratio indicated that the children had better education of the parents or care-givers and worse oral health index namely DMFT and CPITN were 1.59 and 1.90 times higher than those had less education of the parents or care-givers with 95 % CI= 1.05, 2.39 and 1.22, 2.95, respectively.

Table 29 Multivariable logistic regression analysis of dental caries experience (DMFT) with presence versus absence of caries status, as well as CPITN index for assessment of gingival health

Predictors	Coefficient (b)		OR (95% CI)	
	DMFT	CPITN	Worse DMFT	Worse CPITN
Better education of parents or care giver	0.46	0.64	1.59 (1.05, 2.39)*	1.90 (1.22, 2.95)**
Oral health practice level	0.55	0.48	1.74 (0.97, 3.10)	1.62 (0.90, 2.90)
Types of drink				
Sweeten drink	0.65	1.20	1.92 (0.67, 5.53)	**3.33 (1.09,10.18)***
Types of snacks /desserts				
Potato ship/ starchy snack	- 0.35	-0.54	0.70 (0.38, 1.29)	0.58 (0.32, 1.05)
Knowledge of dental service location	-0.67	-1.29	0.51 (0.08, 3.22)	0.28 (0.04, 1.87)
Sources information from mass media				
Magazine	0.60	0.53	1.83 (0.86, 3.90)	1.70 (0.76, 3.80)
Sources information from personnel				
Teachers	0.61	0.18	1.84 (1.03, 3.28)*	1.19 (0.67, 2.13)

***P- value< 0.05**

****P- value< 0.01**

CHAPTER 5
DISCUSSION

In Vietnam, a number of epidemiological data on oral health status are scarce; however, systematic data on oral health behaviour of children are not available at national level. The present survey provides such information as regards to primary school children, Soc Son District, Hanoi City, Vietnam was given to assess the relationship between related factors i.e., predisposing, enabling and reinforcing factors and oral health status; in addition highlighting the impact of the national mass oral health education programmers, such as the SBDP. The survey was not conducted on a national scale and therefore the data are not representative of the country in pure statistical terms; although the epidemiological part of the study may be considered representative of the general population. The finding of this study were discussed as the followings:

5.1 Oral status: Dental caries

In this study the prevalence of dental caries is 53.1 % which is higher than the results from local oral health survey in Hanoi city in 2000 and lower than the National Oral Health Survey of Vietnam 2001; the prevalence of dental caries shows 36.0 % and 56.6 % respectively. The caries prevalence in this study compares to three different regions: hilly and central region were nearly the same, but river region was little higher; the results showed 50.79%, 49.53%, and 62.06% respectively.

For mean DMFT 1.5 was lower than the National Oral Health Survey of Vietnam 2001 which revealed DMFT= 1.9. The DMFT in this study compared to three different regions: hilly and river region were nearly the same, but central region was little lower; the DMFT showed 1.57, 1.41, and 1.58 respectively.

The reasons for the substantial difference from local survey in the National Oral Health Survey of Vietnam 2001 might be:

- The characteristics of sample are different. In 2001 survey, the samples covered the real city, hilly and river regions. This study was carried out in the area near Hanoi city, samples were school children in SBDP delivery 5 years areas, which may have different characteristics with Hanoi or other parts of the country, such as; rural area, mountainous area or school children who are waiting for SBDP.

- The variation in eating behavior might be differed. This need more longitudinal study in this topic related to dental caries.

5.2 Oral status: Periodontal disease

The results from recording of the periodontal conditions of the school children aged 11-12 years in Socson district, Hanoi city Vietnam show that more than half of the children studied had healthy gum, reflecting good oral hygiene. Whereas in the National Oral Health Survey of Vietnam 2001 was 95%; and as to Hanoi city in 2000 survey, demonstrated healthy periodontal tissue only 16%, calculus and gingivitis 84%. Thus, primary school children in Socson district in 2008 survey had better healthy gum than the both survey (already mentioned). This might be the characteristics of sample were different. In the National Oral Health Survey of Vietnam 2001 and Hanoi city in 2000 survey the samples were children in every area. In this study, samples were school children in SBDP delivery 5 years areas.

In term of virulence, the mean number of healthy sextants, bleeding and calculus, were 5.2, 0.4 and 0.2 respectively. The finding revealed that the mean number of sextants with CPITN score 0- 2 of the school children aged 11-12 years in Socson district, Hanoi city Vietnam correspond fairly well to the other reports and findings from developing countries (1). It must be evident to all of study on 11-12 years old children because in this age fully erupted incisors or premolars substituted, that mean there is no inflammable factors influence to the gum tissue.

Results from table 4.3 showed the lower lateral sextant (#36, #37, # 46, and # 47) were 23.6% makes as bleeding, 16.3% calculus. This might be due to the tooth brushing (correct method, but not covered oral cavity thoroughly), or the eating characteristic, or flow rate of saliva (near by opening of the sublingual saliva gland and parotid salivary gland)

5.3 General characteristics of respondents

In this study, the respondents are school children aged 11-12 years in SBDP delivery 5 years areas in Socson district, Hanoi city. It was 25 kilometers far from Hanoi. Because of the good communication such as roads, television, made their life-style changed. It stats intermediate life-style between urban areas, like Hanoi or municipalize in big provinces, and true rural areas. Some of their fathers or mothers left there to work in Hanoi and another big province.

This study refers to parents' or care givers' socio-demographic factors, and is hoped that if education and occupation of parents or care giver were on high level and they had good income, parents or care giver could support for daily need of children and give information about knowledge, perception, and support of their children to get better condition; reflecting good oral hygiene.

The result shows that most of parents' or care givers' occupation are farmer/ gardening, mostly have income range less than 2 million VND (64% or 78.57%) and most of them graduated from secondary school, high school and college/university. There was a surprisingly statistically significant association between less education of the parents or care-givers and better oral health index namely DMFT and CPITN [p-values = 0.036 and 0.012, respectively]. The results from this study in contrary to the other reports and findings from Kuwait (20). This might be due to the fact that less education of the parents or care-givers had lower income but they try gain knowledge and accepted and adopted new practices from public media, National health promotion or health education, etc., and they using information on oral health to help their children had better preventive behaviour.

5.4 Students Psychosocial factors

5.4.1 Knowledge of the school children on oral health

In this part, referred to the knowledge of students about oral health that is divided into three levels: poor, moderate and good. According to the percentage which was ≤ 6 as poor knowledge, 7-8 moderate knowledge and ≥ 9 of good knowledge. The knowledge of the school children was slightly good with mean and SD was 7.37 and 1.60 respectively. The medium score (7- 8) showed 51.8 %. In this study, the children with poor score in knowledge on prevention of dental plaque and the periodontal disease (the question about dental plaque lead to).

Compared with the previous study by Wahyu Sulistianingsih, 2001, the percentage about cause of dental disease, the result was almost similar (73.5%), sign of tooth decay was 71.5%, meaning of dental plaque was 54%, the most effective way prevent dental caries was 30.5%, best paste for dental health was 78%; but knowledge on correct method of toothbrushing was only 26.0% (21) lower than present study (71.1%). The reasons for result difference might be the characteristics of sample were different. In the study by Wahyu Sulistianingsih, 2001, samples were 200 primary school children in Nakhon Pathom Province, Thailand. Samples in this study were school children in SBDP delivery 5 years areas, reflecting had difference source of information.

5.4.2 Perception on oral health

The perception on oral health is divided into two groups using statistical Mean; that was < 39 low perception and ≥ 39 high perceptions.

Looking from the result, one side students knew and understood about oral health. From answering the questionnaire of perception, almost students agree that brushing teeth every day can prevent tooth decay (93%), it means students had good perception and if referred to practice of students, 89.5 % of the respondents claimed to brush their teeth at least twice a day and 61.0 % respondents claimed that they spent 3 minutes or more on brushing their teeth. 81.6% agreed that using

toothpaste could prevent dental caries, this statement pointed that the behaviour of students who usually used toothpaste (90.8%), also 84.2% of knowledge the students knew about the best paste for dental health.

This part had emphasized on dental visit, 84.2% respondents disagreed that participate dental clinic check up regularly is costly and 72.4% disagree that visiting the dentist every 6 month/year was not necessary; because they knew that regular visits to the dentist keep away dental problems (84.6%). But less than half of students agreed on" dental treatments cost are expensive", it might be students honest but they concern about their family or care giver income or misunderstood in this answering condition.

This statement is pattern important for the perception of students with regard to eating and drinking sweet, 79.0% students agreed that food with a lot of sugar composition may increase dental caries, this statement pointed that 75% of students disagreed that eating/ drinking sweet things does not cause tooth decay, similar and 64% perceived that taking candy/ chocolate regularly without cleaning teeth (after eating) are not harmful to the teeth.

Regarding the result, students had good level of perception nearly two third. Wahyu Sulistianingsih's study in 2001 about "Oral health behavior among primary school children in Nakhon Pathom Province, Thailand ", results almost similar, only 44% students had good level of perception (21). This might be explained by the fact that not only dental health education programs in Thailand but also SBDP in Vietnam have been consciously promoting the role of prevention and the proper management of primary school children by taking systemic well-being, psychological aspects, and children's satisfaction into consideration but had not enough. However, SBDP in Vietnam have been mainly conveyed to the public on a narrow scale by certain formal medical/dental institutes and dental schools in Vietnam. Unfortunately, these efforts are limited and insufficient nationwide; hence, there is a need for comprehensive national educational programs to improve the oral health practice, knowledge, and perception of the general population.

5.5 Oral hygiene practice of Socson primary school children

5.5.1 Tooth brushing habits

After unifying (1975) until now, in Vietnam efforts to SBDP implement primary preventive oral care programmes and oral health education were made by the preventive practices component of the School – Based Dental Program for in schools were: regular tooth brushing at least twice a day, performance of standard methods of brushing, tooth brushing from early childhood as well as the use of standard toothbrushes and fluoridated toothpaste (4).

The present study revealed that 89.5% of students performed the recommended practice of brushing teeth twice a day or more. This level is higher than observed in China (59.1%) (18); and similar found in related studies in Asia, such as in Thailand. (88%) (1). Moreover, oral self-care practices of Socson students seemed to be more frequent than observed in the European countries and Canada (24). This response was expected because only 24% of the children were good knowledge about caries and 59.6% had a good perception of oral health care, which is the main source of SBDP.

Traditionally, Vietnamese people tend to practice an unsystematic or horizontal method of brushing. In order to encourage the Vietnamese population to adopt proper oral hygiene habits, the right tooth brushing technique, move the brush up from the bottom and down from the top with circular motion were considered most appropriate by the SBDP. The present survey indicated that 71.5% of the respondents performed the recommended methods of brushing. The results may suggest that growing numbers of Socson students adopt regular tooth brushing in early childhood since 85.5% of the students reported tooth brushing before they started at school. Furthermore, it is worth noting that the use of fluoridated toothpaste was 90.8% more frequent than observed in China (22.7%) (18), while the proportion of use of fluoridated toothpaste is somewhat lower than found in Wahyu Sulistianingsih's study, 2001, Nakhon Pathom Province, Thailand. (99.5%) (21). If brushing was performed only once a day, it apparently tended to take place in the morning (49.6%) rather than in the evening (9.2%), despite the SBDP messages emphasizing tooth

brushing to be carried out in the evening. This may indicate that such habits are difficult to change merely through mass health education.

Based on the theory, Primary preventive dentistry 4th et said that "the time factor for brushing is very important, since it must be added to the time required for other aspects of total tooth and mouth hygiene". In this result, majority of the students (61%) needed 3 minutes for brushing the teeth, and less than 3 minutes (20.2%) whereas when compared to similar surveys carried out in China, the results showed 28.4% and 71.6% respectively (18). All in all, the present survey provides an overview of oral health behaviour and benefit of SBDP to primary school children in Socson district, Hanoi city, Vietnam.

5.5.2 Consumed food of respondents

According to the result, it was found that 18.4% of students ate candies/chocolate, the kind of drink usually have in- between- meals/ every day; soda/ coca-cola (20.6%), sweeten drink (22.4%), tea/ coffee with sugar (8.3%). Only 4% students had a meal at night. It was not the same with Wahyu Sulistianingsih's reports and findings from Thailand (21). This can be explained by some reasons as follows:

- The study area, in this study was residents 25 km far from Hanoi city, students exposed in inappropriate the consumption of various sweets, soft drinks, and biscuits, as well as the intake of sugary drinks was extremely frequent. Advice for not eating sugar or carbohydrate as sources of low cost energy might be not so difficult.

- Nevertheless, Soc son district located 25 km north of Hanoi not so far from urban. It was convenient to improve perception and knowledge about the harmful effects of cariogenic foods and drink with many health education programs. It can be explained that 77.2% of students received dental health preventive behavior from television, 68.9% of students received it from dentist, especially from SBDP at least 5 years.

After controlling for confounding variables, the most important predictors of caries experience were drinking sweetened drinks. Other factors being equal, significantly lower risk of dental caries was observed for students who had lower drinking sweetened drinks. The results from this study correspond fairly well to the other reports and findings from Thailand (1). This response was expected because diet is another important factor in controlling caries progression; sugar is the most important dietary item in etiology of caries (13). Based on the theory, Primary preventive dentistry 4th et said that:" the introduction of sugar to children was important for two reasons: firstly, there was a considerable risk of disease in the primary dentition and secondary, it was the time when habits which may influence future behaviour were being formed" (18).

5.6 Dental services accessibility

The result showed that 15 % the participants reporting that they don't know where to get dental service; that mean they had never visited a dentist at all, most of them live in central and river region (91.2%). However, 85 % of students know where to get dental services. Distance, transportation, long waiting time before treatment are the barriers to access of dental service. From this study 53.6 % of them reporting that less than 3 km distance from dental clinic, 71.6 % reporting that convenient perceived to dental clinic, 80.4 % used private vehicle went to dental clinic, then 75.3 % had waiting time less than 30 minute. The result from present study is similar to the other reports and findings from China (18). The results demonstrated that utilisation of dental services among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam is convenient to access. Meanwhile, the analysis revealed that students who known about where to get dental service was have poor dental health status than whose don't know where to get dental service. They were more likely to perform regular self-care practices, and this may suggest that they had been instructed in oral self-care by the dentist. Although 24.7 % of students find the waiting time for the dental treatment to be quite long (more than 30 minutes), but because they have already developed some oral problem, they still have to wait for the treatment to relief the pain. . It can be explained that the crowding of patients in the public sector dental

service in Vietnam still presented everywhere or even though in the private sector dental services.

5.7 The source of information about dental health preventive behavior

Relating the sources of information about dental health preventive behavior which was categorized into two main sources: mass media (television, radio, magazine, newspaper) and person (dentist, parents, teachers, and friends). According to the result of this study, television was the most frequent source among all source of information about dental health preventive behavior received by students (77.2%), it is similar to previous study in Thailand by Hak Sithan and Luong Ngoc Khue. This clearly showed that the most common source of information about dental health preventive behavior among students was through television. The second leading source of information about dental health came from dentist with 68.9%; it may explain that nowadays the people can easily get the information from oral health personals and health promotion campaign through mass media. Hak Sithan 2003 note that "the role of mass media should be considered as a key measure to spread the appropriate messages of oral health care to people in community" (26). As to the further improvement of oral health in Vietnam children, health education therefore may play an instrumental role. Parents, schoolteachers and dentist were identified by the survey as being the most important key people in health communication and they should be targeted by the community oriented health promotion programmes. In addition, a significant number of respondents indicate that they were informed about oral health through TV, magazine or radio and the relevance of using mass media is hereby shown. Finally, the primary schools also have great potential for influencing oral health behaviour, dental perception and self- esteem of young children. Such children spend considerable time in schools and can be reached at a life- stage when their health habits are being formed. The SBDP established in Vietnam also include systematic oral health education and activities are integrated with general health education. The intention present project is to conduct follow- up studies of children in order to measure the oral health outcomes.

5.8 Level of social support (parents or care giver, teachers and supporting environment)

The study expressed that most of the parents or care giver neglected to take care of their children in oral hygiene, 21.5 % always reminded for mouth-rinsing, 19.7 % regularly take care of tooth-brushing before bed time, then 18.8 % regularly take care of tooth-brushing in the morning. Only the percentage of the parents or care giver always took a visit to the dentist was high (72.4%). It might be the parents or care giver not concern or misunderstood in oral hygiene support for their children; anyhow, they expected their children had been instructed in oral self-care by the teachers and dentist. This is in contrast to previous study in Thailand by Wahyu Sulistianingsih (21).

The number and percentage distribution of respondents by social support from teachers and supporting environment in this part almost had high percentage, may be samples were school children in SBDP delivery 5 years areas. This result was similar with some studies' results, such as in United States and Vietnam (28) (29).

This survey found that a high percentage of the children in this study brush their teeth at least twice a day or more although this effort was not fully organized or supported by community related factors (included parents or care giver and teachers); the results showed that only 56.14% of the level community related factors was good . The subjects also reported irregular times of mouth cleaning immediately after eating sweet candies or confectionaries. These findings could be explained by the fact that many of subjects were primary school children when students try to achieve independence and start their attempts to build their own identity without family or teachers interference. Lack of parents or care giver and teachers oral health education might also explain these findings.

5.9 Relationship between predisposing and oral health status

5.9.1 Relationship between socio-economic factors of their parents or care giver and oral health status.

The results showed a substantial significant association between education level and DMFT index (p-value=0.036), and CPITN index (p-value=0.012). Many studies revealed the same results (1) (20) (23). The three types of socio-economic status usually interact to each other. People who were in the high education level mostly had high income and social class. In fact the upper social class made proportionately more use of health service than lower social class (7). Subsequently, they had more knowledge to practice for their health (also their child).

In this study, there was non significant association between occupation of their parents or care giver and oral health status of children. This might be due to the grouping of the data and the less number of samples of sample size, or the pattern of this study, which was a cross-sectional study.

5.9.2 Relationship between knowledge, perception, practice and oral health status.

The total knowledge score presented no significant relationship to oral health status of the children. For the knowledge that leads to practice, there was association (p-value=0.006). In fact, the important point which concerned to oral health was the practice. Knowledge made the children perception, and then leads to practice. Data demonstrated the knowledge associated with practices score. (Already mentioned).

For the perception that leads to practice, there was association (p-value=0.015). However, no association with oral health status. In fact, the 3 levels in perception level were difficult for children to answer. The variation might be depended on their emotion while making the questionnaires. Perhaps, it was suitable to group only “agree” and “disagree”.

Another possibility of lacking association might be reliability and validity of questionnaires. The α of knowledge part was 0.56, α in perception part was 0.58. The reliability test was done 1 times. After correcting the content and wording the researcher did not have time to do the second reliability test because the school children were nearly in semester final exam and TET holiday (TET mean New Year in Vietnam), so that need check reliability again by conducted second pre-test.

5.9.3 Relationship between practice and oral health status.

As to the practice, the results from this study found that there was significantly association between sweeten drink and ate potato ship between meals with CPITN index, P-value = 0.023 and 0.040, respectively. This is in contrast to the observation that most children seem to be aware of the negative effect of sugar. After controlling for confounding variables, the most important predictors of caries experience were drinking sweetened drinks. Other factors being equal, significantly lower risk of dental caries was observed for students who had lower drinking sweetened drinks. The results from this study correspond fairly well to the other reports and findings from Thailand (1). (Already mentioned)

5.10 Relationship between accessibility, availability and oral health status.

To explore the accessibility dental service of primary school children, questions were asked regarding place, distance, convenience, mode of traveling and waiting time. However, this study did not find any significant association between accessibility factors and oral health status. The reason for these results may be due to face that Vietnam has not an extensive network of dental services delivery. More over, already mentioned, this might be due to the grouping of the data and the less number of samples of sample size, or the pattern of this study, which was a cross-sectional study. This need more longitudinal study in this topic related to utilisation of dental services.

With regard to the source information about dental health preventive behaviour, it found that the main source of information was television was the most

frequent source among all source of information from mass media (77.2%); the second leading source of information about dental health came from dentist with 68.9%. However, this study did not find any significant association between the source information from TV, dentist and oral health status. Among these source information about dental health preventive behaviour, only source information from magazine and teachers where there was significantly association with students' DMFT index (P-value = 0.040). It could be explained that the magazine (may be leaflet from SBDP or hand book of oral health care had 100% in primary school) was one of source of information that made students pay more attention when their teachers tough about dental health preventive behaviour in class.

5.11 Relationship between reinforcing factors and oral health status.

Regarding the relationship between reinforcing factors and oral health status, this data presented no association, which was differed from other studies (27) (28) (29). The difference in the results possibly was that the measurement of the reinforcing factors was not prospered. The measurement was based up on retrospection by the students. The students might not have remembered their parents or care giver and their teachers remind their preventive dental behaviour correctly, or they might have been inclined to give answers they thought would please the questionnaires, so there might be some sort of bias.

The results showed that most of parents or care giver graduated from secondary school, high school, college/university and occupation were farmer/ gardening, mostly had income range under 2 million VND (64% or 78.57%) per month; but the percentage of the parents or care giver bringing the children to see the dentist was high (72.4%) that mean they always took care of their children. The data noted that 89.5% of students performed the recommended practice of brushing teeth twice a day or more, 71.5% of the students performed the recommended methods of brushing and majority of the students (61%) needed 3 minutes for brushing the teeth, which meant that the students had enough knowledge about oral health behaviour. Furthermore, the proportion of use of fluoridated toothpaste was 90.8%. It might be the parents or care giver not neglected to take care of their children in oral hygiene

even though their income was low. For this situation parents or care giver understood the importance of regular visit to the dentist and brushing teeth with fluoridated toothpaste; they knew how to manage income to support daily needs and daily activities of their children.

5.12 Limitation of the study

This survey was carried out as a cross- sectional study. The oral health status was examined by dentist by using WHO recommended dental caries status (DMFT index) and Community Periodontal Index of Treatment Needs (CPITN); details of related factors i.e., predisposing factors, enabling factors, reinforcing factors were obtained by interviewed by self-administered questionnaire (group- approach). Pre-testing of questionnaire was conducted in 3 primary schools: Phu lo A, Phu lo B, Socson central five years delivered School-Based Dental Program, Soc Son District, Hanoi City, Vietnam; and it was revised. However, several limitations were still existed this study:

This study had limitation by inability to draw random sample and time constrain. Large-scale sample size should be studied in order to get more useful results.

Samples in this study were three school children in five years SBDP delivery all 34 primary schools in Soc Son district, which have different characteristics program for from other parts of the country, such as; rural, mountainous or based school children who are waiting for SBDP.

There were some open ended questions, which was based on the memory of students. Therefore, some recall bias could occur such as student didn't remember exactly about the family or care giver income, about the community related factors of their parents or care giver income; about School-based dental program's and supporting environment. Issue on knowledge about caries and periodontal disease

might be addressed in questionnaire as well professionally oriented for primary school children level to respond accurately.

Although there are many aspects of perception, the study only assessed students' perception towards teeth, dental care, eating sweet, tooth brushing and tooth paste. Further study should conducted questionnaire on perception of students towards self- report, for example report that they avoid smiling or laughing because of teeth, or friends made fund of their teeth ….

The researcher need to explain to students clearly such as what was the aim of this study, direct communication with students or in-depth interview, would help facilitate students to respond to questionnaire more precisely. In this study, researcher did not pay attention to collect information directly from their parents or care giver; therefore, lack some necessary information to explain oral health care behavior of the primary school children.

CHAPTER 6
CONCLUSION AND RECOMMEMDATION

6.1 Conclusion

This cross sectional descriptive study aimed to identify the relationship between oral health status and related factors and was conducted among 11-12 year old school children in the Soc Son District, Hanoi City, Vietnam during January, 2008. 228 school children in 3 primary schools who had received the School- Based Dental Program (SBDP) over five years were selected by the simple randomize sampling technique. Their oral health status was examined by a dentist using the WHO recommended DMFT and CPITN index. Details of related factors were obtained by self-administered questionnaire. Statistical descriptive analysis was used and tested by Chi square and multivariable logistic regression.

Measuring these results, the following conclusion can be drawn as follows:

1. The prevalence of dental caries was 53.1 % and mean DMFT 1.5. 56.6% of the children studied had healthy gums.

2. Only 24% of the children were good knowledge about caries.

3. 59.6% of the children had a good perception of oral health care.

4. Most of the school children had correct practice: 89.5% brushed their teeth at least twice per day.

5. 72.4% of the children were brought by the parents or care-givers to see the dentist for a normal oral check up.

6. There was a statistically significant association between poorer education level of the parents or care-givers and better DMFT index (p= 0.036) CPITN index (p = 0.012); between drinking sweetened drinks and eating potato chips between meals with CPITN index, p = 0.023 and 0.040, respectively. There was a significant association between those whose source of information was from magazines and teachers with students' DMFT index (p = 0.040 in both groups).

7. Importantly, oral health status was best predicted by drinking sweetened drinks and CPITN index (β= 0.65, OR=3.33, 95 %CI= 1.09 - 10.18, p= 0.034).

6.2 Recommendation

6.2.1 Recommendations

Based on these findings and the author's understanding, recommendations are suggested as follows:

1. When dental caries occurred, it is necessary to be treated by filling; and when gingival bleeding and calculus occurred, it is necessary to be treated by scaling. The mean of decay teeth= 1.02, mean of filling teeth= 0.34, interpreted children had only a little treatment in dental caries; the total of 42.9% of the children had gingival bleeding and calculus (score 1+2).

The service of SBDP should be increased access to preventive dental services including not only for filling, but also for scaling, dental sealants, topical fluorides and oral hygiene instruction.

With aimed that decreases in barriers typically experienced when accessing dental care for children such as transportation, financial and time constraints.

The dental personnel of SBDP should prepare a mobile unit to operate in the school.

2. The result found that students had poor knowledge and perception on oral health, especially on periodontal disease. There was a significant association between those whose source of information was from teachers with students' DMFT index.

SBDP should be conducted research to find out the reasons, e.g teachers were lack of information on periodontal disease or students know about the oral diseases and it's severity but they do not perception that oral health is the part of their health and necessary to take care, etc.

Community related factors (included reinforcing factors from family, teachers and dental health personnel of School based dental program) should be improved the knowledge and perception on oral health of students.

The teacher or dental health personnel should emphasize on covering area in the periodontal disease through health education and promotion training, especially curriculum health education in class of SBDP.

3. The results of this study indicate that there was a statistically significant association between poorer education level of the parents or care-givers and better oral health status; so parents' or care giver education must be included in any national program that promotes preventive oral care in schools as well as in other oral health educational programs aimed at the general public.

The results of this study might help to evaluate the efficacy of public education programs in the future.

This recommendation is based on the finding that children were aware of the importance of dental care, but their parents' or care giver perceptions and knowledge seemed to significantly affect the frequency of and the reason for their dental visits. So, the dental personnel should educate their parents or care giver to change their behaviour in taking care their children's oral hygiene.

4. In this study was found that magazine had effected to students and had significantly. Thus magazine should be considered as effective SBDP. It is notice to convey messages via all kind of printing materials like newspapers, magazines, books, posters, leaflets, pamphlets, counseling cards, etc… including training curriculums of SBDP.

The primary schools also have great potential for influencing oral health behaviour, dental perception and self- esteem of young children. Such children spend considerable time in schools and can be reached at a life- stage when their health habits are being formed.

The SBDP established in Vietnam also include systematic oral health education and activities are integrated with general health education. The intention present project is to conduct follow- up studies of children in order to measure the oral health outcomes.

5. Regards to drinking sweetened drinks are found to be statistical associated and best predictor with CPITN index.

In Vietnam, nowadays response may be find out by combination of some ministry, e.g ministry of health, ministry of education and ministry of justice, etc. in order to obtain an optimal outcome is make policy to the purpose primary school children not eating sugar so much or eating carbohydrate as sources of low cost energy.

For short-term, SBDP should be included other program in order to obtain an optimal outcome, e.g a sugar-free chewing gum program improve oral health, permits the consumption of only milk and fruit at break time, role of mass media (magazine) against sugar consumption, etc.

6.2.2 Further study

Any one who conducts the research like this, he/she should be focused on some suggested as follows:

1. 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. Another study should be carried out in other parts of Vietnam in order to explore the proportion of utilization of health service as well as its related factors among different groups of people.
2. Parents' or care giver behaviour about dental care of their children.
3. Role of magazine on oral health, role of mass media against sugar consumption or law enforcement to the purpose primary school children not eating sugar so much or eating carbohydrate as sources of low cost energy.
4. Factors associated with improvement on perception toward oral health.
5. Model development of oral health care program.

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APPENDIX

APPENDIX A

QUESTIONNAIRE

ORAL HEALTH STATUS AND RELATED FACTORS AMONG PRIMARY SCHOOL CHILDEN IN SOC SON DISTRICT, HANOI CITY, VIETNAM.

ID number | | | |

Date ……/…../……..

General information

Name:.....

Class:.....

Name of primary school:.....

Part I Socio- demographic characteristics

1. When were you born? …...../……/…… (day/ month/ year)……. years old.

2. How many brother/ sister (No. of siblings) in your family(including yourself)? ……

3. What is your birth order (or rank of sibling)? ……

Please check (√) in front of the most appropriate correct answer.

4. Characteristic of the family?

☐ a. Nuclear family (only mom- dad- children)

☐ b. Extended family (own family, cousins and relatives from mother/ fathers)

☐ c. Only live with grandparents

5. Who is the care giver?

☐ a. Father (skip to Q 6)
☐ b. Mother (skip to Q 9)
☐ c. Grand parents (skip to Q13)
☐ d. Other (specify)…… ……. (skip to Q 13)

6. How old is your father?.....years

7. What is the highest level of your father education?

☐ a. No education.
☐ b. Primary school.
☐ c. Secondary school.
☐ d. High school.
☐ e. College/university.
☐ f. Other (specify)……

8. What is your father's occupation? (after finish Q 8 skip to Q 12)

☐ a. Labour
☐ b. Farmer/ gardener
☐ c. Government officer
☐ d. Factory worker
☐ e. Own business
☐ f. Other (specify)……

9. How old is your mother?.....years

10. What is the highest level of your mother education?

☐ a. No education

☐ b. Primary school

☐ c. Secondary school

☐ d. High school

☐ e. College/university

☐ f. Other (specify)……

11. What is your mother's occupation?

☐ a. Labour

☐ b. Farmer/ gardener

☐ c. Government officer

☐ d. Factory worker

☐ e. Own business

☐ f. Other (specify)……

12. How much is your family total income/month? (after finish Q 12 skip to Q 17)

☐ a. ≤ 2,000,000 (VND)

☐ b. 2,000,001- 5,000,000(VND)

☐ c. 5,000,001- 10,000,000(VND)

☐ d. > 10,00,000(VND)

13. How old is your care giver? (if the care giver is not parent).....years

14. What is the highest level of your care giver? (if the care giver is not parent)

☐ a. No education

☐ b. Primary school

☐ c. Secondary school

☐ d. High school

☐ e. College/university

☐ f. Other (specify)……

15. What is your care giver? (if the care giver is not parent)

☐ a. Labour
☐ b. Farmer/ gardener
☐ c. Government officer
☐ d. Factory worker
☐ e. Own business
☐ f. Other (specify)……

16. How much is your care giver (if the care giver is not parent) total income/month?

☐ a. ≤ 2,000,000 (VND)
☐ b. 2,000,001- 5,000,000(VND)
☐ c. 5,000,001- 10,000,000(VND)
☐ d. > 10,00,000 (VND)

Part II Knowledge on oral health for primary school children

Please check (√) in front of the most appropriate correct answer.

17. What is the cause of dental caries?

☐ a. Caries insects ☐ b. Congenital cause

☐ c. Bacteria and food remnants in oral cavity ☐ d. Virus

18. What are the symptoms of tooth decay?

☐ a. A hole with black color ☐ b. Bleeding from gingival surrounding the tooth

☐ c. Abscess ☐ d. Fracture of tooth

19. What does gum bleeding mean?

☐ a. Healthy gum ☐ b. Inflamed gum

☐ c. Gum recession ☐ d. Good oral hygiene

20. What is dental plaque?

☐ a. Debris on tooth surface ☐ b. Staining of the teeth

☐ c. Enzyme ☐ d. Liquid in enamel surface

21. What does dental plaque lead to?

☐ a. Inflammation of the gum ☐ b. Staining of the teeth

☐ c. Dental caries ☐ d. Crack of tooth

22. What is the most effective way to prevent dental caries?

☐ a. Mouth rinsing after meal

☐ b. Tooth brushing after every meal

☐ c. Use good tasting toothpaste to stimulate brushing practice

☐ d. Tooth brushing before going to bed at night

23. How do you protect yourself from gum bleeding?

☐ a. Brushing your teeth with toothbrush

☐ b. Using soft food

☐ c. Using vitamin C

☐ d. Using salt

24. What is the correct method of tooth-brushing?

☐ a. Move the brush back and forth

☐ b. Brush up from the bottom and down from the top with circular motion

☐ c. Brush in circular motion

☐ d. Move the brush from front of teeth to back

25. What kind of toothpaste is good for dental health?

☐ a. Toothpaste with smell

☐ b. Toothpaste with fruit taste

☐ c. Toothpaste with salt

☐ d. Toothpaste with fluoride

26. What is the most harmful food for healthy teeth?

☐ a. Rice ☐ b. Sweets

☐ c. Bread ☐ d. Milk

27. What is the most important food for healthy teeth?

☐ a. Milk ☐ b. Rice

☐ c. Vegetable ☐ d. Bread

Part III Perception on oral health.

Please answer the following questions according to your opinions "Agree", "Not sure", "Disagree".

Statements	Agree	Not sure	Disagree
28. Front tooth decay can make one look bad.			
29. Keeping natural teeth are not that important.			
30. False teeth will be less of a bother than natural teeth.			
31.Children afraid of going to the dentist because of possible pain.			
32. Regular visits to the dentist keep away dental problems.			
33. Participate dental clinic check up regularly is costly.			
34. Visit the dentist every 6 month/year is not necessary.			
35. Brushing teeth every day can prevent tooth decay.			
36. Brushing teeth will keep one from having trouble with gum.			
37. Using toothpaste and tooth brush is not costly.			
38. Using -flouride toothpaste can prevent dental caries.			
39. Eating and drinking sweet things does not cause tooth decay.			
40. Food with a lot of sugar composition may increases dental caries.			
41. Taking candy and chocolate regularly without cleaning teeth (after eating) are not harmful to the teeth.			
42. Dental treatments cost are expensive.			

Part IV Oral hygiene practice

Please answer the following question based on your actual practice of oral health care. Your honest response will be most valuable to this project.

43. When do you start brushing your teeth?

☐ a. Before schooling ☐ b. When attending primary school

☐ c. After completing primary school

44. How often do you brush your teeth?

☐ a. Seldom or no brushing ☐ b. Brushing once a day

☐ c. Brushing at least twice per day

45. When do you brush your teeth?

☐ a. In the morning. ☐ b. In the evening

☐ c. After meals ☐ d. After eating dessert/sweets

46. What kind of toothpaste do you use?

☐ a. Fluoridated ☐ b. Non- fluoridated

47. Which method do you always use to brush your teeth?

☐ a. Move the brush back and forth

☐ b. Move the brush up from the bottom and down from the top with circular motion

☐ c. Move the brush in circular motion

☐ d. Move the brush from front of teeth to back

48. For how long do you spend on brushing your teeth?

☐ a. Less than 3 min ☐ b. 3 min or more

☐ c. Others specify……..

49. Which kind of drink do you usually have in- between- meals/ every day?

☐ a. Soda/ Coca-cola ☐ b. Sweeten drink

☐ c. Tea/ coffee with sugar ☐ d. Water

50. How many times per day do you eat sweets?

☐ a. 1-3 times per day ☐ b. 4-6 times per day

☐ c. 7-10 times per day ☐ d. Every time including bed time

51. What kind of snacks or desserts do you usually eat in- between- meals or every day?

☐ a. Fresh fruit ☐ b. Biscuits/cakes etc.

☐ c. Potato ship/ starchy snack ☐ d. Candies/chocolate

Part V Accessibility and availability to service

Please check (√) in front of the most appropriate correct answer.

52. Do you know where to get dental service?

☐ a. Yes (skip to Q53)

☐ b. No (skip to Q57)

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

☐ a.< 3 km ☐ b. 3-5 km

☐ c. > 5 km

54. How do you perceive about going to dental service?

☐ a. Very convenient ☐ b. Convenient

☐ c. Inconvenient

55. How do you go to the dental service?

☐ a. Walking ☐ b. Public vehicle

☐ c. Private vehicle ☐ d. Other (please specify……)

56. How long do you wait before receiving dental service?

☐ a. < 30 minute ☐ b. 30- 60 minute

☐ c. > 60 minute

57. From which of the following media did you generally receive information concerning preventive dental health? (More than one answer is possible)

☐ a. Newspaper ☐ b. Magazine

☐ c. TV ☐ d. Radio

☐ e. Others (specify)……

58. From which of the following personnel did you generally receive information concerning preventive dental health? (More than one answer is possible)

☐ a Dentist ☐ b Parents

☐ c Teachers ☐ d Friends

☐ e Others (specify)……

Part VI Family

Please check (√) in front of the most appropriate correct answer.

59. Do you need to be reminded by your parents to brush your teeth regularly in the morning?

☐ a. No need (meaning you do it by your own notice) ☐ b. Regularly

☐ c. Never (refer to parent's negligence) ☐ d. Some times

60. Do you need to be reminded by your parents to brush your teeth regularly before bed time?

☐ a. No need (meaning you do it by your own notice) ☐ b. Regularly

☐ c. Never (refer to parent's negligence) ☐ d. Some times

61. Do your parents emphasize that you should clean your mouth immediately after eating sweet candies or confectionaries?

☐ a. No need (meaning you do it by your own notice) ☐ b. Regularly

☐ c. Never (refer to parent's negligence) ☐ d. Some times

62. During the past 1 year, what was the reason that your parents brought you to see the dentist?

☐ a. When you had toothache

☐ b. For normal periodical oral hygiene check up

☐ c. Never done.

Part VII School-based dental program's and supporting environment

Please make a check mark (√) in the column about true activity:

No	Question	Yes	No
63	Does the teacher give you information about dental diseases?		
64	Does the teacher remind you about taking healthy food?		
65	Does the teacher showing you the cariogenic food?		
66	Does the teacher remind you to used toothpaste for toothbrushing?		
67	Does the teacher give you information about tooth brushing technique?		
68	Does the teacher remind you to have your oral health examine by school district dentist once every six months?		
69	Does the teacher give you information about Fluorua Natri 0.2% mouth rinsing prevent dental caries?		

APPENDIX B

SUPPORTING ENVIRONMENT CHECK LIST

Items	Appropriate	Sufficient	Insufficient
Environment			
Place for students to brush teeth			
Condition of tooth brush			
Facilities for Fluorua Natri 0.2% mouth rinsing			
Activities			
Oral health screening by teacher			
Brushing after lunch			
Handbook of oral health care			

APPENDIX C

RECORD FOR RESEARCH ON
ORAL HEALTH STATUS AND RELATED FACTORS AMONG PRIMARY SCHOOL CHILDEN IN SOC SON DISTRICT,
HANOI CITY, VIETNAM.

Name……..
ID. No...……..
Date ……/…../…….
Age……
Sex …… (male= 1) (female= 2)

Oral health status: Dental caries status

	17	16	55 15	54 14	53 13	52 12	51 11	61 21	62 22	63 23	64 24	65 25	26	27
Dental status														
Needs of treatment														
Needs of treatment														
Dental status														
	47	46	45 85	44 84	43 83	42 82	41 81	31 71	32 72	33 73	34	35	36	37

D=……
M=……...
F=……
DMFT=……

Oral health status: periodontal status

17/16	11	26/27
47/46	31	36/37

0= healthy
1= bleeding
2= calculus

Dental caries status

Primary teeth	Permanent teeth	Status	Needs of treatment
B	1	Decayed tooth.	Filling
C	2	Filled tooth with decay	Endodontist treatment
D	3	Filled tooth with no decay	Endodontist treatment
E	4	Tooth missing due to caries	
	5	Permanent tooth missing for any other reason	
	8	Unerupted tooth	

APPENDIX D

Information Sheet

(For parents or teachers of students to participate in a survey)

Oral health status and related factors among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam.

Study Site: 3 primary schools: Phu lo A, Phu lo B, Socson central, Soc Son District, Hanoi City, Vietnam.

Your children or your students are invited to participate in a survey on "Oral health status and related factors among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam". This study concerns about the level of oral disease in primary schools - children in Soc Son District, Hanoi City, Vietnam; to details of knowledge, perception and oral hygiene practice of school children, socioeconomic status and supporting factors of their parents. This information helps us to assess the effect of school-based dental programs on dental and periodontal experience in Soc Son District, Hanoi City, Vietnam. Your children or your students are selected as a possible participant because Your children or your student are had been studying at three primary school: Phu lo A, Phu lo B and Scoson central school delivered School-Based Dental Program five years and can read and write. A total of 228 school children aged 11-12 years are enrolled in this study. We ask that you (parents or teachers) read this form and ask me question you may have before agreeing to be in the study.

This study conducted by Dao Le Nam Trung who is a 2008- MPHM student at ASEAN Institute for Health Development, Mahidol University.

Background Information

Three primary school: Phu lo A, Phu lo B and Scoson central in Soc Son District, Hanoi City, Vietnam has been involved in the School-Based Dental Program since 2003.

The aim of this study was to identify the relationship between oral health status and related factors among school children aged 11-12 years who students had been studying at three primary school delivered School-Based Dental Program five years, Soc Son District, Hanoi City, Vietnam.

Procedures

If you allow your children or your students agree to participate in this study, we would like to examine your children or your student's oral health status and ask him/her to answer the questions of the following questionnaire, which comprises of seven parts:

- Part I Socio- demographic characteristics
- Part II Knowledge on oral health for primary school children
- Part III Perception on oral health
- Part IV Oral hygiene practice
- Part V Accessibility and availability to service
- Part VI Family
- Part VII School-based dental programs and supporting environment

The whole process will take around 25 minutes, the following things will happen:

1. Your children or your students will answer the questions about him/her and their family. This will take 20 minutes.
2. Dentists from Viet nam- Cu ba Friendship Hospital-Ha noi-Viet Nam will examine and recording him/her oral health status. This will take about 5 minutes.

Risks and Benefits of being in this study:

There are no foreseeable physical and mental risks to your children or your students. However, he/she might experience uncomfortable feeling from recalling information about themselves and him/her actual practices regarding behavior. Some question may explicit and unexpected. There will be no direct benefit to your children or your students from participating in this study.

Confidentiality:

All of your children or your student's answers will be kept confidential. There is no way we can link he/she name with their answer on the questionnaire. All questions will be kept in a locked filing cabinet. Code will be used to identify the data collection form. Only the primary investigator will have access to the questionnaire. After the data in the questionnaire has been entered in to a computer data file, the questionnaire will be destroyed. In any sort of report we might publish, we will not include any information that will make it possible to identify your children or your students.

Voluntary nature of study:

Your decision to allow your children or your students participates or not, will not to be revealed to any local authorities or workshop your children or your students belong to. It does not affect your children or your student's routine study and their current or future relation with local authorities and workshop. If your children or your students start to answer the questions, and find he/she does not want to answer, he/she can stop any time. He/she may also choose not to answer questions that make him/her uncomfortable.

Contact and questions:

The researcher conducting this study is Dao Le Nam Trung a 2008- MPHM student at ASEAN Institute for Health Development, Mahidol University, Salaya, Thailand. You may ask any questions to the researcher/interviewer before answering any questions. You may keep a copy of this form for your own record.

Contact tel. : Dao Le Nam Trung at 04-8264303

Address : Department of Dentistry,Vietnam- Cuba Hospital 37 Hai Ba Trung, Hoan kiem, Ha Noi, Viet Nam.

Statement of consent:

I have read the above information. I have asked questions and have received satisfactorily answers. Answering the interviewer by using a structured questionnaire will indicate my consent to allow my children or my students participate in this study.

APPENDIX E

CONSENT FORM

Project Title: Oral health status and related factors among 11-12 years old school children in Soc Son District, Hanoi City, Vietnam.

Responsible person(s) and institute: Dao Le Nam Trung a 2008- MPHM student at ASEAN Institute for Health Development, Mahidol University, Salaya, Thailand.

Date of consent……

General information of parents or care giver

(Mr./Mrs./Ms)……Last name…….

Home address:…….

District :……City……Area code……

General information of students

Name:..... Class:.....

Name of primary school:.....

I have read and understood all statements in consent form. I also have been given explanation regarding the objectives and methodology of the study, possible risk, and benefit that may occur to my children upon the participation in this study. I understand that the information will be kept confidentially. My children name will not be presented in the study report. I understand that I shall be given a copy of the signed consent to keep.

Signature……(parents or care giver)

(Mr./Mrs./Ms…….…..)

Signature…….……..(research)

(……)

Signature…….....…….(Witness)

(……..……..)

APPENDIX F

MISCELLANEOUS TABLES

Table 30 Association between oral health index and community related factors from family and SBDP

	DMFT				Total	χ^2	CPITN Max				Total	χ^2
	Good		Poor			df P-Value	Score 0		Score 1	Score 2		df P-Value
	n	%	n	%			n	%	n %	n %		
Family									Score1 and score2			
Good	10	37.04	17	62.96	27	2.031	14	51.85	13	48.15	27	3.405
Fair	2	20.00	8	80.00	10	2	5	50.00	5	50.00	10	4
Poor	80	41.88	111	58.12	191	0.362	111	58.11	25	13.09	191	0.492
Teachers (School-based dental program's)									Score1 and score2			
Good	11	37.93	18	62.07	29	0.697	15	51.72	14	48.28	29	0.526
Fair	73	41.71	102	58.29	175	2	102	58.29	73	47.71	175	2
Poor	8	33.33	16	66.67	24	0.706	13	54.17	11	45.83	24	0.769

* **P- value< 0.05**

Table 31 Association between oral health index and socio- demographic factors for parents or care giver and primary school children

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df	Score 0		Score 1		Score 2			df
	n	%	n	%		P-Value	n	%	n	%	n	%		P-Value
No. of sibling									**Score 1 and Score 2**					
1	9	42.86	12	57.14	21	1.359	12	11.97	9		9.03		21	0.016
2	52	37.41	87	62.59	139	3	79	79.25	60		59.75		139	3
3	24	46.15	28	53.85	52	0.715	30	29.65	22		22.35		52	0.999
4 and above	7	43.75	9	56.25	16		9	9.12	7		6.88		16	
Rank of sibling														
1	54	44.26	68	55.74	122	1.682	75	61.48	36	29.51	11	9.02	122	4.201
2	30	36.14	53	63.86	83	2	44	53.01	27	32.53	12	14.46	83	4
3 and above	78	34.78	15	65.22	23	0.431	11	47.83	7	30.43	5	21.74	23	0.379
Characteristic of the family									**Score 1 and Score 2**					
Nuclear family	80	40.00	120	60.00	200	0.083	113	49.56	87		38.16		200	0.178
Extended family&	12	42.86	16	57.14	28	1	17	7.46	11		4.82		28	1
live with grandparents						0.773								0.673

* **P- value< 0.05**

Table 32 Association between oral health index and started brushing teeth, frequency of tooth brushing, use of toothpaste and frequency of eating sweets

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df	Score 0		Score 1		Score 2			df
	n	%	n	%		P-Value	n	%	n	%	n	%		P-Value
Started brushing teeth														
Correct	81	41.54	114	58.46	195	0.789	114	58.46	57	29.23	24	12.31	195	1.443
Incorrect	11	33.33	22	66.67	33	1	16	48.48	13	39.39	4	12.12	33	2
						0.374								0.486
Frequency of tooth brushing														
Correct	84	41.18	120	58.82	204	0.549	120	58.82	59	28.92	25	12.25	204	3.110
Incorrect	8	33.33	16	66.67	24	1	10	41.67	11	45.83	3	12.50	24	2
						0.459								0.211
Use of toothpaste														
Correct	82	39.61	125	60.39	207	0.508	118	57.00	63	30.43	26	12.56	207	0.195
Incorrect	10	47.62	11	52.38	21	1	12	57.14	7	33.33	2	9.52	21	2
						0.476								0.907
Frequency of eating sweets							**Score 1 and Score 2**							
1-3	80	40.40	118	59.60	198	0.002	115	58.08	83		41.92		198	0.694
≥4	12	40.00	18	60.00	30	1	15	17.11	15		12.89		30	1
						0.966								0.405

Table 33 Association between oral health index and method of brushing, time spent on brushing teeth

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df P-Value	Score 0		Score 1		Score 2			df P-Value
	n	%	n	%			n	%	n	%	n	%		
Method of brushing														
Correct	61	37.42	102	62.58	163	2.036	88	53.99	53	32.52	22	13.50	163	2.222
Incorrect	31	47.69	34	52.31	65	1	42	64.62	17	26.15	6	9.23	65	1
						0.154								0.597
Time spent on brushing teeth														
Correct	58	41.73	81	58.27	139	0.280	78	56.12	45	32.37	16	11.51	139	0.547
Incorrect	34	38.20	55	61.80	89	1	52	58.43	25	28.09	12	13.48	89	2
						0.597								0.761
Occasion of tooth brushing									**Score 1 and Score 2**					
Morning	8	50.00	8	50.00	16	3.093	11	9.12	5		6.88		16	2.745
Evening	32	41.03	46	58.97	78	3	46	44.47	32		33.53		78	3
After meals	5	23.81	16	76.19	21	0.377	9	11.97	12		9.03		21	0.433
After sweets	47	41.59	66	58.41	113		64	64.43	49		48.57		113	

* **P- value< 0.05**

Table 34 Association between oral health index and kind of drink usually has in- between- meals/ every day

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df	Score 0		Score 1		Score 2			df
	n	%	n	%		P-Value	n	%	n	%	n	%		P-Value
Type of drinks taken- between- meals/ day														
Soda														
Yes	21	44.68	26	55.32	47	0.461	26	55.32	16	34.04	5	10.64	47	0.375
No	71	39.23	110	60.77	181	1	104	55.32	54	29.83	23	12.71	181	2
						0.497								0.829
Sweeten														
Yes	17	33.33	34	66.67	51	1.344	22	43.14	22	43.14	7	13.73	51	5.640
No	75	42.37	102	57.63	177	1	108	61.02	48	27.12	21	11.86	177	2
						0.246								0.060
Tea sugar														
Yes	8	42.11	11	57.89	19	0.027	8	42.11	10	52.63	1	5.26	19	4.886
No	84	40.19	125	59.81	209	1	122	58.37	60	28.71	27	12.92	209	2
						0.871								0.087
Water														
Yes	70	41.42	99	58.58	169	0.310	100	59.17	51	30.18	18	10.65	169	2.003
No	22	37.29	37	62.71	59	1	30	50.85	19	32.20	10	16.95	59	2
						0.578								0.367

* **P- value< 0.05**

Table 35 Association between oral health index and kind of snacks or desserts usually eat in- between- meals or every day

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df	Score 0		Score 1		Score 2			df
	n	%	n	%		P-Value	n	%	n	%	n	%		P-Value
Kind of snacks or desserts usually eat in- between- meals or every day														
Fresh fruit														
Yes	66	44.00	84	56.00	150	2.426	91	60.67	45	30.00	14	12.28	150	4.196
No	26	33.33	52	66.67	78	1	39	50.00	25	32.05	14	17.95	78	2
						0.119								0.123
Biscuits														
Yes	16	50.00	16	50.00	32	1.440	18	56.25	12	37.50	2	6.25	32	1.667
No	76	38.78	120	61.22	196	1	112	57.14	58	29.59	26	13.27	196	2
						0.230								0.435
Potato ship/ starchy snack														
Yes	25	33,78	49	66.22	74	1.963	35	47.30	28	37.84	11	14.86	74	4.228
No	67	43.51	87	56.49	154	1	95	61.69	42	27.27	17	11.04	154	2
						0.161								0.121
Candies/ chocolate														
Yes	21	50.00	21	50.00	42	1.992	24	57.14	14	33.33	4	9.52	42	0.435
No	71	38.17	115	61.83	186	1	106	56.99	56	30.11	24	12.90	186	2
						0.158								0.805

Table 36 Association between oral health index and accessibility dental services (cont.)

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df P-Value	Score 0		Score 1		Score 2			df P-Value
	n	%	n	%			n	%	n	%	n	%		
Mode of traveling														
Walking	8	42.11	11	57.89	19	0.032	10	52.63	5	26.32	4	21.05	19	1.784
Not walking	70	40.00	105	60.00	175	1	98	56.00	58	33.14	19	10.86	175	2
						0.859								0.410
Waiting time														
< 30 minute	58	39.73	88	60.27	146	0.057	80	54.79	45	30.82	21	14.38	146	3.758
> 30minute	20	41.67	28	58.33	48	1	28	58.33	18	37.50	2	4.17	48	2
						0.0812								0.153

* **P- value< 0.05**

Table 37 Association between oral health index and information sources from mass media

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df	Score 0		Score 1		Score 2			df
	n	%	n	%		P-Value	n	%	n	%	n	%		P-Value
Newspaper														
Yes	27	50.94	26	49.06	53	3.219	32	60.38	13	24.53	8	15.09	53	1.439
No	65	37.14	110	62.86	175	1	98	56.00	57	32.57	20	11.43	175	2
						0.073								0.487
Magazine														
Yes	21	55.26	17	44.74	38	4.213	26	68.42	6	15.79	6	15.79	38	4.800
No	71	37.37	119	62.63	190	1	104	54.74	64	33.68	22	11.58	190	2
						0.040*								0.091
TV														
Yes	71	40.34	105	59.66	176	0.000	101	57.39	53	30.11	22	12.50	176	0.136
No	21	40.38	31	59.62	52	1	29	55.77	17	32.69	6	11.54	52	2
						0.995								0.934
Radio														
Yes	25	50.00	25	50.00	50	2.477	30	60.00	13	26.00	7	14.00	50	0.715
No	67	37.64	111	62.36	178	1	100	56.18	57	32.02	21	11.08	178	2
						0.115								0.699
Others mass media														
Yes	14	34.15	27	65.85	41	0.800	19	46.34	13	31.71	9	21.95	41	4.822
No	78	41.71	109	58.29	187	1	111	59.36	57	30.48	19	10.16	187	2
						0.371								0.090

* **P- value< 0.05**

Table 38 Association between oral health index and information sources from personnel

	DMFT				Total	χ^2	CPITN Max						Total	χ^2
	Good		Poor			df	Score 0		Score 1		Score 2			df
	n	%	n	%		P-Value	n	%	n	%	n	%		P-Value
Dentist														
Yes	61	38.85	96	61.15	157	0.470	89	56.69	49	31.21	19	12.10	157	0.065
No	31	43.66	40	56.34	71	1	41	57.75	21	29.58	9	12.68	71	2
						0.493								0.968
Parents														
Yes	65	43.05	86	56.95	151	1.350	84	55.63	46	30.46	21	13.91	151	1.123
No	27	35.06	50	64.94	77	1	46	59.74	24	31.17	7	9.09	77	2
						0.245								0.570
Teachers														
Yes	45	48.39	48	51.61	93	4.214	55	59.14	27	29.03	11	11.83	93	0.293
No	47	34.81	88	65.19	135	1	75	55.56	43	31.85	17	12.59	135	2
						0.040*								0.864
Friends														
Yes	6	31.58	13	68.42	19	0.663	7	36.84	9	47.37	3	15.79	19	3.563
No	86	41.15	123	58.85	209	1	123	58.85	61	29.19	25	11.96	209	2
						0.416								0.186
Others personnel									**Score 1 and score2**					
Yes	12	60.00	8	40.00	20	3.517	15	75.00	5		25.00		20	2.893
No	80	38.46	128	61.54	208	1	115	55.29	93		44.71		208	1
						0.061								0.089

* **P- value< 0.05**

BIOGRAPHY

NAME	Dr. Dao Le Nam Trung
DATE OF BIRTH	04 July 1972
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INSTITUSTION ATTENDED	Ha Noi Medical University, 1989- 1995, Doctor of Dental Surgery DDS. Mahidol University, 2007-2008. Master of Primary Health Care Management, ASEAN Institute for Health Development
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