



CHAPTER III

RESEARCH METHODOLOGY

1. Research design

This study design was a cross-sectional analytical study. The goals were to ascertain dental caries status, oral hygiene practice, fluoride supplements, eating habit and perception on oral problems. The other main purpose of this study was to characterize the relationships between dental caries and these factors in students of the first and the second academic year in Thaibinh Medical University.

2. Study population

The population of this study was medical students who were studying in the first or second academic year in Thaibinh medical university. Most of these students came from 8 provinces in the Red river Delta of Vietnam. Some of them were foreign students who came from Lao or Cambodia.

3. Sample size calculation

A sample size calculation for measuring the prevalence of dental caries was performed under the following formula:

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

n = sample size

α = level of significant

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

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

$p = 0.75$: proportion of dental caries of 18-34 year olds reported by the Nationwide Oral Health Survey 1999-2001 in Vietnam.

$d=0.05$: acceptable difference.

Therefore:

$$n = \frac{(1.96)^2 (0.75)(1 - 0.75)}{(0.05)^2} = 288$$

A sample size calculation for exploring the association between some risk factors and dental caries was performed under the results from Vehkalahti's study. The Table 4 in her study showed the associations between root caries and dental health behaviors (reproduced in table 2 below).

Table 2: Occurrence of root caries by type of a subject's dental health behavior

Elements of Dental Health Behavior	Number of subjects, % with Root Caries (%RC), and Odds Ratio (OR) for Having RC					
	Women			Men		
	n	%RC	OR*	n	%RC	OR*
Tooth-brushing: frequent Sugar in coffee or tea: no Dental check-up: regular	781	6.8		317	5.7	
Tooth-brushing: frequent Sugar in coffee or tea: yes Dental check-up: regular	520	6.5	1.0	538	8.9	2.1
Tooth-brushing: frequent Sugar in coffee or tea: no Dental check-up: irregular	437	16.5	2.7	237	16.5	3.3
Tooth-brushing: frequent Sugar in coffee or tea: yes Dental check-up: irregular	527	18.8	3.2	707	25.0	5.5
Tooth-brushing: infrequent Sugar in coffee or tea: yes Dental check-up: irregular	121	28.1	5.4	522	39.1	10.7
Tooth-brushing: infrequent Sugar in coffee or tea: no Dental check-up: irregular	36	38.9	8.7	125	23.2	5.0
Other combinations	19	5.3		111	10.9	
Cases with missing data	19			11		
Total	2460	12.5		2568	20.1	

*Compared with subjects following all three recommendations.

The table showed six behavior groups, in which, the first group was one which had the entirely good dental health behavior. Other groups had at least one of unhealthy behaviors.

From that table, we had total of 1098 (=781+317) subjects in first group. Thus, the prevalence for both sexes in this group was 6.4% ($=\frac{0.068 \times 781 + 0.057 \times 317}{1098}$).

By the same way, we had the prevalence for both sexes in the group 3, which had good behavior of tooth-brushing and sugar intake but unhealthy behavior

of dental check-ups, is 16.4%. Based on this prevalence and under the assumption that confidence level is 95% and power of study is 80%, we calculated the desirable sample size for finding the association between dental caries and eating habits is 354. Because the prevalence in other behavior groups 4, 5 and 6 is higher than group 3 so the sample size calculated based on group 3 also was appropriate to see the association between dental caries and other supposed related factors.

All sample size calculations were done with Stacalc component of EpiInfo software for cohort and cross-sectional study.

4. Sampling method

At the time the study was conducted, the number of students in Thaibinh Medical University were 279 second-year ones and 228 first-year ones. There were 6 class units for first year students and 5 class units for second year students.

The randomly sampling method was applied to choose 5 from 6 classes in the first years and 4 from 5 classes in the second years. Total students in chosen classes were invited participate in the study, in which 365 students participated in both oral examination and answering questionnaire.

5. Research Instruments and measurements

- The data about social-economic status, oral hygiene practice, eating habits, fluoride supplement and perception on oral problem was gathered by structured questionnaire.
- A clinical examination was carried out to collect data about dental health status. The WHO caries diagnostic criterion for decayed, missing, and filled teeth (DMFT) was used to measure the dental health status. Method of assessing dental

caries followed instructions of “Oral Health Surveys - Basic methods, 1997”. Examinations were performed in a spacious environment. The individuals to be examined remained seated on a dental chair and the examiner stood. The examiners were properly and professionally vested with mask, cap and gloves (the latter were changed at each examination) and made use of periodontal probes (CPI Probe) and flat dental mirrors, previously sterilized. All the biosafety norms were followed. Examiners adopted a systematic approach to the assessment of dentition status. The examination proceeded in an orderly manner from one tooth to the adjacent tooth. A tooth was considered present in the mouth when any part of it is visible. Considerable care was taken by examiners while diagnosing tooth-colored fillings, which was extremely difficult to detect.

- Radiography for detection of caries was not recommended because of the impracticability of using the equipment in all situations. Likewise, the use of fiber optics was not recommended also. Although it was realized that both these diagnostic aided would reduce the underestimation of the need for restorative care, the extra complication and frequent objections to exposure to radiation outweigh the gains to be expected.

The Criteria for diagnosis and coding are presented in table 3.

Table 3: Codes for the dentition status of primary and permanent teeth (crowns and roots)

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

Source: "Oral health survey – Basic method", (WHO, 1997).

Sound crown (code 0)

A crown is recorded as sound if it shows no evidence of treated or untreated clinical caries. The stages of caries that precede capitation, as well as other conditions similar to the early stages of caries, are excluded because they cannot be reliably diagnosed. Thus, a crown with the following defects, in the absence of other positive criteria, will be coded as sound:

- white or chalky spots;
- discolored or rough spots that are not soft to touch with a metal CPI probe;
- stained pits or fissures in the enamel that do not have visual signs of undermined enamel, or softening of the floor or walls detectable with a CPI probe;

- dark, shiny, hard, pitted areas of enamel in a tooth showing signs of moderate to severe fluorosis.
- lesions that, on the basis of their distribution or history, or visual/tactile examination, appear to be due to abrasion.

Sound root (code 0)

A root is recorded as sound when it is exposed and shows no evidence of treated or untreated clinical caries. (Unexposed roots are coded 8.)

Decayed crown (code 1)

Caries is recorded as present when a lesion in a pit or fissure, or on a smooth tooth surface, has an unmistakable cavity, undermined enamel, or a detectably softened floor or wall. A tooth with a temporary filling, or one which is sealed (code 6) but also decayed, will also be included in this category. In case where the crown has been destroyed by caries and only the root is left, the caries is judged to have originated on the crown and therefore scored as crown caries only. The CPI probe will be used to confirm visual evidence of caries on the occlusal, buccal and lingual surfaces. Where any doubt exists, caries will not be recorded as present.

Decayed root (code 1)

Caries is recorded as present when a lesion feels soft or leathery to probing with the CPI probe. If the root caries is discrete from the crown and will require a separate treatment, it will be recorded as root caries. For single carious lesions affecting both the crown and the root, the likely site of origin of the lesion will be recorded as decayed. When it is not possible to judge the site of origin, both the crown and the root will be recorded as decayed.

Filled crown, with decay (code 2)

A crown is considered filled, with decay, when it has one or more permanent restorations and one or more areas that are decayed. No distinction is made between primary and secondary caries (i.e., the same code applies whether or not the carious lesions are in physical association with the restoration(s)).

Filled root, with decay (code 2)

A root is considered filled, with decay, when it has one or more permanent restorations and one or more areas that are decayed. No distinction is made between primary and secondary caries.

In the case of fillings involving both the crown and the root, judgment of the site of origin is more difficult. For any restoration most likely site of the primary carious lesion is recorded as filled, with decay. When it is not possible to judge the site of origin of the primary carious lesion, both the crown and the root will be recorded as filled, with decay.

Filled crown, with no decay (code 3)

A crown is considered filled, without decay, when one or more permanent restorations are present and there is no caries anywhere on the crown. A tooth that has been crowned because of previous decay is recorded in this category. (A tooth that has been crowned for reasons other than decay, e.g. a bridge abutment, is coded 7)

Filled root, with no decay (code 3)

A root is considered filled, without decay, when one or more permanent restorations are present and there is no caries anywhere on the root.

In the case of fillings involving both the crown and the root, judgment of the site of origin is more difficult. For any restoration involving both the crown and the

root, the most likely site of the primary carious lesion is recorded as filled. When it is not possible to judge the site of origin, both the crown and the root will be recorded as filled.

Missing tooth, as a result of caries (code 4)

This code is used for permanent or primary teeth that have been extracted because of caries and is recorded under coronal status. For missing primary teeth, this score will be used only if the subject is at an age when normal exfoliation would not be a sufficient explanation for absence.

The root status of a tooth that has been scored as missing because of caries will be coded "7" or "9".

It may be difficult to distinguish between unerupted teeth (code 8) and missing teeth (code 4 and code 5). Basic knowledge of tooth eruption patterns, the appearance of the alveolar ridge in the area of the tooth space in question, and the caries status of other teeth in the mouth may provide helpful clues in making a differential diagnosis between unerupted and extracted teeth. Code 4 will not be used for teeth judged to be missing for any reason other than caries.

Permanent tooth missing, for any other reason (code 5)

This code is used for permanent teeth judged to be absent congenitally, or extracted for orthodontic reasons or because of periodontal disease, trauma, etc. As for code 4, two entries of code 5 can be linked by a line in cases of fully edentulous arches.

The root status of a tooth scored 5 will be coded "7" or "9".

Fissure sealant (code 6)

This code is used for teeth in which a fissure sealant has been placed on the occlusal surface; or for teeth in which the occlusal fissure has been enlarged with a rounded or "flame-shaped" bur, and a composite material placed. If a tooth with a sealant has decay, it will be coded as 1.

Bridge abutment, special crown or veneer (code 7)

This code is used under coronal status to indicate that a tooth forms part of a fixed bridge, i.e., is a bridge abutment. This code can also be used for crowns placed for reasons other than caries and for veneers or laminates covering the labial surface of a tooth on which there is no evidence of caries or a restoration.

Missing teeth replaced by a bridge are coded 4 or 5, under coronal status, while root status is scored 9.

Implant This code is used under root status to indicate that an implant has been placed as an abutment.

Unerupted crown (code 8)

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 excluded from all calculations concerning dental caries. This category does not include congenitally missing teeth, or teeth lost as a result of trauma, etc. For differential diagnosis between missing and unerupted teeth, see code 5.

Unexposed root (code 8)

This code indicates that the root surface is not exposed, i.e. there is no gingival recession beyond the CEJ.

Trauma (fracture) (code T)

A crown is scored as fractured when some of its surface is missing as a result of trauma and there is no evidence of caries.

Not recorded (code 9)

This code is used for any erupted permanent tooth that cannot be examined for any reason (e.g. because of orthodontic bands, severe hypoplasia, etc.).

This code is used under root status to indicate either that the tooth has been extracted or that calculus is present to such an extent that a root examination is not possible.

Information on the Decayed, Missing, and Filled Teeth Index (DMFT) were calculated base on clinical files recorded by using the WHO caries diagnostic criteria, 1997 as described above. The **D**-component included all teeth with codes 1 or 2. WHO caries diagnostic criteria, the **M**-component comprised teeth with code 4 in subjects under 30 years of age, and teeth coded 4 or 5 for subjects 30 years and older, i.e. missing due to caries or for any other reason. In my study, all participants were less than 25 years of age, so **M**-component comprised only teeth with code 4. The **F**-component includes only teeth with code 3. There was 47.7 percent of my researched population with non wisdom teeth. The rest part of population has the number of wisdom teeth varies from 1 to 4. Because of the diversity of number of wisdom teeth in the population, these teeth are not concerned in further analysis of DMFT score. Therefore, the basis for DMFT calculations is 28, with all permanent teeth excluding wisdom teeth. Teeth coded 6 (fissure sealant) or 7 (bridge abutment, special crown or veneer/implant) were not included in calculations of the DMFT.

6. Data collection:

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

- The researcher introduced the rector and the chief of Training Management Department of Thaibinh medical university the objectives of this study and details of data collection procedure as well as for cooperation in collecting data.
- The researcher had meeting with monitors of all chosen classes to explained and informed the objectives of this study and details of data collection procedure as well as for cooperation in collecting data and sat the date and time to collect the data.
- The researcher trained the assistants to use the structured questionnaire and examiner to perform physical examination.
- Data collection was done everyday from 7.00 a.m. to 17.00 p.m. from January 24 – 28, 2008.

7. Data Analysis

7.1 Data entry and editing

Data was coded and entered twice by using Epi Data software.

7.2 Statistical technique:

Data analysis was done by using SPSS software.

Descriptive statistic includes frequency distribution and mean were used to describe dental caries experience (DMFT). Frequency distribution will be used to describe the general characteristic, oral hygiene practices, eating habits, fluoride supplement and perception of oral problem.

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

To test the DMFT score and dichotomous variables, the Mann-Whitney tests were employed. The Kruskal-Wallis tests were used, due to the stratification in more than two categories. The choice of non-parametric tests is justifiable, since the caries index utilized (DMFT) was not present a normal distribution. A 5% level of statistical significance was adopted.

8. Ethical Considerations

Purpose of the study was explained to all prospective subjects. The verbal consent was taken from each participant before interview and examination.

Prospective subjects were free to refuse to participate and they could also withdraw through out the interview or examination. If, during the examination, a potentially fatal condition or one that demanded immediate care was identified, the case was referred to a pertinent public oral health center.

The present study was submitted to the Ethics in Research Committee, Thaibinh Medical University, and received a favorable.