



CHAPTER IV

RESEARCH RESULTS

This chapter describes the results of the study in 3 parts. The first part addresses general characteristics of first and second year medical students in Thai Binh Medical University. General dental status of these subjects is included in this part. Descriptive data of oral hygiene practice, fluoride supplements, eating habits and perception of oral health problem are presented in part 2. The third part presents associations between dental caries, as measured by DMFT score (continuous variable) and DMFT category (presence or absence of non-zero DMFT), and general characteristics, oral hygiene practice, fluoride supplements, eating habits and perception of oral health.

It was originally proposed to evaluate tobacco smoking. However, very few people smoked (4%), and a substantial percentage, 20.3% could not estimate how much time a day they exposed to tobacco smoke. Therefore, effects of smoking could not be analyzed with confidence.

1. General characteristics of the medical students in the first and second academic years

General subject characteristics are presented in table 4. A total of 365 medical students at first year (67.4%) and second year (32.6%) in Thai Binh Medical University received dental examination and were interviewed. 55.1% of respondents were male, and 44.9% were female.

Table 4: General characteristic of subjects

Characteristics	Number of subjects (%) or Mean \pm SD
Academic year (n = 365):	
First year	246 (67.4)
Second year	119 (32.6)
Age	
17 – 19	266(72.9)
20 - 24	97(26.6)
Gender (n = 365):	
Male	201 (55.1)
Female	164 (44.9)
Nationality (n = 365):	
Vietnamese	329 (90.1)
Non-Vietnamese	36 (9.9)
Residence before admitted to university (n = 358):	
Rural area	259 (72.3)
Urban area	99 (27.7)
Current residence while at university (n = 364):	
Outside campus	216 (59.3)
On campus	148 (40.7)
Monthly expenditure (VND/in thousand) (n = 361)	
< 500,000 VND/month	753.35 \pm 313.86
\geq 500,00 VND/month	91 (25.2)
	270(74.8)
Perception of monthly expenditure: (n = 361)	
Satisfied	238 (65.9)
Unsatisfied	123 (34.1)

Most of participants were Vietnamese (90.1%), only few of them (9.9%) come from Lao and Cambodia. Mean of monthly expenditure of all participants was 753.35 thousand VND, higher than minimum wage established by Vietnam government in 2006, which was 500 thousand VNDs per month (one thousand VNDs is about 0.062 USD, approximates 2 Thai Bath). Even so, about 25% of subjects spent less than 500 thousand VND per month. There were about two thirds of participants satisfied with amount of money they have to spend every month. 59.3% of the students were living outside campus at the time of study.

Table 5: Parental occupation and education

Parental occupation and education	Fathers (%)	Mothers (%)
Occupation	n = 361	n = 364
Farmer	210 (58.2)	236 (64.8)
Government employee	45 (12.5)	33 (9.1)
Private business	32 (8.9)	38 (10.4)
General worker	25 (6.9)	-
Teacher	17 (4.7)	27 (7.4)
Other jobs	32 (8.9)	30 (8.2) (includes general worker)
Education	n = 360	n = 362
Primary or no education	120 (33.3) (include secondary)	29 (8.0)
Secondary	-	130 (35.9)
High school	146 (40.6)	133 (36.7)
Occupation training	31 (8.6)	25 (6.9)
College or higher	63 (17.5)	45 (12.4)

As shown in table 5, more than half of students have father or mother or both being farmers. 7.4% of mothers were teachers and only 4.7% of fathers were teachers. As for government employee which did not include teacher, 45 fathers (12.5%) and 33 mothers (9.1%) were taking these positions. Private business, general worker and other jobs take not over one-fourth of the total parental occupations. Table 5 also shows that most of parents' education are high school level or lower. Fathers and

mothers who had occupational training account for 31 (8.6%) and 25 (6.9%), respectively. There are more fathers (17.5%) having college or higher degrees than mothers (12.4%).

Table 6: Dental status of the subjects

Dental status	Frequency	Mean score
(n = 365)	(%)*	± SD
Unerupted wisdom teeth		
Percentage of population with no erupted teeth	174 (47.7)	2.48 ± 1.62
Percentage of population with at least one erupted wisdom teeth	191 (52.3)	
DMFT	257 (70.4)	2.28 ± 2.18
DT	254 (69.6)	2.16 ± 2.09
MT	17 (4.7)	0.07 ± 0.36
FT	8 (2.2)	0.05 ± 0.46

**prevalence of non-zero measurements only, for example 2.2 is prevalence of FT > 0*

Table 6 shows the students' tooth status. There was 47.7 percent of this population with no erupted teeth. The number of visible wisdom teeth in the rest of the subjects varied from 1 to 4. In view of these findings, wisdom teeth were not considered in data analysis. Dental caries prevalence was assumed as the proportion of individuals with DMFT > 0. As revealed in table 6, dental caries affected 70.4% (257 subjects) of population, in which 69.6 % of population with untreated decayed teeth (represented by DT). Mean number of DMFT in this population was 2.28, in which mean number of D component, M component was 2.16 and 0.07, respectively.

F, the last component of DMFT, which summarizes treatment for decay, had a mean of only 0.05.

Table 7: Tests of Normality of DMFT

	Kolmogorov-Smirnov(a)		
	Statistic	df	p-value
Decay teeth	.156	365	< .001
Filled teeth	.526	365	< .001
Missing teeth	.529	365	< .001
DMFT	.149	365	< .001

(a) Lilliefors Significance Correction

According to table 7 and figure 3, the distribution of DMFT in the population was non-normal. Hence, further statistic tests involving this measure will be done in terms of non-parametric tests.

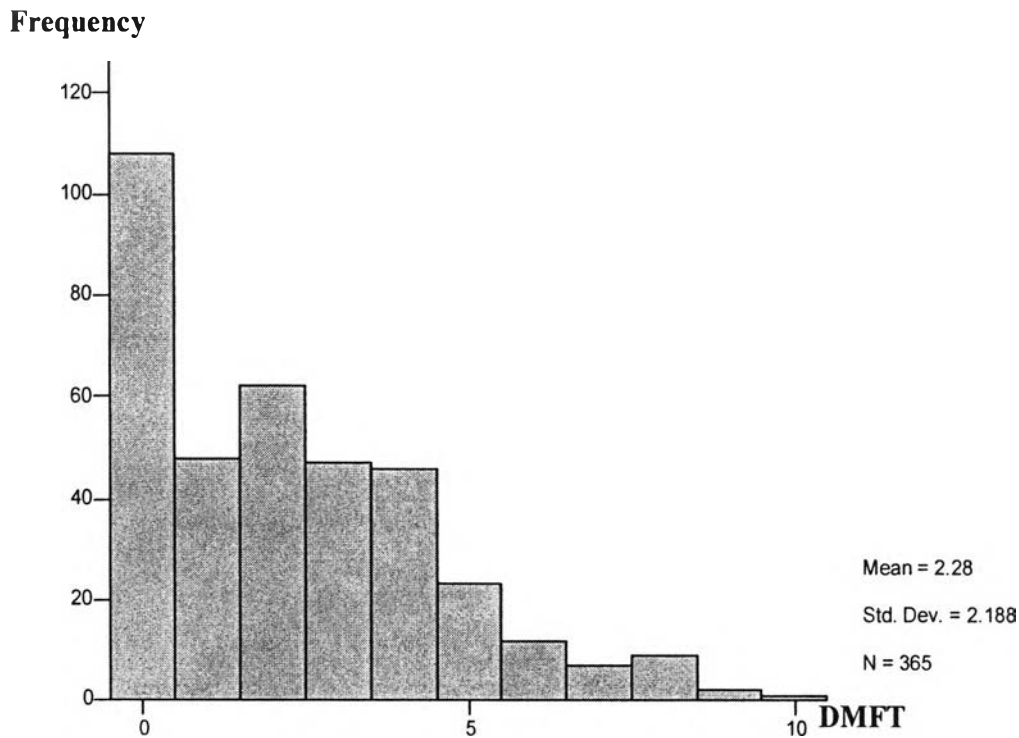


Figure 3: Histogram of DMFT score

2. Oral hygiene practice, fluoride supplement, eating habits and perception of oral health problem

2.1 Descriptive data of oral hygiene practice:

Brushing behaviors of medical students in this study were measured by questionnaire with 4 items: frequency of brushing, frequency of changing toothbrush, forgetting to brush for 7 or more days and brushing model. These three first behaviors are shown in table 8. Most of the students brushed their teeth twice or more a week (83.5%). Only 31 students used their brush until it broke or wore out, accounts for 8.1%. 6.8% reported they had ever forgotten to brush their teeth for 7 days. All participants brushed their teeth everyday. Thus, the proportion was 100% not presented in the table.

Table 8: General oral hygiene practice of medical students

Brushing behaviors	Frequency	Percent
Frequency of brushing per day (n = 364)		
once or less	60	16.5
twice or more	304	83.5
Toothbrush change (n = 365)		
once 3 month	273	74.8
once 6 month	61	16.7
breaks or wears out	31	8.5
Ever forgot to brush (n = 365)		
never	340	93.2
ever	25	6.8

7.1% of subjects reported that they had no regular brushing schedule, followed by brushing after breakfast with 11.6%. About 80 percent brushed after getting up and around 72 percent brushed before going to bed. However, in the population of the research, there was not more than 12 percent brushing their teeth after breakfast (table 9).

Table 9: Time of brushing

Time of brushing	Frequency	Percent
Brushing, no regular schedule (n = 364)		
No	338	92.9
Yes	26	7.1
Brush after getting up (n = 364)		
No	74	20.3
Yes	290	79.7
Brush after breakfast (n = 363)		
No	321	88.4
Yes	42	11.6
Brush before going to bed (n = 364)		
No	99	27.2
Yes	265	72.8

More than half of the students surveyed said that they had ever visited a dentist, specifically 207 in total of 365 people. 40.3% had never gone to see dentist and only very few (3.0) said they did not remember whether they had done or not. In 207 people who had visited dentist, there were over one third had their most recent visits more than two years ago. 35 people (16.9%) had most recent dental visit between last year and the year after last year. Nearly half of these 207 students reported they had most recent dental exam last year. (See table 10 below).

Table 10: Visits to dentist by subjects

	Frequency	Percent
Visit history (n = 365)		
ever	207	56.7
never	147	40.3
don't remember	11	3.0
Most recent visit (*)		
less than 6 months	46	22.2
6 months to 1 year	55	26.6
1 year to 2 years	35	16.9
more than 2 years	71	34.3

() in total of 207 those who ever visited dentist*

As for reasons for going to dentist, extraction, scaling and pain were the three most frequent reasons; followed by filling with 19.8% reported, as shown in table 11. Each of these three reasons counted for 21.3% of total reasons for dental visiting in sample of 207 medical students who had ever gone to see dentist. There were 14.0% said that they did not remember why they had to see dentist as shown in table 11. Our analysis revealed that all students who did not remember the reason for dental visiting had the most recent visit more than 2 years ago (data not shown).

Table 11: Reasons for going to dentist (may choose more than 1)

Reasons (n = 207)	Frequency	Percent
Extraction	44	21.3
Scaling	44	21.3
Pain	44	21.3
Filling	41	19.8
Checkup	28	13.5
Bleeding	17	8.2
Other treatments	15	7.2
Do not remember reason	29	14.0

2.2 Description of fluoride supplements

Regarding to fluoride supplements in medical students in Thaibinh Medical University, some types of fluoride supplements were listed to ask. These included fluoride mouth rinse, fluoride gel and other source of fluoride supplement such as fluoride vitamin or fluoride tablet. Fluoride in tooth paste was not included in these questions. The “yes” answers for these questions related to using fluoride never exceeded 50% of the whole study sample. 43.3 % reported that they had ever used fluoride mouth rinse. 20.9% said that they had ever used fluoride gel and only 11.2 % of sample answered they had ever used other sources of fluoride supplements. 196 students (53.7%) said that they had ever used at least one type of fluoride supplement (table 12).

Table 12: Fluoride supplementation in medical students by fluoride source

Fluoride supplements	Frequency	Percent
Ever used Fluoride mouth rinse (n = 365)		
yes	158	43.3
never	183	50.1
don't remember	24	6.6
Ever used Fluoride gel (n = 363)		
yes	76	20.9
never	253	69.7
don't remember	34	9.4
Ever used other Fluoride sources (n = 365)		
yes	41	11.2
never	272	74.5
don't remember	52	14.2
Ever used any Fluoride supplement	196	53.7

We summed all fluoride supplements in Thaibinh medical students to see how many sources of supplement the students could access. This data is presented in table 13. The very few of students supplement their teeth with fluoride from all source (3.8%). Otherwise, the figure for those who never used any type of fluoride supplement was quite high with 46.3 percent; follow by 35.9 percent of those who had ever used only one source of fluoride supplement. Among subjects who had ever used fluoride supplements, more than half were not using them at the time of survey (53.6%). Some people were using two or three types of fluoride at that time with 7.7%

for the former and 3.1% for the latter. There were around 36 percent using one source of fluoride supplement when data were collected.

Table 13: Number of fluoride supplement in medical students

Fluoride supplements	Frequency	Percent
Ever used fluoride (n = 365)		
Never	169	46.3
Used one type	131	35.9
Used two types	51	14.0
Used all	14	3.8
Using fluoride at present (n = 196)		
Not using now	105	53.6
Using one type	70	35.7
Using two type	15	7.7
Using all	6	3.1

2.3 Description of eating habits

For the questions related to food intake, we gave three score for three level of intake. 1, 2, 3 score were respectively given to food which was never or rarely taken (0-10% of days such food is taken), sometimes taken (10-50% of days such food is taken) or often taken (more than 50% of days such food is taken). To get the total score for each food item I summed all score of each food items given by each individual in the whole sample. It means that for each food the lowest score might be 365 and the highest score might be $3 \times 365 = 1095$. Thus, the score closes to the

lowest score means the food is rarely consumed. Inversely, the food had score closes to the highest score is most frequent consumed. Then, we divided total of 32 food items into 6 groups, namely protein, grain, vegetable, fruit, beverages and snack. Protein group consisted of beef, pork, chicken, egg, tofu, and fish. Grain group included rice, bread, and noodles. Vegetable group was carrot, morning-glory, cabbage, tomato, and other vegetable. Fruit group included banana, orange, pineapple, and other fruits. In beverage group there were soft carbonated drinks, fruit juice, and yoghurt drinks. Snack group consisted snacks, cookies, cake, candy, chocolate and gel. Sweetened milk and unsweetened milk has documented having inverse role in causing dental caries. Hence, these two kinds of milk were not combined. Sweetened milk, snack and beverage were put together in one new group namely “unhealthy food” according to the classification by Le, T.H. (Le, 2002). Other foods included protein, grain, vegetable, fruit, and unsweetened milk were considered as healthy food. To get the score for each food group, we summed all score of each food item in the group. Table 14 shows mean score and adjusted mean of each food group. Adjusted means were calculated by dividing mean of each food group by number of its food item. Among 8 food groups (include unsweetened and sweetened milk) grain was the most frequently consumed, followed by other healthy food group that were protein, vegetable and fruit. Beverage and snacks and unsweetened milk were at the end of the list of intake frequency of 7 food groups. In comparison, unhealthy food was less consumed than healthy food with adjusted mean = 1.49 comparing with 1.95.

Table 14: Food intake in medical students

Food group	Number of food items	Range score	Mean	Adjusted mean*
Grain (n = 364)	3	3-9	6.66	2.22
Protein (n = 362)	6	6-18	12.94	2.16
Vegetable (n = 363)	6	6-18	11.58	1.93
Fruit (n = 363)	5	5-15	8.83	1.77
Unsweetened Milk (n = 362)	1	1-3	1.40	1.40
Sweetened milk (365)	1	1-3	1.64	1.64
Beverage (n = 364)	3	3-9	4.54	1.51
Snack (n = 363)	6	6-18	8.90	1.48
Unhealthy food (n = 363)	9	9-27	13.42	1.49
Healthy food (n = 360)	22	26-66	43.05	1.95

* Overall mean divided by number of questions used to calculate the score.

Table 15: Intake of individual unhealthy food items

Order	Food items	Total score in whole sample	N	Mean score*
1.	Candy	602	364	1.65
2.	Sweetened milk	599	365	1.64
3.	Snack	582	365	1.59
4.	Cookies	567	363	1.56
5.	Fruit juice	530	365	1.45
6.	Soft drink	523	365	1.43
7.	Cake	509	364	1.40
8.	Gel	498	364	1.37
9.	Chocolate	483	364	1.33

* *mean score = total score/N*

Table 15 shows the total score of each unhealthy food items in order of descending of intake level. Candy was consumed most frequently and chocolate was consumed least frequently. However, there were not much differences of food intake within the unhealthy food group.

Table 16: Tests of normal distribution for food variables

Food group	Kolmogorov-Smirnov (a)		
	Statistic	df	p-value
Protein score	.101	359	< .001
Grain score	.161	359	< .001
Vegetable score	.119	359	< .001
Fruit score	.100	359	< .001
Beverage score	.201	359	< .001
Snack score	.147	359	< .001
Unsweetened milk score	.407	362	< .001
Sweetened milk score	.293	362	< .001
Unhealthy food score	.138	359	< .001
Healthy food score	.056	359	.008

(a) *Lilliefors Significance Correction*

Tests of normality for food variables are given in table 16. The table shows that none of food variables were distributed normally. Therefore, the analysis used non-parametric tests to test the associations between these variables and DMFT.

2.4 Description of perceived oral health problems

Table 17: Perception of oral health problem

Perception of oral health problem		Number of subjects (%)
Pain n = 354		
	Present	54 (15.3)
	Past only	202 (57.1)
	Never	98 (27.7)
Chewing n = 352		
	Present	26(7.4)
	Past only	125 (35.5)
	Never	201 (57.1)
Smiling n = 356		
	Present	48 (13.5)
	Past only	33(9.3)
	Never	275 (77.2)
Communication n = 353		
	Present	32 (9.1)
	Past only	23 (6.5)
	Never	298 (84.4)
Tooth color n = 354		
	Present	109 (30.8)
	Past only	35 (9.9)
	Never	210 (59.3)
Tooth damage n = 355		
	Present	95 (26.8)
	Past only	61 (17.2)
	Never	199 (56.1)
Bad odor n = 354		
	Present	62 (17.5)
	Past only	71 (20.1)
	Never	221 (62.4)
School absence n = 356		
	Present	8 (2.2)
	Past only	16 (4.5)
	Never	332 (93.3)

72.4% of population reported they have ever had oral pain, in which 54 people said they were suffering from such symptom, as shown in table 17. Following pain problem were chewing, bad odor and tooth damage with 35.5%, 20.1% and 17.2% respectively of population had it in the past. Smiling and tooth color hold the similar frequency with 9.3% for the former and 9.9% for the latter. School absence is reported as lowest frequency for both past (4.5%) and at present (2.2%).

3. Relationship between dental caries and general characteristics, oral hygiene practice, fluoride supplements, eating habits and perception of oral health problem

The DMFT score variable and group food scores are continuous variable with non-normal distribution as indicated in previous tables. Thus, the relationships between DMFT and general characteristic, oral hygiene practice, fluoride supplement, eating habits and perception of oral health problem were examined by non-parametric Mann-Whitney test, Kruskal-Wallis test or Spearman correlation. Chi-square test was used to determine the association between DMFT category and the examined factors. The level of significance for relationships among these variables was set at $\alpha = 0.05$. Table 18 shows the relationship between DMFT score and general characteristics. Significantly higher mean ranks of DMFT can be seen in second years, in older subjects, in females, in non-Vietnamese, in those whose hometown was urban area and in those who was living on campus at the time of survey. Only monthly expenditure showed no significant between higher and lower expense group.

Table 18: Relationship between general characteristics and DMFT score

	N	Mean Rank	Mann-Whitney U Z (p-value)
Academic year (n = 365)			
First year	246	171.09	-3.162 (.002)
Second year	119	207.63	
Age			
17 -19	266	174.35	-2.345 (.019)
20 – 24	97	202.98	
Gender (n = 365)			
Male	201	172.90	-2.065 (.039)
Female	164	195.38	
Nationality (n = 365)			
Vietnamese	329	177.72	-2.948 (.003)
Non-vietnamese	36	231.28	
Hometown (n = 364)			
Rural area	259	172.81	-2.018 (.044)
Urban area	99	197.00	
Recent residence (n=364)			
Outside campus	216	173.02	-2.117 (.034)
On campus	148	196.33	
Monthly expenditure (n=361)			
< 500,000 VND/month	91	169.04	-1.289 (.198)
≥ 500,00 VND/month	270	185.03	

Table 19: Relationship between DMFT score and parental occupation and education

Occupation and levels of education	Fathers			Mothers		
	N	Mean Rank	p-value*	N	Mean Rank	p-value*
Occupation			.512			<.001
Farmer	210	177.4		236	163.6	
Government employee	45	205.4		33	217.2	
Private business	32	192.1		38	221.3	
General worker	25	181.5		30	211.1	
Teacher	17	170.2		27	218.2	
Other jobs	32	163.8		-	-	
Total	361			364		
Education			.412			.092
Primary or no education	120	172.6		29	193.9	
Secondary	-	-		130	167.0	
High school	146	178.9		133	179.1	
Occupation training	31	180.3		25	199.3	
College or higher	63	199.2		45	212.6	
Total	360			362		

* *Kruskal-Wallis test*

For parent occupation, the table mentioned that the higher DMFT, the better occupation of parents. The highest DMFT score can be seen in subjects whose parent were private businessman and lowest DMFT score was in subjects whose parent were

famer (exclude jobs which was not specified). The association was strongly significant in mother occupation.

Parent education shows the inverse association with dental caries. Among students whose father was more educated had more teeth affected by caries. No educated mothers or high educated mothers were more likely to have children affected by caries than those whose schooling was secondary or high school. The lowest DMFT score was in those whose mother education was secondary or high school level.

Table 20: Relationship between brushing behavior and DMFT category

Brushing behavior	DMFT category		Pearson Chi-Square	
	DMFT = 0	DMFT > 0	Value (df)	p-value
Brushing frequency per day (n = 364)			.004 (1)	.951
Once or less	18 (30.0)	42 (70.0)	OR = 1.01	
Twice or more	90 (29.6)	214 (70.4)	95%CI = (0.55 – 1.86)	
Changing toothbrush (n = 365)			.614 (2)	.736
Once 3 month	80 (29.3)	193 (70.7)		
Once 6 month	17 (27.9)	44 (72.1)		
breaks or wears out	11 (35.5)	20 (64.5)		
Ever forgot to brush (n = 365)			.529 (1)	.467
Ever	9 (36.0)	16 (64.0)	OR = 0.73	
Never	99 (29.1)	241 (70.9)	95%CI = (0.31-1.70)	

Table 20 showed the relationship between brushing behavior and DMFT category. It was shown that there was no significant association between frequency of

brushing and DMFT category (p-value = 0.951). The proportion of non-zero DMFT among those who brushed their teeth twice or more than twice per day was not too much difference from this figure among those who did not (70.4% compare within 70.4%). Similarly, frequency of changing toothbrush and ever forgetting to brush were not associated with DMFT category.

Table 21: Relationship between brushing time and DMFT category

Brushing time	DMFT category		Pearson Chi-Square	
	DMFT = 0	DMFT > 0	Value(df)	p-value
Brush, no regular schedule (n = 364)			4.302 (1)	.038
Yes	3 (11.5)	23 (88.5)	OR = 3.40	
No	104 (30.8)	234 (69.2)	95%CI = (1.01 – 11.60)	
brush after getting up (n = 364)			4.912 (1)	.027
Yes	93 (32.1)	197 (67.9)	OR = 0.49	
No	14 (18.9)	60 (81.1)	95%CI = (0.26 – 0.93)	
Brush after breakfast (n = 363)			.734 (1)	.392
Yes	10 (23.8)	32 (76.2)	OR = 1.38	
No	97 (30.2)	224 (69.8)	95%CI = (0.65 – 2.93)	
Bush before going to bed (n = 364)			.081 (1)	.776
Yes	79 (29.8)	186 (70.2)	OR = 0.92	
No	28 (28.3)	71 (71.7)	95%CI = (0.55 – 1.54)	

There was significant association between unfixed brushing behavior, brushing after getting and DMFT category (p-value = 0.38 for the former and p-value = 0.27 for the latter) as shown in table 21. In those who did not brush their teeth

regularly, the prevalence of non-zero DMFT score was higher than those who did. Students in “brush after getting up” group had lower non-zero DMFT score prevalence than “not brush after getting up” group. Brushing at other times of day was not significantly associated with this index ($p \geq 0.392$).

Table 22: Relationship between fluoride use and untreated decay (DT)

Ever used any fluoride	DT		Pearson Chi-Square	
	DT = 0	DT > 0	Value (df)	p-value
Never	60 (35.5)	109 (64.5)	3.856 (1)	.050
Ever	51 (26.0)	145 (74.0)		OR = 1.56 95%CI = (.99 – 2.45)

Table 23: relationship between fluoride use and DMFT category

Ever used any fluoride	Mean DMFT \pm SD	DMFT category		Pearson Chi-Square	
		DMFT = 0	DMFT > 0	Value (df)	p-value
Never	2.13 \pm 2.208	58 (34.3)	111 (65.7)	3.38 (1)	.066
Ever	2.41 \pm 2.167	50 (25.5)	146 (74.5)		OR = 1.52 95%CI = (.97 – 2.39)

Tables 22 and 23 show the relationship between using any fluoride and dental caries. In table 22, the association was determined between untreated decay (represented by non-zero DT score or DT score > 0) and fluoride use. P-value = 0.05 revealed the marginal significant difference between prevalence of untreated decay

teeth in those who had never used any type of fluoride supplement and in those who had ever used. The difference between prevalence of non-zero DMFT score in “never used” group and “ever used” group was not significant with p-value = .066 (table 23). OR in these two tests were higher than 1 showing the association between DMFT category and fluoride supplement but 95% confidence interval of OR in these two cases included 1 confirming the associations not being significant. However, the direction of the association goes in the way that prevalence of non-zero DMFT score was higher in subjects who had used fluoride than in those who had not.

When looking at relationship between DMFT score and each fluoride supplements, there was also no significant association. The association went in the same way for all three supplements of fluoride that DMFT score was higher in those who ever used and lower in those who never used or did not remember ever used or not (table 24).

Table 24: Relationship between each type of fluoride supplement with DMFT score

Fluoride supplements	N	Mean rank of DMFT	K-W test p-value
Fluoride mouth rinse			
Yes	158	185.84	.364
Never	183	177.33	
Don't remember	24	207.56	
Fluoride gel			
Yes	76	183.51	.857
Never	253	182.80	
Don't remember	34	172.69	
Fluoride from other source			
Yes	41	210.27	.187
Never	272	180.52	
Don't remember	52	174.48	

Table 25: Relationship between fluoride supplement parent occupations

Parent occupation		Fluoride supplement		Chi-square (p-value)
		Never	Ever	
Mother's occupation	farmer	121 (51.3)	115 (48.7)	9.220 (.056)
	private business	10 (26.3)	28 (73.7)	
	government employee	13 (39.4)	20 (60.6)	
	teacher	12 (44.4)	15 (55.6)	
	general worker, housewife, others	13 (43.3)	17 (56.7)	
	Father's occupation	farmer	107 (51.0)	
government employee	17 (37.8)	28 (62.2)		
private business	11 (34.4)	21 (65.6)		
fisherman, soldier, others	14 (43.8)	18 (56.3)		

The relationship between fluoride use and parents' occupation is shown in table 25. The table states that subjects whose mother's occupation was high income job had had more access to fluoride than those whose mother's occupation was not. The association is almost significant with p-value = .056.

Table 26: Relationship between fluoride supplement and parent education

Parent education		Fluoride supplement		Chi-square (p-value)
		Never	Ever	
Mother's education	Cannot read or write, primary school	16 (55.2)	13 (44.8)	10.70 (.030)
	Secondary school	73 (56.2)	57 (43.8)	
	High school	53 (39.8)	80 (60.2)	
	Occupation trainings	10 (40.0)	15 (60.0)	
	Graduated	16 (35.6)	29 (64.4)	
Father's education	Cannot read or write, primary school, secondary School	60 (50.0)	60 (50.0)	.96 (.809)
	High school	67 (45.9)	79 (54.1)	
	Occupation training	14 (45.2)	17 (54.8)	
	Graduated	27 (42.9)	36 (57.1)	

Table 26 shows the relationship between fluoride supplement and parent education. The prevalence of using fluoride among students whose mother was highly educated was significantly higher than among students whose mother was not. This trend was not as strong in relation father's education.

Table 27: Spearman correlations of DMFT score with food intake variables

Food groups	Correlation Coefficient (p-value)
Protein score (n = 362)	-.012 (.823)
Grain score (n = 364)	.055 (.295)
Vegetable score (n = 363)	-.015 (.770)
Fruit score (n = 363)	.111 (.034)
Beverage score (n = 364)	.056 (.285)
Snack score (n = 363)	.096 (.068)
Unsweetened milk score (n = 362)	.076 (.150)
Sweetened milk score (n = 365)	.146 (.005)
Unhealthy food score (n = 363)	.109 (.039)
Healthy food score (n = 360)	.044 (.403)

Spearman correlations of food intake-related scores with DMFT score are given in table 27. This table consisted two parts. The first part listed 8 separate food groups in association with DMFT score and second part looked at the association between DMFT score and the group of unhealthy foods, which include beverage, snack and sweetened milk, and between DMFT score and healthy foods, which include the rest of 31 foods listed in the survey. Protein and vegetables were negatively correlated with DMFT score and these correlations were not significant. 5 of 8 food groups were positively correlated with DMFT score in which fruit, which was treated as healthy food but showed significant positive correlation (p-value = .034), sweetened milk showed highly significant correlation (p-value = .005). Snack score was almost significant with p-value = .068. The overall score for unhealthy

foods was positively and significantly correlated with DMFT score ($=0.039$). The healthy food score was not significantly correlated with DMFT score.

Then we used DMFT category to further assess the relationship between this measurement and food intake and we found that only sweetened milk and unhealthy food showed the significant association with DMFT category, p -value = 0.011 and 0.03, respectively (table 28). Other food groups were not significant at all.

Table 28: Relationship between DMFT category and food intake variables

DMFT category		N	Mean Rank	Mann-Whitney Z (p-value)
Protein score				-0.069 (.945)
(n = 362)	DMFT = 0	107	182.07	
	DMFT > 0	255	181.26	
Grain score				-1.352 (.176)
(n = 364)	DMFT = 0	107	171.29	
	DMFT > 0	257	187.17	
Vegetable score				-0.299 (.765)
(n = 363)	DMFT = 0	107	184.52	
	DMFT > 0	256	180.95	
Fruit score				-1.632 (.103)
(n = 363)	DMFT = 0	107	168.23	
	DMFT > 0	256	187.76	
Beverage score				-1.391 (.164)
(n = 364)	DMFT = 0	108	171.06	
	DMFT > 0	256	187.33	
Snack score				-1.910 (.056)
(n = 363)	DMFT = 0	107	165.93	
	DMFT > 0	256	188.71	
Unsweetened milk score				-0.943 (.346)
(n = 365)	DMFT = 0	107	174.85	
	DMFT > 0	255	189.29	
Sweetened milk score				-2.531 (.011)
(n = 362)	DMFT = 0	108	163.53	
	DMFT > 0	257	191.18	
Unhealthy food score				-2.168 (.030)
(n = 363)	DMFT = 0	107	163.63	
	DMFT > 0	256	189.68	
Healthy food score				-0.790 (.430)
(n = 360)	DMFT = 0	106	173.80	
	DMFT > 0	254	183.30	

Table 29: Relationship between DMFT category and unhealthy foods

Food items		DMFT category		Chi-square (p-value)
		DMFT = 0	DMFT > 1	
Snacks	often	6 (14.6)	35 (85.4)	5.705 (.058)
	sometimes	39 (28.9)	96 (71.1)	
	never or rarely used	63 (33.3)	126 (66.7)	
Cake	often	6 (28.6)	15 (71.4)	.748 (.688)
	sometimes	27 (26.2)	76 (73.8)	
	never or rarely used	74 (30.8)	166 (69.2)	
Candy	often	8 (21.6)	29 (78.4)	1.206 (.547)
	sometimes	50 (30.5)	114 (69.5)	
	never or rarely used	49 (30.1)	114 (69.9)	
Chocolate	often	3 (23.1)	10 (76.9)	6.695 (.035)
	sometimes	18 (19.4)	75 (80.6)	
	never or rarely used	86 (33.3)	172 (66.7)	
Gel	often	7 (43.8)	9 (56.3)	11.788(.003)
	sometimes	17 (16.7)	85 (83.3)	
	never or rarely used	83 (33.7)	163 (66.3)	
Sweetened milk	often	7 (19.4)	29 (80.6)	6.424 (.040)
	sometimes	41 (25.3)	121 (74.7)	
	never or rarely used	60 (35.9)	107 (64.1)	

Among unhealthy foods, the trend that the more frequent intake, the higher prevalence of non-zero DMFT score could be seen in snacks, chocolate and sweetened milk. Chocolate and sweetened milk revealed significant association with DMFT category. Snacks revealed marginal significance. In 5 of 6 unhealthy food items, DMFT prevalence went in the way that “sometimes” user had equal or a little bit higher prevalence of non-zero DMFT score in comparison with “often” user but had marked higher prevalence of non-zero DMFT score than “never or rarely” user (table 29).

Table 30: Relationship between brushing behavior and snacks consumption

	N	Mean Rank	Mann-Whitney Z (p-value)
Brushing frequency per day (n = 362)			
once or less	59	204.02	-1.829(.067)
twice or more	303	177.12	
Ever forgot to brush (n = 351)			
Ever	12	188.58	-.443(.658)
Never	339	175.55	
Brushing, no regular schedule (n = 362)			
no	337	180.57	-.626 (.531)
yes	25	193.98	
Brushing after getting up (n = 362)			
no	73	186.74	-.485(.628)
yes	289	180.18	
Brushing before going to bed (n = 362)			
no	99	194.03	-1.415(.157)
yes	263	176.78	

Even there was not any brushing behavior significantly associated with snacks consumption, there was still a trend that snacks consumption was higher among those who brushed their teeth less than twice per day, who had ever forgot to brush for 7 days, who had no regular brushing schedule. The consumption level was lower among

those who usually brushed after getting up and those who usually brushed before going to bed (table 30).

3. Relationship between perception of oral problems and DMFT score

Table 31: Relationship between perception of oral health problems and DMFT score
(DMFT is considered as outcome)

Oral Health Problems		Frequency (%) of DMFT		Chi-square p-value
		DMFT = 0	DMFT > 0	
Pain (n=354)	Never	35 (35.7)	63 (64.3)	2.877 (.090)
	Ever	68 (26.6)	188 (73.4)	
Chewing (n=352)	Never	62 (30.8)	139 (69.2)	.568 (.451)
	Ever	41 (27.2)	110 (72.8)	
Smiling (n=356)	Never	79 (28.7)	196 (71.3)	.635 (.426)
	Ever	27 (33.3)	54 (66.7)	
Communication (n=353)	Never	86 (28.9)	212 (71.1)	.334 (.563)
	Ever	18 (32.7)	37 (67.3)	
Color (n=354)	Never	62 (29.5)	148 (70.5)	.005 (.942)
	Ever	42 (29.2)	102 (70.8)	
Tooth damage (n=355)	Never	76 (38.2)	123 (61.8)	17.299 (< 0.01)
	Ever	28 (17.9)	128 (82.1)	
Odor (n=354)	Never	66 (29.9)	155 (70.1)	.067 (.796)
	Ever	38 (28.6)	95 (71.4)	
School absence (n=356)	Never	101 (30.4)	231 (69.6)	2.036 (.154)
	Ever	4 (16.7)	20 (83.3)	

Table 32: Relationship between perception of oral health problems and DMFT score

(Oral health problems are considered as outcomes)

Oral Health Problems		Frequency (%) of Problems		Chi-square p-value
		Never	Ever	
Pain (n=354)	DMFT = 0	35 (34.0)	68 (66.0)	2.877 (.090)
	DMFT > 0	63 (25.1)	188 (74.9)	
Chewing (n=352)	DMFT = 0	62 (60.2)	41 (39.8)	.568 (.451)
	DMFT > 0	139 (55.8)	110 (44.2)	
Smiling (n=356)	DMFT = 0	79 (74.5)	27 (25.5)	.635 (.426)
	DMFT > 0	196 (78.4)	54 (21.6)	
Communication (n=353)	DMFT = 0	86 (82.7)	18 (17.3)	.334 (.563)
	DMFT > 0	212 (85.1)	37 (14.9)	
Color (n=354)	DMFT = 0	62 (59.6)	42 (40.4)	.005 (.942)
	DMFT > 0	148 (59.2)	102 (40.8)	
Tooth damage (n=355)	DMFT = 0	76 (73.1)	28 (26.9)	17.299 (< 0.01)
	DMFT > 0	123 (49.0)	128 (51.0)	
Odor (n=354)	DMFT = 0	66 (63.5)	38 (36.5)	.067 (.796)
	DMFT > 0	155 (62.0)	95 (38.0)	
School absence (n=356)	DMFT = 0	101 (96.2)	4 (3.8)	2.036 (.154)
	DMFT > 0	231 (92.0)	20 (8.0)	

Relationships between perceived dental health-related problems and dental caries are presented in tables 31 and 32. Time relationships between these variables are not clear, that is, it is not clear whether occurrence of dental caries preceded the

perceived problems or vice versa. Therefore, in data analysis the researcher considered both possibilities. Table 31 shows the relationships between dental caries and perception of oral health problems as though the problems preceded the caries (caries considered to be the dependent variable). In this table, except smiling and communication, others problems show the higher prevalence of non-zero DMFT when the problems were reported (shown in bold). Inversely, table 32 shows the same relationship but perception of oral health problems were considered as dependent variables. However, in this case, the similar results were repeated. Except smiling and communication, the higher prevalence of problems reported in non-zero DMFT group comparing with the lower prevalence of problems reported in zero DMFT group (shown in bold). Highly significant and marginally significant associations can be seen between dental caries and perceived tooth damage and pain, respectively. For each specific perceived problem, the strength of association with dental caries, as measured by the X^2 statistic and the corresponding p-value, was the same in tables 31 and 32.