MINISTRY OF EDUCATION AND TRAINING

MINISTRY OF HEALTH

THE NATIONAL INSTITUTE OF HYGIENE AND EPIDEMIOLOGY

NGUYEN ANH SON

STATUS AND SOME FACTORS RELATED TO TOOTH DECAY, GINGIVITIS, INTERVENTION EFFECTIVENESS TO GRADE 6 PUPILS IN SOME SECONDARY SCHOOLS IN BINH XUYEN DISTRICT, VINH PHUC PROVINCE

Major: Public health
Code: 62 72 03 01

DOTORIAL THESIS SUMMARY

Hanoi - 2019

THE RESEARCH COMPLETED AT THE NATIONAL INSTITUTE OF HYGIENE AND EPIDEMIOLOGY

Science supervisors:

1. Prof.Dr. Nguyen Tran Hien
2. Prof.Dr. Trinh Dinh Hai

Reviewer 1: .....
.....

Reviewer 2: .....
.....

Reviewer 3: .....
.....

The thesis will be (or has been) protected at the Institute-level Evaluation Council meeting at the National Institute of Hygiene and Epidemiology.

At ... time ..., day ... month ... 2019.

The thesis can be found at:

1. National Library
2. Library of National Institute of Hygiene and Epidemiology.

QUESTION

The decay and gingivitis are common diseases in Vietnam as well as in many countries around the world, if the disease is not treated promptly, it will lead to dangerous complications. According to the World Health Organization, the need to prevent tooth decay as soon as possible especially ages 11 to 12 years is the most important time in the formation of basic permanent teeth. In Vietnam, the school dental program has been implemented since 1987. However, after many years of implementation, the rate of pupils with tooth decay and gingivitis is still high. It is necessary to find easy-to-apply and comprehensive solutions to reduce the rate of pupils suffering from tooth decay and gingivitis.

Objectives of the study

1. Describe the situation and some factors related to tooth decay, gingivitis of grade 6 pupils in some secondary schools in Binh Xuyen district, Vinh Phuc province in 2014.

2. Evaluate the effectiveness of oral care intervention of the above groups.

New points of science and practical value of the topic

Research shows that a new approach to forming habits, reflexes skills in pupils' brushing techniques through training skills at school contributes to reducing the rate of pupils with tooth decay and gingivitis.

STRUCTURE OF THE THESIS

The thesis consists of 118 pages excluding references and appendices, 37 tables and 24 figures. Open 2 pages. Overview of 31 pages; 17 page research method; research results 35 pages; 31 page discussion; 1 page conclusion and 1 page petition.

Chapter 1. OVERVIEW

1.1. The cause of tooth decay, gingivitis

1.1.1. The cause of tooth decay

Tooth decay is a pathological process that occurs after teeth have sprouted, characterized by demineralization that gradually dissolves inorganic and organic substances in tooth enamel, dentin, forming deep holes.

1.1.2. The cause of gingivitis

Gingivitis is an inflammation of the gums in the gums (margin, papillae, gum) but does not affect the alveolar bone.

1.2. The situation of tooth decay, gingivitis in 12-year-old pupils in the world and in Vietnam

1.2.1. On the world

Tooth decay of children 12 years old is quite high in some countries in the world. In Mangalore, India, (2013) the rate of tooth decay was 59.4%. In Campanian, Italy (2016) the rate of tooth decay was 35.8%, the index of decay loss (SMT) was 1.17. Gingivitis is also very high in India, from 14 to 15 years of age, the rate of gingivitis is nearly 100%. In the UK, the percentage of pupils with gingivitis is 96%. In China, Thailand and Southeast Asian countries, the gingivitis rate is also 70% - 84%.

1.2.2. In Viet Nam

In Vietnam, the rate of tooth decay and gingivitis of pupils aged 12 is still high. In An Giang (2013) the rate of tooth decay was 55.6%. Dong Thap (2015) rate of tooth decay is 47.9%, SMT index is 1.0. Thua Thien Hue (2012) rate of tooth decay is 74%, gingivitis is 80.1%. Vinh Phuc (2010) rate of tooth decay is 67.4%, SMT index is 1.58, gingivitis is 81.9%. Dong Da District, Hanoi (2013) showed that SMT index was 1.58, gingivitis was 69.77%.

1.3. Some factors related to oral diseases in 12-year-old pupils in the world and in Vietnam

According to research the literature and research materials of the authors in the world and in Vietnam have shown pupils themselves, pupils' parents, schools and social factors ... have affect the oral health care of children.

1.4. Effective oral health care measures for pupils in schools around the world and Vietnam

1.4.1. On the world

Some studies in the world have shown the effectiveness of the reproductive health program for pupils through oral health education, guiding pupils to practice brushing and having a reasonable diet.

1.4.2. In Viet Nam

In Vietnam, the effectiveness of the school dental program is not high, the activities are still formal, most of them only implement the oral care education content and let the pupils rinse their mouth with NaF 0.2% but not full, often. The periodic oral examination of early oral diseases and preventive treatment of complications, filling of the permanent tooth cavity is not implemented because of lack of facilities, medical equipment and school health workers has professional jaw and lack of funding for implementation.

Chapter 2. RESEARCH METHOD

2.1. Describe the situation and some factors related to tooth decay, gingivitis in pupils.

2.1.1. Research subjects

- Grade 6 pupils and parents agree to participate in the study.

- Administrators; school health workers; Homeroom teachers of grade 6; Public health officer of the Health Department; Health officer of the Department of Education and Training.

2.1.2. Location and time of study

At 4 secondary schools in Binh Xuyen district, Vinh Phuc province from September 2014 to November 2014.

2.1.3. research design

The study describes cross-sections, combining quantitative and qualitative research.

2.1.4. Sample size and sampling method

* Quantitative research: Sample size according to the following formula

$$n = Z^2 (1- \alpha/2) \frac{p.q}{d^2} x\ DE$$

In which n: The smallest sample size must be achieved

Z: Responding to 95% confidence, Z = 1.96

α: Is the level of statistical significance, taking α = 0.05

p = 0.67: Estimated rate of pre-intervention caries (Percentage of caries at Huong Canh secondary school, Binh Xuyen district, Vinh Phuc province in 2010 was 67.4%).

q = 1 - p = 1 - 0.67 = 0.33

d: is the permissible error rate, with the study choosing d = 0.06

DE: Design validity, with research selected DE = 2

After calculation, there are n = 472 pupils.

Similar to that sample size formula with gingivitis rate of 81.9% (p = 0.82), n = 316 pupils. This sample size is smaller than the sample size with the rate of tooth decay so that the sample size selected is 472, plus 10% of giving up is 519, rounding is 520 pupils.

Sampling method: In Binh Xuyen district, there are 10 schools in the district, 4 schools in the town, randomly draw 2 schools in the district and 2 schools in the town. The school group in the district includes the secondary school: Huong Canh and Thanh Lang; The school group in the town consists of Secondary School: Son Loi and Dao Duc. Select all 544 pupils and 544 pupils participating in the study.

2.1.5. Evaluation indicators

* Qualitative research: 08 group discussions, 14 in-depth interviews.

* Percentage of tooth decay (%) = (Total number of tooth decay pupils / Total number of pupils examined) x100

* SMT index = Total number of teeth (Depth + Loss + Fill) / Total number of pupils examined.

* Gingivitis rate (Gingivitis) (%) = (Total number of gingivitis pupils / Total number of pupils examined) x 100

* Assessing knowledge, practicing of preventing tooth decay, gingivitis: By marking the answers in the questionnaire; If the total score is over 50% of the maximum score, then there is knowledge or practice achieved

2.1.6. The method of data collection

Collect secondary data through documents and reports on public health work. Collect primary data through observation of pupils brushing their teeth, examining teeth, interviewing pupils, distributing self-filled forms for parents, group discussions, in-depth interviews.

2.1.7. Processing and analyzing data

- Quantitative data: Data entry with Epi Data 3.0 software, data analysis using SPSS 16.0 software. Single and multivariate analysis.

- Qualitative data: Remove tape, record, encode according to topics.

2.2. Evaluate the effectiveness of oral health care for pupils

2.2.1. Research subjects

Pupils in grade 7 of 4 secondary schools: Huong Canh, Thanh Lang, Son Loi and Dao Duc (these pupils participated in research in 2014) and their parents.

2.2.2. Location and time of study

- From 4 schools participating in the random research and selection of intervention schools and control schools: The intervention school group is Huong Canh and Son Loi secondary schools; The control group is Thanh Lang and Dao Duc secondary schools.

- Time: From September 2015 to May 5/2016.

2.2.3. Research design

Intervention study with control.

2.2.4. Sample size and sampling method

Intervention study, sample size:

$$n = D \times \frac{\{Z_{(1-\alpha/2)}\sqrt{2\bar{p}\bar{q}} + Z_{1-\beta}\sqrt{p_1q_2 + p_2q_2}\}^2}{(p_1 - p_2)^2}$$

$$\text{Với } \bar{p} = \frac{p_1 + p_2}{2} = \frac{0.67 + 0.48}{2} = 0.575$$

D: design effect = 2

p1= 0.67: Proportion of pre-intervention caries (Percentage of caries at Huong Canh secondary school, Binh Xuyen district, Vinh Phuc province in 2010 was 67.4%).

p2 = 0.48: Proportion of tooth decay in the desired intervention group

Z (1-α / 2): when α = 0.05, Z = 1.96

β: is a type 2 error, β = 0,1 1-β = 0,9 then Z = 1.282

Replace the number we have n = 230 pupils.

Similar to that sample size formula with gingivitis rate of 81.9% (p1 = 0.82, p2 = 0.48), the sample size is 64 pupils, smaller than the calculated sample size based on the depth teeth. Therefore, the sample size was chosen to be 230, plus 10% to give up 253 pupils, rounding up 260 pupils.

2.2.5. Evaluation indicators

Indicators evaluated in section 2.1.5

Intervention efficiency index (Q) is calculated as follows:

Q = d1 - d2 (Where: d1 = q1 - p1; d2 = q2 - p2)

d1: Difference in the proportion of research outcomes before and after intervention in the intervention group.

d2: Difference between the ratio of research outcomes before and after the intervention in the control group.

2.2.6. Intervention content

- Dental care education for pupils.
- Guide pupils to brush their teeth properly.
- Improve knowledge of preventing tooth decay, gingivitis for parents.

2.3. Ethics in research

Ethics in research is approved by the Council of Detailed Outlines of the National Institute of Hygiene and Epidemiology.

Chapter 3. RESULTS

3.1. Situation and some factors related to tooth decay, gingivitis in pupils

3.1.1. Situation of tooth decay, gingivitis in pupils

Table 3.1. Situation of tooth decay in pupils (n = 544)

Status of tooth decay		Frequency	Ratio %
Pupils with tooth decay	There are	346	63.6
	No	198	36.4
Pupils get worms according to the number of deep teeth	1 tooth decay	175	50.6
	2 teeth decay	92	26.6
	3 teeth decay	54	15.6
	≥4 teeth decay	25	7.2

Table 3.1 shows that the rate of pupils with high caries is 63.6%.

Table 3.2. SMT index by gender (n = 544)

Gender	S	M	T	SMT	S/SMT (%)	T/SMT (%)
Male (280)	1.30	0.05	0.30	1.65	78.79	18.18
Female (264)	1.17	0.06	0.40	1.63	71.78	24.54
General	1.24	0.06	0.35	1.64	75.29	21.36

Table 3.2 shows that the overall SMT index is 1.64, meaning that an average student with 1.64 teeth is deep.

Table 3.3. Status of gingivitis in pupils (n = 544)

Status of gingivitis		Frequency	Ratio %
Pupils with gingivitis	There are	441	81.1
	No	103	18.9
Pupils have gingivitis according to levels	The mild inflammation of gingivitis	312	70.7
	Inflammation average	115	26.1
	Severe inflammation	14	3.2

Table 3.3 shows that the rate of pupils with high gingivitis is 81.1%.

3.1.2. Some factors related to tooth decay, gingivitis in pupils

3.1.2.1. Relation between knowledge, practice of preventing tooth decay, gingivitis with caries, gingivitis in pupils

Table 3.8. Relation between gender and the situation of tooth decay, gingivitis in pupils (n = 544)

Sex	Tooth decay			Gingivitis		
	Yes	No	Total	Yes	No	Total
- Male	194 (69.29%)	86 (30.71%)	280	235 (83.93%)	45 (16.07%)	280
- Female	152 (57.58%)	112 (42.42%)	264	206 (78.03%)	58 (21.97%)	264
OR (95% KTC) p	1.66 (1.17 – 2.36); < 0.05			1.47 (0.96 – 2.27); = 0.05		

Table 3.8 shows that male pupils are 1.66 times more likely to get caries than female pupils (p <0.05).

Table 3.13. Relation between knowledge of prevention of tooth decay, gingivitis with the situation of tooth decay, gingivitis in pupils (n = 544)

	Tooth decay			Gingivitis		
	Yes	No	Yes	No	Yes	No
Knowledge of preventing tooth decay and gingivitis of pupils						
- Not reached	196 (70.25%)	83 (29.75%)	279	238 (85.30%)	41 (14.70%)	279
- Reached	150 (56.60%)	115 (43.40%)	265	203 (76.60%)	62 (23.40%)	265
OR (95% KTC) p	1.81 (1.27 – 2.58); < 0.05			1.77 (1.15 – 2.74); < 0.05		

Table 3.13 shows that pupils with knowledge of preventing tooth decay, gingivitis not reached, risk 1.81 times higher and gingivitis 1.77 times higher than pupils with knowledge of preventing tooth decay, gingivitis reached (p <0, 05).

Table 3.17. Relation between proper brushing with the situation of tooth decay, gingivitis in pupils (n = 544)

	Tooth decay			Gingivitis		
	Yes	**No**	**Total**	**Yes**	**No**	**Total**
Brush your teeth properly						
- No	300 (65.93%)	155 (34.07%)	455	407 (81.89%	90 (18.11%)	497
- Yes	46 (51.69%)	43 (48.31%)	89	34 (72.34%)	13 (27.66%)	47
OR (95% KTC) p	1.81 (1.14 – 2.86); < 0.05			1.73 (0.88 – 3.41); < 0.05		

Table 3.17 shows that pupils who improperly brush teeth have a 1.81 times higher risk of tooth decay than pupils who brush teeth properly (p <0.05).

Table 3.18. Relation between practice of preventing tooth decay, gingivitis with the situation of caries, gingivitis in pupils (n = 544)

	Tooth decay			Gingivitis		
	Yes	**No**	**Total**	**Yes**	**No**	**Total**
Practicing prevention of tooth decay, gingivitis of pupils						
- Not reached	227 (69.42%)	100 (30.58%)	327	280 (85.63%)	47 (14.37%)	327
- Reached	119 (54.84%)	98 (45.16%)	217	161 (74.19%)	56 (25.81%)	217
OR (95% KTC) p	1.87 (1.31 – 2.67); < 0.001			2.07 (1.34 – 3.20); < 0.05		

Table 3.18 shows that pupils with practice of preventing tooth decay, gingivitis not reached risk of tooth decay were 1.87 times higher (p<0.001) and gingivitis was 2.07 times

higher ($p<0.05$) than pupils with practice of preventing tooth decay, gingivitis reached.

Table 3.19. Multivariate regression analysis on the relationship between knowledge, practice of preventing tooth decay, gingivitis with the situation of tooth decay in pupils (n = 544)

Relevant factors	n (%)	OR multivariate	p
Sex: - Male	194 (69.29%)	1.65 (1.14 – 2.38)	
- Female	152 (57.58%)	1	0.008
Knowledge of the harmful effects of tooth decay:			
- Not reached	175 (69.44%)	1,02 (0,65 – 1,60)	
- Reached	171 (58.56%)	1	0.933
Knowledge of measures on preventing tooth decay, gingivitis: - Not reached	150 (72.12%)	1.06 (0.63 – 1.80)	
- Reached	196 (58.33%)	1	0.821
Knowledge about dealing with tooth decay, gingivitis:			
- Not reached	161 (73.85%)	1.82 (1.10 – 3.03)	
- Reached	185 (56.75%)	1	0.020
How to brush teeth properly			
- Incorrect	291 (64.39%)	1.29 (0.81 – 2.07)	
- It's correct	55 (55.32%)	1	0.283
Time to brush teeth			
- <2 minutes	100 (71.43%)	1.45 (0.94 – 2.24)	
- ≥ 2 minutes	246 (60.89%)	1	0.094
Habits of eating snacks			
- Regular, sometimes	272 (66.50%)	1.81 (1.20 – 2.73)	
- Rarely, never	74 (54.81%)	1	0.005

Table 3.19 shows that, after putting variables with p <0.05 into the multivariate regression model, only the remaining variables in the model (after eliminating confounding factors) are related variables. Pupils' tooth decay: Male sex, knowledge of management when having tooth decay, inadequate gingivitis and eating habits.

Table 3.20. Multivariate regression analysis on the relationship between knowledge, practice of preventing tooth decay, gingivitis with the situation of gingivitis in pupils (n = 544)

Relevant factors	n (%)	OR multivariate	p
Knowledge of the causes of tooth decay, gingivitis			
- Not achieved	249 (84.41%)	1.43 (0.92 – 2.22)	
- Reached	192 (77.11%)	1	0.115
Time to brush teeth			
- Incorrect	29 (14.50%)	1.39 (0.86 – 2.25)	
- It's correct	74 (21.51%)	1	0.182
Time to brush teeth			
- <2 minutes	18 (12.86%)	1.53 (0.87 – 2.69)	
- ≥ 2 minutes	85 (21.04%)	1	0.139
Number of dental visits in a year: - <2 times	75 (16.93%)	1.69 (1.02 – 2.82)	
- ≥ 2 times	28 (27.72%)	1	0.044

Table 3.20 shows that, after putting variables with p <0.05 into the multivariate regression model, only the number of times that the pupils go to the dentist during the remaining year (only after eliminating confounding factors) remains variable.) is a variable related to the gingivitis of pupils.

Table 3.22. Relation between practice of preventing tooth decay, gingivitis for pupils of parents and pupils with the situation of caries, gingivitis in pupils (n = 544)

	Tooth decay			Gingivitis		
	Yes	**No**	**Total**	**Yes**	**No**	**Total**
Practice of preventing tooth decay, gingivitis for pupils of parents						
- Not reached	197 (73.23%)	72 (26.77%)	269	228 (84.76%)	41 (15.24%)	269
- Reached	149 (54.18%)	126 (45.82%)	275	213 (77.45%)	62 (22.55%)	275
OR (95% KTC) p	2.31 (1.62 – 3.31); < 0.001			1.62 (1.05 – 2.51); < 0.05		

Table 3.22 shows that pupils whose parents have practice of preventing tooth decay, gingivitis for pupils not reached, the risk of tooth decay is 2.31 times higher ($p<0.001$) and 1.62 times higher benefit ($p<0.05$) compared to pupils whose parents have practice of preventing tooth decay, gingivitis for pupils reached.

3.1.2.2. Several factors affect oral health care for pupils in schools

Secondary schools are all staffed with health workers who are trained in general nursing, and lack of knowledge about health care for pupils at school.

> *"school health workers are less likely to attend training courses on traditional medicine."*
>
> (In-depth interview with school health workers 4)

All schools lack facilities, medical equipment, and funds to implement health care activities for pupils.

"Facilities for school dentist are limited, a few parents and pupils have not really been aware of education and personal hygiene care."

(In-depth interview with school health workers 4)

Lack of models or means to teach reproductive health care for pupils.

"The school still lacks models and practical tools for teaching about teeth care."

(Teacher group discussion 4)

3.2. Evaluate the effectiveness of oral health care for grade 6 pupils in some secondary schools

3.2.1. Effect on improving the situation of tooth decay, gingivitis in pupils and some related factors

Table 3.23. The effectiveness of intervention changes the situation tooth decay in pupils

		Intervention group (n=282)		**Control group (n=262)**		**p**	**Q (%)**
		Before (1)	**After (2)**	**Before (3)**	**After (4)**		
Situation of tooth decay							
Yes	n	180	166	166	207	$p_{1-3} > 0.05$	**-20.61**
	%	63.83	58.87	63.36	79.01	$p_{2-4} < 0.05$	
No	n	102	116	96	55		
	%	36.17	41.13	36.64	20.99		

Table 3.23 shows that the percentage of pupils with caries after intervention decreased compared to before intervention in the intervention group and compared with the control group was 20.61% ($p < 0.05$).

Table 3.24. The effectiveness of intervention changes the situation gingivitis in pupils

		Intervention group (n=282)		Control group (n=262)		p	Q (%)
		Before (1)	After (2)	Before (3)	After (4)		
Situation of gingivitis							
Yes	n	230	137	211	241	$p_{1-3} > 0.05$ $p_{2-4} < 0.001$	**-44.43**
	%	81.56	48.58	80.53	91.98		
No	n	52	145	51	21		
	%	18.44	51.42	19.47	8.02		

Table 3.24 shows that the rate of pupils with gingivitis after intervention decreased compared to before intervention in the intervention group and compared with the control group was 44.43% (p <0.001).

Table 3.25. The effectiveness of intervention changes knowledge of preventing tooth decay, gingivitis of pupils

		Intervention group (n=282)		Control group (n=262)		p	Q (%)
		Before (1)	After (2)	Before (3)	After (4)		
Knowledge of preventing pupils' tooth decay and gingivitis							
Reached	n	134	203	131	119	$p_{1-3} > 0.05$ $p_{2-4} < 0.001$	**29.05**
	%	47.52	71.99	50.00	45.42		
Not reached	n	148	79	131	143		
	%	52.48	28.01	50.00	54.58		

Table 3.25 shows that the percentage of pupils with knowledge of preventing tooth decay, gingivitis reached after

intervention increased compared to before intervention in the intervention group and compared with the control group was 29.05% (p <0.001).

Table 3.28. Effective intervention changes the brushing of pupils correctly

		Intervention group (n=282)		Control group (n=262)		p	Q (%)
		Before (1)	After (2)	Before (3)	After (4)		
Brush your teeth properly							
True	n	24	86	23	28	$p_{1-3} > 0.05$	**20.08**
	%	8.51	30.50	8.78	10.69	$p_{2-4} < 0.05$	
Not correct	n	258	196	239	234		
	%	91.49	69.50	91.22	89.31		

Table 3.28 shows that the rate of pupils brushing properly after intervention increased compared to before intervention in the intervention group and compared with the control group was 20.08% (p <0.05).

Table 3.29. The effectiveness of intervention changes the practice of preventing tooth decay and gingivitis of pupils

		Intervention group (n=282)		Control group (n=262)		p	Q (%)
		Before (1)	After (2)	Before (3)	After (4)		
Practicing prevention of tooth decay, gingivitis of pupils							
Reached	n	123	197	94	126	$p_{1-3} > 0.05$	**14.03**
	%	43.62	69.86	35.88	48.09	$p_{2-4} < 0.01$	

Not reached	n	159	85	168	136		
	%	56.38	30.14	64.12	51.91		

Table 3.29 shows that the percentage of pupils with have practice of preventing tooth decay and gingivitis increased after the intervention in the intervention group and the control group was 14.03% ($p < 0.01$).

Table 3.32. The effectiveness of intervention changes the practice of preventing tooth decay, gingivitis for pupils of the parents

		Intervention group (n=282)		**Control group (n=262)**		**p**	**Q (%)**
		Before (1)	**After (2)**	**Before (3)**	**After (4)**		
Practicing prevention of tooth decay, gingivitis of parents							
Reached	n	156	193	121	134	$p_{1-3} > 0.05$	**8.15**
	%	55.32	68.44	46.18	51.15	$p_{2-4} < 0.01$	
Not reached	n	126	89	141	128		
	%	44.68	31.56	53.82	48.85		

Table 3.32 shows that the percentage of parents with have practice of preventing tooth decay, gingivitis for pupils after intervention increased compared to before intervention in the intervention group and 8.15% compared with the control group ($p < 0.01$).

Table 3.33. Effective intervention changes the way of brushing properly (Through direct observation of pupils brushing teeth)

		Intervention group (n=282)		Control group (n=262)		p	Q (%)
		Before (1)	After (2)	Before (3)	After (4)		
How to brush teeth							
True	n	29	97	26	42	$p_{1-3} > 0.05$ $p_{2-4} < 0.05$	**18.01**
	%	10.28	34.40	9.92	16.03		
Not correct	n	253	185	236	220		
	%	89.72	65.60	90.08	83.97		

Table 3.33 shows that the rate of correct brushing pupils in intervention increased compared to before intervention in the intervention group and compared with the control group was 18.01% (p <0.05).

Table 3.34. The effectiveness of intervention changes the brushing time (Direct observation of pupils brushing teeth)

		Intervention group (n=282)		Control group (n=262)		p	Q (%)
		Before (1)	After (2)	Before (3)	After (4)		
Time to brush teeth							
≥ 2 minutes	n	37	152	35	28	$p_{1-3} > 0.05$ $p_{2-4} < 0.001$	**43.45**
	%	13.12	53.90	13.36	10.69		
< minutes	n	245	130	227	234		
	%	86.88	46.10	86.64	89.31		

Table 3.34 showed that the rate of pupils brushing teeth ≥ 2 minutes after intervention increased compared to before intervention in the intervention group and compared with the control group was 43.45% (p <0.001).

Chapter 4. DISCUSSION

4.1. Current situation and some factors related to tooth decay, gingivitis in grade 6 pupils in some secondary schools

4.1.1. Situation of tooth decay, gingivitis in pupils

The results of our research show that the rate of tooth decay and gingivitis of the pupils is still high (63.6% and 81.1%), the SMT index is 1.64; meaning that each student has an average of 1.64 permanent teeth. Comparing with the development trend of caries in the world, this index is low but it is also alarming for us in health care activities for pupils. Some recent studies also show that the rate of tooth decay and gingivitis is still high as Vinh Phuc (2010) the rate of tooth decay is 67.4%, gingivitis is 81.9%; Ninh Thuan (2012) rate of tooth decay is 46%, gingivitis is 37.9%; Gia Lam, Hanoi (2013) rates of caries were 61.1%, gingivitis was 41.9%. This difference can be explained by studies being conducted in different regions, the sampling method and the time of study are also different.

4.1.2. A number of factors related to the situation of tooth decay, gingivitis in pupils

4.1.2.1. Relation between knowledge, practice of preventing tooth decay, gingivitis of pupils

Our research results show that male pupils are 1.66 times more likely to get caries than female pupils. This may infer that male pupils do not have the same sense of reproductive health

as girls. The study shows that the proportion of pupils with knowledge of preventing tooth decay, gingivitis not reached still a high proportion (51.3%). The pupils still lack knowledge about disease signs, the causes of disease, the effects of disease and lack of knowledge about how to prevent disease.

Comparison between interviewing pupils on the practice of brushing and directly observing pupils brushing their teeth found that there was a difference in brushing and time to brush teeth. The percentage of brushed pupils brushing, brushing for 2 to 3 minutes in the observation group is lower than the interview. This shows that there is a need to strengthen the instruction for pupils to practice brushing more properly. A number of studies have also shown that the rate of pupils brushing incorrectly high as the study of Nguyen Huyen Trang (2012) is 46.07%; Le Huu Loc (2015) is 72.9%. Our research has shown that the link between improper brushing and the risk of tooth decay is higher than that of pupils brushing their teeth properly.

Pupils with knowledge, practicing of preventing tooth decay, gingivitis not reached have a risk of tooth decay, gingivitis is higher than those with knowledge, practicing of preventing tooth decay, gingivitis reached. This is consistent with the scientific basis of tooth decay as well as previous studies. It also shows that there is a need to pay more attention to the quality of communication and practices of preventing tooth decay, gingivitis of pupils to reduce the incidence of diseases.

4.1.2.2. Relation between practice of preventing tooth decay, gingivitis for pupils of parents and pupils

The results show that the relationship between preventing tooth decay, gingivitis for pupils of parents with the situation of tooth decay and gingivitis of pupils. Parents have practices of

preventing tooth decay, gingivitis for pupils not reached, pupils are at higher risk of tooth decay and gingivitis. It is understandable that the Pupil is the person who lives closest to the student and who also provides the knowledge and guidance for the pupils on their dental care practice skills.

4.1.2.3. Current situation of oral health care activities in 4 secondary schools

Qualitative research shows that health care activities for pupils in 4 schools participating in research are not effective. All schools have qualified health workers as mid-level nursing staff on the school staff, only know briefly about health care work since they were still in professional school. Most schools do not teach the content of reproductive health care for pupils, this content is only integrated into 8th grade Biology and civic education. Teachers lack the tools for teaching health

4 schools participating in the study all arranged 01 room to perform health care for pupils. However, there is no medical equipment to serve the health care for pupils. Funding for health care activities for pupils is mainly used for the first year health examination of pupils, including dental health checkups. Thus, 4 contents of the bank's banking program have not been implemented and are suitable with some studies such as Nguyen Le Thanh (2006), Dao Thi Dung (2007).

4.2. Evaluate the effectiveness of oral health care for pupils in some secondary schools

4.2.1. Effect on improving the situation of tooth decay, gingivitis in pupils and some related factors

Our study showed that the rate of pupils with caries reduced by 20.61% and the rate of gingivitis decreased by 44.43% after intervention compared to before. After the

intervention, the pupils had more knowledge about disease signs, the causes of disease, the harmful effects and knowledge of prevention of tooth decay, gingivitis. Since then, they have been conscious and proactive in health care for themselves, reducing the incidence of tooth decay and gingivitis.

Proper brushing (brushing 3 teeth, rotating brush, brushing teeth for 2-3 minutes) will help clean dental plaque and limit the residence of bacteria that cause tooth decay and gingivitis. From the pupils having more knowledge of preventing tooth decay, gingivitis, they will gradually change the habits in the practice of reproductive health. Percentage of pupils with have practice of preventing tooth decay, gingivitis reached after intervention of the intervention group increased compared to before intervention and compared with the control group. A number of studies have also shown that the effectiveness of intervention increases the practice of reproductive health for pupils, especially the guidance of pupils to brush teeth properly as the Emler study (1980), Hartono SWA (2002), Damle SG (2014).

Parents have an important role in preventing tooth decay, gingivitis for children, especially for children of school age. Parents will be an example for them to follow and guide and supervise their children in health care at home. After the communication intervention, providing information on reproductive health for parents, the rate of parents with have knowledge of preventing tooth decay, gingivitis increased. A number of studies have shown the effectiveness of PHS-related interventions for pupils such as Poul Erik Petersen (2004).

4.2.2. Effectively observe directly the practice of brushing pupils' teeth

Through direct observation, after the intervention, the pupils who brushed their teeth properly increased, the percentage of correct brushing pupils of the intervention group increased. Brushing your teeth properly with a brushing time of 2-3 minutes will help clean dental plaque, remove the habitat of bacteria that cause tooth decay, gingivitis, thereby leading to a reduction in the rate of deep pupils teeth, gingivitis. Thus, regular provision of knowledge on preventing tooth decay, gingivitis for pupils, especially instructing them to brush their teeth properly at school has helped them change their behaviors and have a habit of practicing reproductive health care. it's correct.

CONCLUDE

1. Situation and some factors related to tooth decay, gingivitis of grade 6 pupils in some secondary schools in Binh Xuyen district, Vinh Phuc province in 2014.

- The rate of tooth decay and gingivitis of pupils is still high (the rate of tooth decay is 63.6%, the SMT index is 1.64; the gingivitis is 81.1%).

- Some factors may be risk for tooth decay, gingivitis of pupils as follows: Male pupils (OR = 1.66; 95% CI: 1.17 - 2.36); pupils with knowledge of preventing tooth decay, gingivitis not reached (OR = 1.81; 95% CI: 1.27 - 2.58); pupils with practices of preventing tooth decay, gingivitis not reached (OR = 1.87; 95% CI: 1.31 - 2.67); Parents have practices of preventing tooth decay, gingivitis for pupils not reached (OR = 2.31; 95% KTC: 1.62 - 3.31); Health care activities for pupils in schools in Binh Xuyen district have not been fully and effectively implemented due to lack of investment and there is no close coordination between the Education sector and the Health sector.

2. Effective some oral health care interventions for pupils

Intervention solutions have been implemented and effectively in prevention of tooth decay, gingivitis for pupils, demonstrating:

- Reduce the rate of students with tooth decay (Q = -20.61%), gingivitis (Q = -44.43%). Increasing the rate of students with knowledge of preventing tooth decay and gingivitis has achieved (Q = 29.05%); increasing the rate of pupils brushing correctly by interview (Q = 20.08%) and by direct observation (Q = 18.01%); increase the rate of pupils with practices of preventing tooth decay, gingivitis (Q = 14.03%).

- Increasing the proportion of parents whose practice of preventing their children from tooth decay, gingivitis has achieved (Q = 8.15%).

REQUEST

From the findings in this study, we would like to propose some of the following recommendations:

1. Strengthen communication and education of reproductive health contents, guide pupils in the correct brushing skills at the school through key lectures or extra-curricular classes. In order to do this well, it is necessary to provide training for school health workers, teachers in charge of knowledge on reproductive health, oral care skills to guide pupils in proper brushing skills.

2. Arranging funds, ensuring medical facilities and equipment according to school medical regulations.

3. Enhancing the provision of information for parents about reproductive health care for pupils; guide and supervise pupils to implement their own reproductive health care at home.

4. Health care interventions for pupils at school should focus on communication and guidance on proper brushing skills in schools and communities.

LIST OF PUBLISHED ARTICLES RELATED TO THE THESIS

1. Nguyen Anh Son, Nguyen Tran Hien, Trinh Dinh Hai, Pham Thi Minh Phuong (2017), "The status of tooth decay, gingivitis and some related factors in pupils at 4 secondary schools at Binh Xuyen district, Vinh Phuc province in 2014", *Journal of Preventive Medicine*, Vol. 27, No. 9 - 2017, p. 114-122.

2. Nguyen Anh Son, Nguyen Tran Hien, Trinh Dinh Hai, Pham Thi Minh Phuong (2017), "The relationship between the practice of preventing tooth decay and gingivitis for parents of children with the status of tooth decay, gingivitis for pupils at 4 secondary schools in Binh Xuyen district, Vinh Phuc province in 2014", *Journal of Preventive Medicine*, Vol. 27, No. 9 - 2017, p. 123-129.

3. Nguyen Anh Son, Nguyen Tran Hien, Trinh Dinh Hai (2018), "The effectiveness of oral health care reduces the rate of tooth decay, gingivitis of secondary school pupils in Binh Xuyen district, Vinh Phuc province in 2016", *Journal of Preventive Medicine*, Vol. 28, No. 12 - 2018, p. 109-117.