SITUATION OF DENTAL CARIES AND GINGIVITIS AMONG ETHNIC MINORITY STUDENTS AT BOARDING SECONDARY SCHOOLS IN TUYEN QUANG PROVINCE IN 2017

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Abstract

Objectives: To describe the current status of dental caries and gingivitis among ethnic minority students at boarding secondary schools in Tuyen Quang province in 2017. ***Methods:*** A cross-sectional descriptive study on 1,665 ethnic minority students at 6 boarding secondary schools in Tuyen Quang Province. The characteristics of the incidence of dental caries and gingivitis were evaluated according to gender; the rates of caries of primary and permanent teeth were evaluated according to school; the rates of caries and the index of lost fillings of primary and permanent teeth, dental caries, the prevalence of tartar, and bleeding gums were evaluated according to school. ***Results:*** The rate of dental caries accounted for 59.3%, of which the rate of permanent tooth decay accounted for 52.3%; the rate of baby tooth decay was 44.6%. Among students with tooth decay, 44.4% had enamel caries; dentin caries rate accounted for 34.2%, and 21.5% had complicated caries. The index of decayed, missing, filled, teeth (DMFT) was 1.93, of which permanent teeth were 1.61, lost teeth were 0.20, and filling teeth were 0.11. The index of DMFT of milk teeth was 1.48, the index of decayed teeth was 1.21, the missing teeth were 0.15, and the filling teeth were 0.13. Gum disease accounted for 46.3% of the students studied. The rate of students with tartar was 34.1%. The average rate of students with bleeding gums was 12.3%. ***Conclusion:*** Dental caries, gingivitis, and tartar accounted for a relatively high rate among ethnic minority students at boarding secondary schools in Tuyen Quang Province.

Keywords: Tooth decay; Gingivitis; Secondary school; Tuyen Quang Province.

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INTRODUCTION

Tooth decay and gingivitis are the two common oral diseases in Vietnam and worldwide. The disease is diagnosed early, from the time the new tooth erupts (6 months old). If the disease is not treated promptly, it may cause local and systemic complications, affecting children's physical and aesthetic development in the future. According to the World Health Organization (WHO), about 5 billion people worldwide suffer from tooth decay and gingivitis, mainly in Asian and Latin American countries. Even in developed countries, up to 60 - 90% of school-age children have the disease. Dental caries is a problem that governments around the world are concerned about and offer many measures to solve [1]. In Vietnam, dental caries and gingivitis are still at a high level (over 70% of the population) and tend to increase, especially in places where the dental school program has not been well implemented, such as in mountainous, remote, and ethnic minority areas [2]. Prevention of tooth decay and gingivitis by preventive measures is a relatively simple, uncomplicated, low-cost process that is easy to implement in the community, especially at schools, with high efficiency. Tuyen Quang is a province in the northern midland and mountainous region. The province has many remote districts where many outdated customs and habits still exist as well as people's low understanding of health, especially dental health care for students has not been deployed to schools, communities, and people. Stemming from the above issues, we conducted this study: *To describe the current issue of dental caries and gingivitis among ethnic minority students at boarding secondary schools in Tuyen Quang province in 2017.*

MATERIALS AND METHODS

1. Subjects

Ethnic minority students at boarding secondary schools in Tuyen Quang province

* *Exclusion criteria*: Students did not agree to participate in the study.

* *Research time and place:* The study was conducted from September 2017 to October 2017 at all boarding secondary schools for ethnic minorities in Tuyen Quang province, including schools at Lam Binh, Chiem Hoa, Son Duong, Na Hang, Ham Yen, and Yen Son district.

2. Methods

* *Research design*: A cross-sectional descriptive study was conducted.

* *Sample size*: The sample size was calculated according to the formula:

$$n = Z^2_{\left(1-\frac{\alpha}{2}\right)} \frac{pq}{d^2}$$

n: The minimum sample size for each group of students (including 4 groups of students: 11, 12, 13, and 14 years old).

p: The prevalence of dental caries among primary school students in Yen Bai province is 64.95%, p = 0.6495 (according to Dao Thi Ngoc Lan's research 2003 [3]). Then q = (1-p) = 0.2882.

d: The desired accuracy is 0.05.

Z1- α/2: Z value obtained from Z table corresponding to the selected value, Z1- α/2 = 1.96 (corresponding to 95% significance level assigned confidence).

N = 349.8.

Thus, each group needed to investigate at least 350 students, equivalent to at least 1400 students in 4 groups. In fact, the study surveyed all students of 6 ethnic minority boarding secondary schools in Tuyen Quang province, with the student population of 1665.

* *Data collection:*

Develop a set of interview tools for students, parents, and school teachers with content according to research objectives in 2 forms of closed and open questions. The questionnaire was reviewed and edited after a pilot investigation, with contributions from public health experts, education experts, and investigators before officially collecting information.

- Develop content and forms to record interview and examination results.

- Recruitment and training of health staff to participate in the investigation. Dental and maxillofacial specialist staff of the provincial general hospital and other staff have experience in community research.

+ Oral examination to determine the rate of tooth decay, gingivitis, symptoms of dental disease, periodontal disease, and DMF index

* *Variables and evaluation criteria:*

Prevalence of dental caries, gingivitis according to gender; the rates of caries of primary and permanent teeth according to the school; the rates of caries and decay index of primary and permanent teeth, types of caries, prevalence of tartar, and bleeding gums according to the school.

Criteria for disease identification: Classification of BRM according to WHO (1998) [4].

* *Data processing*:

Data were entered using Excel 2016 software and processed with SPSS 22.0 software. Using descriptive statistics algorithms, calculating the mean.

3. Ethics

The study was approved by the medical ethics committee of the Military Medical Academy. All study participants signed a consent form to participate in the study. The information of research subjects is kept confidential. We affirm that our research was conducted with absolute impartiality and has no conflicts of interest.

RESULTS

Through studying the current situation of tooth decay and gingivitis at 6 ethnic minority boarding schools in Tuyen Quang province, we have drawn some results as follows:

Table 1. The proportion of students with dental caries and gingivitis by gender.

Diseases / Sex	n	Dental caries		Gingivitis	
		Amount	%	Amount	%
Male	702	336	51.8	254	39.1
Female	963	651	64.1	517	50.9
Total	1665	987	59.3	771	46.3

The prevalence of dental caries according to gender showed that more females were affected than males. The rate of gingivitis in females was also 50.9% higher than in that compared to 39.1%.

Table 2. Rate of dental caries by school.

Diseases / School	n	Milk tooth decay		Permanent tooth decay	
		Amount	%	Amount	%
Lam Binh	274	120	43.8	143	52.2
Chiem Hoa	279	108	38.7	133	47.7
Son Duong	274	117	42.7	137	50.0
Ham Yen	281	137	48.8	157	55.9
Na Hang	280	138	49.3	160	57.1
Yen Son	277	123	44.4	141	50.9
Total	1665	743	44.6	871	52.3

Regarding the type of tooth with decay, the rate of permanent tooth decay accounted for 52.3% while the rate of baby tooth decay was 44.6%. The rate of caries of primary teeth and permanent teeth was highest in Na Hang district. However, the difference was not statistically significant (p > 0.05).

Table 3. Index of DMFT of milk, and permanent teeth of students.

Characteristics	Milk tooth					Permanent tooth				
	n	Decayed	Missing	Filled	DMF	n	Decayed	Missing	Filled	DMF
Amount	743	901	108	94	1103	871	1406	176	100	1682
Index		1.21	0.15	0.13	1.48		1.61	0.20	0.11	1.93

The index of DMFT was 1.93, of which the index of permanent teeth was 1.61, lost teeth was 0.20, and filling teeth were 0.11. The decay index (smt) of milk teeth was 1.48, the decay index was 1.21, the missing teeth were 0.15, and the filling teeth were 0.13.

Table 4. Morphology of tooth decay in students (n = 987).

Condition	Permanent tooth		Milk tooth		Total	
	Amount	%	Amount	%	Amount	%
Tooth enamel decay	616	43,8	408	45,3	1024	44.4
Ivory worm	488	34,7	300	33,3	788	34.2
Worms have complications	302	21,5	193	21,4	495	21.5
Total	1406	100	901	100	2307	100

A general assessment of tooth decay morphology in students showed that 44.4% of students had enamel caries. The rate of dentin caries accounted for 34.2%, and 21.5% of the students had complicated dental caries.

Table 5. Rate of tartar and gingivitis among students by school.

Diseases / School	n	Normal		Tartar		Bleeding gums	
		Amount	%	Amount	%	Amount	%
Lam Binh	274	132	48.2	113	41.2	29	10.6
Chiem Hoa	279	156	55.9	96	34.3	27	9.7
Son Duong	274	156	56.9	91	33.2	27	9.9
Ham Yen	281	164	58.4	84	29.9	33	11.7
Na Hang	280	130	46.4	105	37.5	45	16.1
Yen Son	277	156	56.3	78	28.2	43	15.5
Total	1665	894	53.7	567	34.1	204	12.3

The rate of students with tartar was 34.1%, of which the highest was Lam Binh school, accounting for 41.2%. The average rate of students with bleeding gums was 12.3%, of which the highest was at Na Hang with 16.1%.

DISCUSSION

During the study on the situation of dental caries and gingivitis among ethnic minority students at boarding secondary schools in Tuyen Quang province in 2017, we conducted a survey on 6 schools with 1665 students. The survey showed that the proportion of male students accounting for 39.0% was not statistically significant compared to 61.0% of female students. The results of our study showed that the overall rate of dental caries among male students was 51.8%, lower than that of female students (64.1%), and the difference was not statistically significant. According to WHO, about 5 billion people worldwide suffer from dental disease, mainly in Asian and Latin American countries; in developed countries, it is not inferior to 60 - 90% of school-age children suffering from the disease [4]. Currently, dental caries have become a matter of concern worldwide. According to a statistical study by WHO, in some countries between 1994 and 2008, the rate of children aged 7 - 12 with dental caries was very high, over 80% [5]. In Vietnam, according to the results of the "National Oral Health Survey" conducted by the Institute of Odonto-

Stomatology in Ho Chi Minh City, the rate of children with tooth decay in the 6 - 8 age group is 25.4% and increased by age group: 54.6% in the 9 - 11 age group, 64.1% in the 12 - 14 year-old group, and 68.6% in the 15 - 17 year-old group, respectively [3]. The survey also found that two-thirds of 6 - 12-year-old children do not have regular dental check-ups, resulting in 85% of secondary school students having tooth decay and 100% not performing adequate brushing 3 times a day [6]. These children often neglect, avoid brushing their teeth, or just rinse their mouth with cold water before bed. This is of great concern as poor oral hygiene will create conditions that cause tooth decay, affecting the overall health.

There have been many studies on the rate of tooth decay in children in different locations. Our overall dental caries rate of 59.3% is also higher than the study of Nguyen Thi Thinh and Nguyen Huyen Trang (2015) when investigating 408 students from junior high school in Chuong My district, Hanoi from 2011 - 2012, showed that the overall rate of tooth decay was 14.95%, while the rate of caries missing fillings was 0.12%, 0.27% for males and 0.3% for females [7]. After the merger of Hanoi in 2012, middle school students' permanent tooth decay rate was 17.04% [8]. And Dao Thi Lan (2003) showed that the overall rate of baby tooth decay for 6 ethnic groups was 64.95%, of which the highest rates were 80% (H'Mong) and 72.84% (Tay) [3].

The distribution of tooth decay rates by gender in this study showed that the rate of tooth decay among male students was 51.8% and 64.1% among female students. This result is similar to the study of Tran Tan Tai (2016) in Thua Thien Hue on the rate of tooth decay [9]. In an environment without regular dental care, the rates of tooth decay or dental disease between men and women are the same, and there is no difference between men and women.

Regarding the type of tooth with decay, the rate of permanent tooth decay accounted for 52.3%, while the rate of baby tooth decay was 44.6%. The rate of caries of primary teeth and permanent teeth was highest in Na Hang district. However, the difference in the rate of tooth decay in the schools was not statistically significant ($p > 0.05$). This result is opposed to the research results of Tran Tan Tai in Thua Thien Hue, the rate of baby tooth decay accounted for 67.2%, and permanent tooth decay was 45.2% [9]. According to research by Dao Thi

Ngoc Lan (2002), the rate of baby tooth decay was 64.95%, and permanent tooth was 41.04%. This result gives our research a higher rate of baby tooth decay and a lower rate of permanent tooth decay. Research by Dao Thi Ngoc Lan showed that the Central Highlands ethnic groups have the highest rate of caries (80%), followed by the Tay (72.84%) and Dao (70.69%); the difference between ethnic groups was statistically significant ($p < 0.05$) [3].

The characteristics of the decay index of missing fillings showed that the decay index of milk teeth was 1.48, and the decay index of permanent teeth was 1.93. The rate of tooth decay was high; on average, each child has 1.61 permanent teeth and 1.21 baby teeth. The average number of baby teeth lost due to decay was 0.15 per child, and permanent tooth loss was 0.20. Although decayed teeth were high, the dental index was very low, 0.13 for both baby teeth and 0.11 for permanent teeth. In 2001, Tran Van Truong et al. reported the status of children's dental caries according to the results of the National Oral Health Survey (2000), the rate of caries in children 9 - 11 years old was 56.3% for baby teeth, 54.6% for permanent teeth and DMFT index was 1.96 for baby teeth, 1.19 for permanent teeth [6]. It can be seen that although there are some differences when compared with the results of other studies, in general the rate of tooth decay among middle school students is still quite high. The above differences may be due to differences in research areas with different characteristics of habits, lifestyles, and customs of students and parents.

Besides tooth decay, gingivitis and tartar were also oral health problems that need attention in the study group. Risk factors for gingivitis are local and systemic factors that affect plaque accumulation or alter the response of periodontal tissues to dental plaque. Gingivitis appears very early when dental plaque has formed for 7 days. Bacteria in dental plaque stimulate gingivitis, bleeding gums, and enamel damage. Our research results show that the percentage of students with tartar is 34.1%, of which the highest is Lam Binh School, accounting for 41.2%. The average rate of students with bleeding gums was 12.3%, the highest at Na Hang with 16.1%. Our rate of gingivitis was 46.3%, lower than the results of Nong Bich Thuy, who gave the rate of students with gingivitis at 64.9% in which bleeding gums (CPITN 1): 18.4%, with tartar (CPITN 2): 46.5%. The percentage of students

with dental deposits was 39.2%. The simple deposition index (DI-S) was 0.25; 100% of students have a Normal Dean score. Our rate of gingivitis was also lower than that of research by Dao Thi Ngoc Lan (the rate of gingivitis was 57.88%) [3]. Our research results are lower than those of the above authors because they conducted research a long time ago, currently due to socio-economic development as well as awareness and attitudes towards health care. Oral health increased, combined with school dental programs, thereby partly reducing the rate of gingivitis compared to previous times.

CONCLUSION

The survey results at boarding secondary schools for ethnic minority students in Tuyen Quang province in 2017 showed that the percentage of ethnic minority students with dental caries was quite high, with 59.3% of students infected. The rate of permanent tooth decay accounted for 52.3%; the rate of milk tooth decay was 44.6%. Among students with tooth decay, 44.4% had enamel caries; dentin caries rate accounted for 34.2%, and 21.5% had complicated caries. The index of DMFT was 1.93, of which permanent teeth were 1.61, lost teeth were 0.20, and filling teeth were 0.11. The index of DMFT of milk teeth was 1.48, the index of decayed teeth was 1.21, the missing teeth were 0.15, and the filling teeth were 0.13. Gum disease accounted for 46.3% of the students. The rate of students with tartar was 34.1%. The average rate of students with bleeding gums was 12.3%.

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