Dental caries and oral hygiene status among 6-8 years old schoolchildren in Hanoi and Langson cities, Vietnam

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Abstract

Objective: The purpose of this study was to determine dental caries, oral hygiene and access to dental care among 6-8 year-old schoolchildren dwelling in Langson and Hanoi cities.

Materials and Methods: This study was secondary data analysis from Vietnam Five Cities Oral Health Survey (VFCOHS) in 2010. Schoolchildren's oral health was examined using WHO oral survey methods. This study focused on 1,488 schoolchildren aged 6-8 year-old from Northern cities in the VFCOHS data namely Langson (highland) and Hanoi (metropolitan) cities. The study was approved by the Ethical Research Committee from Mahidol University.

Results: Out of 1,488 schoolchildren, 888 from Langson cities and 600 from Hanoi, there were 91.3% affected by caries. In primary dentition, highland schoolchildren had caries prevalence of 93.8% and experience (dmfs = decayed, missing and filled surfaces) of 14.50 (SD=12.14) whereas metropolitan schoolchildren had caries prevalence of 87.5% and dmfs of 6.73 (SD=8.02). In permanent dentition, highland schoolchildren had caries prevalence of 10.1% and DMFS of 0.46 (SD=1.63) while metropolitan schoolchildren had caries prevalence of 19.3% and DMFS of 0.79 (SD=1.91). Findings indicated that schoolchildren with poor and fair oral hygiene had caries twice more than schoolchildren with good oral hygiene (OR 2.09, CI 95%=1.08-4.06). Moreover, highland schoolchildren had higher untreated caries than their counterpart (OR 1.9, CI 95%=1.34-2.71). In addition, all of permanent carious teeth were untreated.

Conclusion: This study was revealed differences of access to dental care between metropolitan and highland cities and confirmed that oral hygiene related to dental caries.

Key words: access to dental care, primary dentition, dental caries, untreated caries, oral hygiene, schoolchildren, residential area.

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Introduction

Dental caries is one of the most important public health problem challenges in worldwide, and it is one of the common chronic diseases in childhood. World Health Organization (WHO, 2013) revealed that oral disease impedes all aged - activities and causing millions of school and work-hours to be lost each year throughout the world. Dental caries in primary teeth can lead on negative impact of children health in both short and long-terms of their lives [1-2]. In the number of developing countries caries prevalence has been affecting 60-90% of schoolchildren [2]. Vietnam is a developing country which is located in Southeast Asia, with the 13th most populous country in the world, having a population of over 90 million. Vietnam country consists of 58 provinces and 5 municipalities and has 54 different ethnic groups, with the main group representing 87% of total population. The others are ethnic minorities scattered all over the country, mostly in mountainous and remote areas.

The most recent national dental survey in Vietnam (2001) indicated that 85% of children 6 to 8 years of age had dental caries experience; 90.2 % have at least one primary tooth with untreated decay [3]. In March 2010 Faculty of Dentistry, Hanoi Medical University carried an oral health survey of schoolchildren between 4 -8 years old among five regions in Vietnam (Vietnam Five Cities Oral Health Survey: VFCOHS). This survey's sampling method was a multi-stage random sampling. There were some limitations on the previous report because the survey reported prevalence of dental caries in children 4 to 8 years old as one group. There was no report of inequality and dental caries between highland and metropolitan areas. Literature reviews showed that caries prevalence was different due to urbanization. At the age of 6 years old in the Burkina Faso, Africa, the prevalence of dental caries was higher between urban children (46%) and that of the rural children (32%) ($p < 0.01$) [4]. Therefore, in this study, the two cities were selected based on the difference of setting areas namely Hanoi and Langson cities. These two cities are different dwelling places for people from various ethnics, background and economic status. Hanoi is the capital city of Vietnam and it is one of the fast growing cities in the country, located on the centre of North Vietnam. Hanoi is the heart of commercial activities and settle of the central government. Hanoi economy is economic 93 % based on business. Dental personnel per population in Hanoi were 10: 100,000 (2011). Langson city, on the other hand, is a frontier mountainous province in the North-East of Vietnam. It is located approximately 125 km from Hanoi city to the Northeast. Langson's economy is 80% based on agriculture and forestry. Dental personnel per population in Langson were 2:100,000 (2011). Currently, information on dental health status in these two cities and accessibility conducted across residential areas was limited. Little is known about dental health nowadays since the Vietnam National Oral Health Surveys were more than 10 years ago.

Material and methods

The Vietnam Five Cities Oral Health Survey (VFCOHS) was a cross-sectional survey conducted by Faculty of Dentistry, Institute of Odonto Stomatology, Hanoi Medical University, Vietnam. The survey aims of VFCOHS were to describe primary and permanent caries of Vietnamese children aged from 4 to 8 as one group. A total of 7,774 schoolchildren ages 4-8 from a representative five cities of Vietnam were selected by multi-stage random sampling method. Clinical examination of caries was performed by using WHO criteria (1997)[5]. For oral hygiene status, the OHI-S criteria (Greene

and Vermilion, 1964)[6] were used. The examination was carried out by using "Dentlite" and WHO/CPI probe. Unfortunately, there are no reports regarding oral health status on 6-8 years old in particular.

This study was a secondary data analysis of VFCOHS which focused on 1,488 schoolchildren aged 6-8 year-old from Northern cities in Vietnam. Hanoi was recognized as one of urban cities while Langson was considered as one of rural cities. The present study has intention to highlight the caries experience among 6-8 years old and comparing caries experience and residential areas.

The study was reviewed and approved from the Ethics Research Committee, Institute of Odonto Stomathology, Hanoi Medical University and Mahidol Institutional Review Board (MU-DT/PY-IRB 2013/013.0103)

Results

1. Caries status of schoolchildren in primary dentition

Figure 1 described primary dental caries experience by residential areas. Caries prevalence in primary dentition was approximately 91.3 % of both cities. Schoolchildren dwelling in Hanoi cities had caries evidence 87.5%, whereas schoolchildren dwelling in Langson city had caries prevalence 93.8 %.

Table 1 described primary dential caries experience using mean dmft and dmfs by residential areas. Mean (SD) of caries in the primary dentition in both cities was 5.63(3.67). The mean (SD) dmft was 6.77 (3.67) in Langson city and 3.94 (2.96) in Hanoi city. This dmft in Hanoi city was lower than those in Langson city. Moreover, mean (SD) dmfs of schoolchildren in Hanoi city was 6.73 (8.02) lower than those mean (SD) dmfs of schoolchildren in Langson city 14.50 (12.1).

2. Caries in permanent dentition

Approximately 14 schoolchildren out of 100 schoolchildren had caries in their permanent teeth and all of caries was untreated. Caries experience in permanent dentition by residential areas was showed in Table 2. Highland schoolchildren had caries prevalence of 10.1% and experience DMFS of 0.46 (SD=1.63) while metropolitan schoolchildren had caries prevalence of 19.3% and DMFS of 0.79 (SD=1.91).

3. Associations between dental caries and velated factors

Table 3 showed an association between caries status and oral hygiene status. It is observed that among schoolchildren who had poor and fair oral hygiene were more likely to

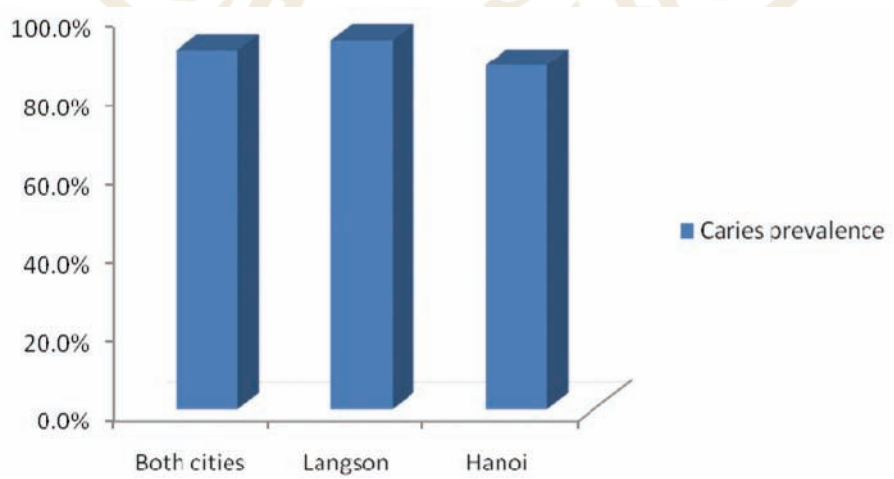

Figure 1 Distribution of caries experience in primary dentition by residential areas among schoolchildren 6-8 years old in Langson and Hanoi cities (n=1,488)

have caries twice (OR 2.09, CI95% 1.08-4.06) more than schoolchildren those who had good oral hygiene. This association was significant with p-value = 0.025.

The result revealed that those schoolchildren who live in Hanoi city were less affected by caries (88.7%) than those live in Langson city (93.2%). There was a significant association between caries status and residential areas with p- value = 0.002; (OR 1.76, CI 95% 1.23-2.54) as shown in Table 4.

Table 5 showed an association between access to dental care and residential areas among 6-8 years old schoolchildren. In this study, the proportion of untreated caries among schoolchildren was measured for dental care

Table 1 Caries experience in primary dentition among schoolchildren 6-8 years old by residential areas (n=1,488)

Variables	dmft* Mean ± SD	dmfs** Mean ± SD
Total	5.63± 3.67	11.37±11.33
Residential areas		
Langson	6.77 ± 3.67	14.50±12.1
Hanoi	3.94 ± 2.96	6.73 ± 8.02

* "dmft" indicates decayed, missing, and filled teeth with reference to primary dentition.
**"dmfs" indicates decayed, missing, and filled surfaces teeth with reference to primary dentition.
SD = Standard Deviation

Table 2 Mean DMFS and caries prevalence among schoolchildren 6-8 years old in residential areas (n=1,488)

Variables	DMFS* Mean ± SD	Caries Prevalence n (%)
Total (n=1,488)	0.59±1.76	206 (13.8)
Residential areas		
Langson (n=888)	0.46±1.63	90 (10.1)
Hanoi (n=600)	0.79±1.91	116 (19.3)

*"DMFS" indicates decayed, missing, and filled surfaces with reference to permanent dentition.

Table 3 An association between oral hygiene and dental caries status among schoolchildren 6-8 years old in Langson and Hanoi cities, 2010 (n=1,488)

Oral hygiene status	Number (%) of caries status		OR (95% CI)	p-value
	Caries	Caries free		
Fair to poor	205 (95.3)	10 (4.7)	2.09 (1.08-4.06)	0.025
Good*	1155 (90.7)	118 (9.3)		

* Reference group
OR=Odds ratio
CI=Confident interval

accessibility. There were a lower proportion of schoolchildren with untreated caries in Hanoi than those schoolchildren in Langson. The analysis showed that there was significant association between residential areas and access to dental care with odds ratio 1.90 (95% CI 1.34-2.71).

Discussions

Oral health status in schoolchildren 6-8 years old in Langson and Hanoi city (2010)

It was ten years apart between the 2nd National Oral Health Survey in Vietnam (2001) and the Vietnam Five Cities Oral Health Survey (2010). From findings of this study, caries experience among schoolchildren living in Langson and Hanoi cities were remained a significant problem despite the fact that the school based dental programs in Vietnam were launched. Caries experience of primary dentition (91.3%; mean dmft: 5.63) in both cities in this study was even higher than the 2nd National Oral Health Survey in Vietnam (84.9%; mean dmft: 5.40) [3]. As we know that dental caries is a multifactorial disease, school based dental programs in Vietnam which had only health education component may be limited in decreasing burden of caries. It is a need to be change health education strategies and also included other preventative strategies into the Vietnam school based dental programs.

An association between oral hygiene and dental caries status

The finding revealed that schoolchildren with poor and fair oral hygiene had higher caries experience than other groups significantly (p = 0.025). This agreed with a Nigerian study which reported that poor oral hygiene was a risk factor for increasing dental caries (p<0.001) [7,8]. In this study, oral hygiene was identified as one of factors significantly association with caries experience; therefore, prevention among

Table 4 An association between caries status and residential areas (n=1,488)

Residential areas	Number (%) caries status		OR (95% CI)	p-value
	Caries	Caries free		
Langson	828 (93.2)	60 (6.8)	1.76 (1.23-2.54)	0.002
Hanoi*	532 (88.7)	68 (11.3)		

*Reference group
OR=Odds ratio
CI=Confident interval

Table 5 An association between access to dental care (untreated caries) and residential areas among 6-8 years old schoolchildren living in Hanoi and Langson cities, 2010 (n=1,488)

Residential areas	Access to dental care		OR (95% CI)	P-Value
	untreated caries	treated caries		
Langson (n = 888)	826 (93.0)	62 (7.0)	1.90 (1.34-2.71)	<0.001
Hanoi * (n = 600)	525 (87.5)	75 (12.5)		

*Reference group
OR=Odds ratio
CI=Confident interval

schoolchildren in order to promote good oral hygiene habits should be lauched in a School Based Dental Program such as brushing teeth after lunch at school and before bedtime.

An association between untreated caries and residential areas

All of decay on permanent teeth of this age group had not been treated (100%). Schoolchildren dwelling in Langson city had 93% untreated caries in their primary teeth. On the other hands, those schoolchildren dwelling in Hanoi city had 87% of untreated primary teeth. It is shown that schoolchildren dwelling in highland city had significantly higher untreated decay than those dwelling in metropolitan city OR = 1.9 (95% CI 1.34-2.71). The result was consistent with a study in Scotland (2010) showed that urban-rural differences for untreated decay were significant OR = 0.63 (95% CI 0.50- 0.79) [9]. Untreated dental decay can lead to numerous dental treatment, tooth pain, and potential tooth loss [10]. Hence, substantial contribution may not only routine oral health education as providing in a school based dental program in Vietnam but new strategies such as Minimal Intervention(MI) approach, will be needed to be included in a school based dental program in Vietnam. Other preventative methods such as dental sealants, fluoride application programs should be also included in reducing burden of future caries.

In conclusion, about 91% of schoolchildren affected by caries and those schoolchildren who had caries were more likely to live in a highland city and had either poor or fair oral hygiene status. In addition, these 6-8 years old schoolchildren had not been received any dental treatments on their permanent carious teeth. These number of active decayed can be reduced by Minimum Intervention (MI) approach. Therefore, dental personals should integrate dental clinical prevention within a school based dental program in order to increase accessibility of dental health services among schoolchildren particularly in highland cities. This study also was highlighting the difference of access to dental care between metropolitan and highland cities and confirmed the association between oral hygiene and caries.

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