M Uetani
M Jimba
T Kaku
K Ota
S Wakai

Oral health status of vulnerable groups in a village of the Central Highlands, southern Vietnam

Authors' affiliations:
Miyuki Uetani, *Masamine Jimba*, *Susumu Wakai* Department of International Community Health, The University of Tokyo, Tokyo, Japan
Taijin Kaku Department of Microbiology, The University of Kyoto, Kyoto, Japan
Kaori Ota Nippon International Cooperation (NICCO), Kyoto, Japan

Correspondence to:
Masamine Jimba
Department of International Community Health
Graduate School of Medicine
The University of Tokyo
7-3-1 Hongo
Bunkyo-ku
Tokyo 113-0034
Japan
Tel.: +81 35841 3697
Fax: +81 35841 3422
E-mail: mjimba@m.u-tokyo.ac.jp

Dates:
Accepted 10 November 2005

To cite this article:
Int J Dent Hygiene **4**, 2006; 72–76
Uetani M, Jimba M, Kaku T, Ota K, Wakai S. Oral health status of vulnerable groups in a village of the Central Highlands, southern Vietnam

Abstract: *Objectives:* Oral health status of vulnerable people in developing countries tends to be given lower priority than other health issues. Consequently, few studies have examined the oral health status of the poor and minorities in developing countries. We aim to examine the dental caries and periodontal status, and explore the risk indicators of dental caries between two ethnic groups in rural villages in southern Vietnam. *Methods:* We examined the caries status and its risk indicators of 150 participants (Co-Ho minority and Kinh majority) living in a hamlet of Dangphuong village in Vietnam. We also assessed periodontal status of the participants aged 14 and over by Community Periodontal Index. *Results:* We first found that dental caries were highly prevalent among both the Co-Ho minority and Kinh majority groups. Second, the higher numbers of dental caries among children with primary teeth were associated with a higher frequency of consuming sweets. Third, most people (87%) aged 14 and over had periodontal problems. Finally, the Kinh majority tended to have more dental caries than Co-Ho among people aged less than 30. *Conclusion:* Oral health promotion should be considered as a part of the development programmes for vulnerable groups in Vietnam and other developing countries.

Key words: dental; ethnic minority; oral health; rural; Vietnam

Introduction

Oral health and general health are inter-related. Poor nutritional status, for example, affects tooth development and oral soft tissues (1). Severe periodontal disease is associated with

diabetes (2). Also, pain and disability that result from oral diseases affect our quality of life, changing how we chew, speak, taste and smile. However, oral health has been given lower priority than other health problems, especially among vulnerable groups such as the poor and minorities in developing countries.

The Central Highlands in southern Vietnam is one of the rural areas where the poor and many ethnic minorities live. Although rapid economic reforms (*Doi Moi*) brought about considerable poverty reduction and urbanization into Vietnam, the poverty rate in the area has remained at about 52% (3). Previous studies have reported that health inequality has significantly increased between the rich and the poor, and between the Kinh majority and other 52 ethnic minorities after *Doi Moi* (4, 5). Similarly, the poor and ethnic minorities in this area cannot easily get access to dental care because dental care in Vietnam was mainly cure-oriented and urban-centred (6). Although a national oral health survey in Vietnam showed the status of oral diseases among the Vietnamese in urban and rural, it did not focus on the poor and minorities (7).

To improve their quality of life and health, the government and other international organizations have initiated programmes for the vulnerable groups in the Central Highlands. However, they have placed a lower priority on oral health compared with other health problems, such as infectious diseases. Consequently, few studies have assessed the oral health status of the poor and minorities living in the Central Highlands, where most people live in poverty.

Since the most common oral diseases of concern are dental caries and periodontal disease, it is important to examine them to estimate the oral health status of the target population. In addition, dental caries are irreversible tooth defects of tooth that are largely influenced by lifestyle and behaviours. Investigating risk indicators for dental caries is useful in developing cost-effective and appropriate programmes aimed at improving the oral health of people living in rural communities.

The objective of this study was to examine the oral health status and explore which potential risk indicators contribute to dental caries among the poor and minorities in a village of the Central Highlands of Vietnam.

Study participants and methods

Study site

This study was carried out as part of a survey implemented by Nippon International Cooperation (NICCO), a non-profit, non-governmental development organization in Japan. In 2003, NICCO conducted a dental and medical survey in the Dangphuong village in Lam Dong Province in southern Vietnam.

The village is located in a mountainous area, about 1050 m a.s.l. According to a household survey by NICCO in 2003, the population of the village was 4829 with 1024 households. The main ethnic groups are the Kinh majority, Co-Ho, Khmer and Hoa. For the villagers, it takes more than half-a-day to walk to visit the two local dentists working in the Lam Ha Hospital. Accessibility to markets had been difficult for villagers until the road to the nearest market was improved in the late 2001.

Data collection

We selected one hamlet in the Dangphuong village, where Co-Ho minority group live clustered together with a small number of members of the Kinh majority. The Co-Ho has been listed as one of the poorest ethnic minorities in Vietnam, with a poverty rate of more than 80% in 2002 (8). The main portion of the hamlet is made up of 514 villagers living in 90 households. They earn their living by agriculture and are the poorest people in the village. Other villagers in the hamlets were not identified because their households were scattered in the mountains.

Before conducting this study, we had carried out oral examinations and informal interviews with nearly 200 villagers to learn about their oral health situation in 2002. Based on the interviews, we selected questions related to dental caries from the questionnaire 'Oral Health Indicators and Determinants for Population Health Survey' developed by Locker (9). In addition to the modified questionnaire, we added a question regarding the newly improved road to the market as a possible factor for their increased sugar consumption. This is because, in our previous survey, more than 50% of villagers who ate sweets indicated that it became easier for them to get to the market after the road was improved (NICCO, 2002; unpublished report).

We selected the following variables from the survey to be used as the explanatory variables: age, gender, ethnicity, length of school attendance, frequency of taking sweets; frequency of having snacks between meals; frequency of toothbrushing; pattern of visiting dental care providers; experience of having heard about oral health (tooth decay, how to brush your teeth); self-evaluation of one's oral health status. We included one other question: whether they consumed sweets more frequently after the road was improved.

For the oral health survey, we examined 150 participants from 53 households by convenience sampling in August 2003.

To recruit the participants, staff members of NICCO distributed serial number cards to 514 villagers in 90 households that we had identified, and notified them of the check-up before the survey. Then, 195 participants from 56 households came to the check-up; we could not examine 45 participants due to scheduling difficulties. As for ethnic groups, only Co-Ho and Kinh were included.

We examined dental caries and periodontal status based on the criteria of World Health Organization (WHO) (10). The dental caries were recorded by using Decayed, Missing and Filled Teeth (dmft/DMFT) Index for all the participants. By convention, dmft refers to the status of primary teeth and DMFT refers to permanent teeth. As for periodontal status, we examined the participants aged 14–81 by Community Periodontal Index (CPI; healthy, bleeding gingival, calculus, 4–5 mm periodontal pocket, 6+mm periodontal pocket). To improve reliability, one dentist (MU) examined dental caries and periodontal status for all the participants.

The explanatory variables were asked by using a structured questionnaire for the participants aged 14–81. For children aged less than 14, we asked their mothers two questions: child's frequency of taking sweets and toothbrushing.

Lam Dong People's committee approved this study and we obtained informed consent from each participant and the children's mothers.

Data analysis

The group of the data was defined into three categories based on WHO criteria: we divided the participants aged less than 30 into two groups according to dentition (primary or permanent); the participants who had primary teeth (the primary teeth group) and the participants who had permanent teeth (the younger group). The group of participants aged 30 and over was defined as the older group.

We then calculated dmft/DMFT score. For the primary teeth group and the younger group with permanent teeth, however, missing teeth (m/M-component) was excluded because it was difficult to determine exactly whether teeth were lost due to caries, especially for children who have mixed dentition. Then, for binary variables (gender and ethnicity, experiences of having heard about oral health), Fisher's exact tests and Wilcoxon signed rank tests were used to clarify the associations with the prevalence and the number of dental caries. Spearman's rank correlation coefficient was also used to investigate the relation between the number of dental caries and explanatory variables other than binary variables.

These statistical analyses were done using SPSS software (version.11.0 for Windows; SPSS Inc., Tokyo, Japan).

Results

Demographics of the participants

The structure by age, gender and ethnicity of the participants in this study was shown to be similar to that of the hamlet population as a whole.

Oral hygiene behaviour: description of explanatory variables

The proportions of the participants who had never brushed their teeth were 82% for the primary teeth group, 37% for the younger group and 17% for the older group. Of the total participants, 22% of the respondents ate snacks between meals more than once a day. As for consuming sweets, 43% of the primary teeth group, 40% of the younger group and 37% of the older group consumed them more than once a week. Altogether, 81% had never visited dental care providers and 76% had never heard about oral health. In particular, the Co-Ho were less likely to have heard about oral health than the Kinh (OR: 6.0; 95%CI: 1.2–14; $P = 0.014$). Eighty per cent respondents aged 14 or over agreed that their opportunity to buy sweets had increased after the road was improved.

Dental caries and periodontal status

The Decayed and Filled Primary Teeth (dft) score of Co-Ho was about half of that of Kinh, which was statistically significant ($P = 0.036$) (Table 1). The Decayed and Filled Permanent Teeth (DFT) score of Co-Ho in the younger group was also lower than that of Kinh ($P = 0.009$). Furthermore, the younger group of the Kinh had more dental caries than the Co-Ho (OR: 1.8; 95%CI: 1.5–2.2; $P = 0.001$) (Table 2). Between males and females, no significant differences were detected in the dft/DFT score in the primary teeth group or the younger group with permanent teeth. For the older group, no statistically significant association was found between the number of dental caries and gender or ethnicity (Table 2).

About 93.5% of the participants aged 30 and over and 75.0% of the participants aged less than 30 years old had periodontal problems (Table 3). Of these, 67.3% of those aged less than 30 and 89.2% of those aged 30 and over had CPI of 2 and more, indicating the presence of calculus, shallow pockets or deep pockets. Furthermore, the participants aged 30 and over were less likely to have healthy periodontal status than those

Table 1. **Dental caries status among the participants aged less than 30**

	Primary teeth				Permanent teeth			
	n	Prevalence (%)	dft median	IQR	*n*	Prevalence (%)	DFT median	IQR
All	60	38 (63.3)	2.0	0.0–6.0	78	49 (47.6)	1.0	0.0–3.0
Gender								
Male	27	19 (70.4)	2.0	0.0–7.0	30	18 (60.0)	1.0	0.0–2.3
Female	33	19 (57.6)	1.0	0.0–4.0	48	31 (64.6)	1.0	0.0–3.0
Ethnicity								
Co-Ho	50	30 (60.0)	2.0	0.0–4.0	65	36 (55.4)	1.0	0.0–3.0
Kinh	10	8 (80.0)	7.0	0.0–11.0	13	13 (100.0)	2.5	0.0–3.0

dft, decayed and filled primary teeth; DFT, decayed and filled permanent teeth; IQR, interquartile range (25th-75th percentiles).

Table 2. **Dental caries status among the participants over age 30**

	n	Prevalence (%)	DMFT median	IQR
All	46	41 (89.1)	4.0	2.0–10.3
Gender				
Male	19	17 (89.5)	4.0	1.0–11.0
Female	27	24 (88.9)	4.0	2.0–10.0
Ethnicity				
Co-Ho	40	36 (90.0)	4.0	2.0–9.8
Kinh	6	5 (83.3)	6.0	2.3–16.8

DMFT, decayed, missing and filled permanent teeth.

Table 3. **Periodontal status among the participants aged between 14 and 29 or 30 or over**

Age	*n*	Healthy	Bleeding	Calculus	4–5 mm periodontal pocket	6+ mm periodontal pocket
14–29	40	10 (25.0)	4 (10.0)	19 (47.5)	6 (15.0)	1 (2.5)
30+	46	3 (6.5)	2 (4.3)	20 (43.6)	19 (41.3)	2 (4.3)

aged less than 30 (OR: 4.8; 95%CI: 1.2–18.8; $P = 0.032$). Periodontal status did not differ significantly by gender or ethnicity.

Associations between explanatory variables and dental caries

For the primary teeth group, the higher dft score was correlated with a higher frequency of taking sweets (rs = 0.64; $P < 0.001$). As stated above, the dft of the Co-Ho was significantly lower than that of Kinh. Other variables were not statistically associated with the dft.

For the younger group, a statistical difference was indicated between Co-Ho and Kinh with respect to the prevalence and the DFT ($P = 0.001$, $P = 0.009$, respectively). The participants with higher DFT tended to evaluate their oral health status as poorer than those had lower scores (rs = −3.4; $P = 0.032$). In addition, an inverse association was detected between the DFT score and the frequency of toothbrushing (rs = −0.30; $P = 0.01$).

In the older group, no statistically significant association was detected between any of the explanatory variables and DMFT. However, the participants with a higher number of dental caries perceived their oral health status as poorer than those who with the lower number (rs = −0.30; $P = 0.04$).

Discussion

This study revealed four important findings regarding the oral health among the poor and minorities living in Dangphuong village of the Central Highlands. First, dental caries were prevalent among these groups. Second, the higher numbers of dental caries among children with primary teeth were associated with a higher frequency of consuming sweets. Third, most people aged 14 or over had periodontal problems. Fourth, the Kinh majority tended to have more dental caries than Co-Ho among people aged less than 30.

Compared with the results seen in rural areas assessed by the national oral health survey (7), the results of this study showed a slightly higher prevalence of dental caries among people aged 6–11 and 18 and older. Likewise, the mean dmft/DMFT scores in this study were a little higher than those in the studies on the minority of highlands in Thailand and Nepal (11, 12). We assume such unfavourable dental caries status in our target groups may be associated with their poor nutritional status as inadequate nutrition, especially during tooth development, could affect the susceptibility to dental caries (1). According to the results of medical examinations for 295 villagers in Dangphuong, most children were suffering from mild malnutrition and 49% ($n = 133$) villagers had intestinal worms; moreover, most mothers did not give their babies appropriate complementary food (NICCO, 2002; unpublished data). Regarding the nutritional status of the vulnerable groups in Vietnam, previous studies also reported that children of such groups tended to be malnourished (4). However, further studies are needed to confirm the influence of nutritional status on their dental caries status because dental caries is a multifactoral disease.

This study showed that the higher frequency of taking sugary food was associated with higher numbers of dental caries in the primary teeth. As many previous studies have shown, the frequency of taking sugary products is one of the risk factors for dental caries (1). This tendency indicated that sweets have already unfavourably affected their oral health, though sweets were comparatively less available in the remote location due to poverty. The improved road may be one of the factors for the increased frequency of taking sugary food as 80% participants responded that their chances to buy sweets increased after the road was improved. However, further studies are needed to confirm the association between sugar and dental caries by examining the amount of sugar consumption.

In this study, both the youth and the adults had periodontal problems associated with inadequate oral hygiene. This indicates that the participant's oral maintenance might be inadequate, though 86% of the participants aged 14 or over brush their teeth at least once a day. According to the informal interview, the villagers usually use their fingers for toothbrushing (NICCO, 2002; unpublished data). This type of oral cleaning may be inadequate for the maintenance of oral hygiene.

The number of dental caries statistically differed by ethnicity among the participants aged less than 30. Dental caries are influenced by sociocultural differences such as dietary habits, beliefs and culture (13). According to the informal interview, the Kinh in this hamlet moved from Mekong Delta to cultivate the lands after the late 1980s. Therefore, Kinh may have some sociocultural difference from Co-Ho. The ethnic difference, however, should be studied by further survey, as the number of Kinh in this study was small.

The risk indicators for dental caries among adults aged 30 and over were not detected. Dental caries is a multifactoral disease, and teeth of the older group had been exposed to more factors for longer periods compared to the younger group. These might make it difficult to detect the risk indicators for the older group.

In conclusion, it is necessary to consider oral health promotion as a part of the developing programmes for both Co-Ho and Kinh ethnic groups in Dangphuong village as oral diseases were highly prevalent among them. As a cost-effective solution, it might be useful to introduce the diet guidance, including warnings about sugary food for children. Also, ethnic differences should be considered in the devising of appropriate solutions. As oral health status can affect their general health and quality of life, we need to pay attention to oral health conditions among the vulnerable people in remote areas of developing countries.

Acknowledgements

We would like to thank staff members of NICCO for providing the opportunity. We would also like to express gratitude to Vietnamese doctors and coordinators for their cooperation in translating the questionnaire and facilitating this study. Finally, we are also grateful to all individuals for their participation in the examinations and interviews.

References

1 Palmer CA. *Diet and Nutrition in Oral Health*, 1st edn. Upper Saddle River, NJ: Pearson Education Inc, 2003.
2 Grossi SG, Genco RJ. Periodontal disease and diabetes mellitus: a two way relationship. *Ann Periodontal* 1998; **3:** 51–61.
3 Asian Development Bank (ADB). *Indigenous Peoples/Ethnic Minorities and Poverty Reduction Viet Nam*. Manila, Philippines: Asian Development Bank, 2002.
4 Thang NM, Popkin B. Child malnutrition in Vietnam and its transition in an era of economic growth. *J Hum Nutr Diet* 2003; **16:** 233–244.
5 Walle DV, Gunewardena D. Sources of ethnic inequality in Viet Nam. *J Dev Econ* 2001; **65:** 177–207.
6 Cherrett HM. International collaboration in dental education. *Dev Dent (FDI)* 2001; Vol. 2, Developing Dentistry: 65.
7 Truong TV, Trinh DH, Lam NH et al. *National Oral Health Survey of Vietnam 2001*. Hanoi, Vietnam: [Vietnamese] Medical Publishing House, 2002.
8 World Bank. *Vietnam development report 2004: poverty*. Report no. 27130-VN. East Asia and Pacific Region: World Bank, 2003.
9 Locker D. *Oral Health Indicators and Determinants for Population Health Surveys*. 2001 Available at: http://www.cdhsru-uoft.ca/download/ohquestions.doc (accessed Aug 2003).
10 World Health Organization. *Oral Health Surveys. Basic Methods*, 4th ed. Geneva: World Health Organization, 1997.
11 Ogawa T, Nakamura S, Ono H et al. Dental survey of Tibetan in Langtang village, a highland people of Nepal (Japanese). *Kyushusikaishi* 1996; **50:** 791–797.
12 Reichart PA, Gehring F, Becher J et al. Prevalence of dental caries and *Streptococcus mutans* in Meo of Northern Thai. *Community Dent Oral Epidemiol* 1986; **14:** 57–59.
13 Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century – the approach of the WHO global oral health programme. *Community Dent Oral Epidemiol* 2003; **31(Suppl.1):** 3–24.