

The oral health of children in a rural area of the Lao People's Democratic Republic

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Abstract: The lack of information on oral health in Laos makes it difficult to estimate the need and methods for preventing oral disease. This study identified problems concerning the oral health of Lao children. The study subjects were 59 school children who lived in Pakkading District. Dental caries, gingivitis malocclusions, temporomandibular joint (TMJ) disorders, dental plaque, and calculus were examined. We observed an average of 1.6 decayed, missing, and filled teeth (DMFT) and 4.1 decayed and filled deciduous

teeth (dft) per child. 25.4% had gingivitis scores from 16 to 20 on the papillary, marginal, and attached (PMA) index; 29.6% had one or more occlusal abnormality; and 0% had signs of TMJ disorders. 93.5% of the children had at least one buccal or lingual tooth surface with plaque covering more than two thirds of the surface; 32.6% had dental calculus. Oral health promotion programs for children should prioritise prevention and treatment of caries. It is likely that the high rate of gingivitis in Lao children is due mainly to unsuccessful plaque control in daily life. In addition to descriptive epidemiological studies of dental diseases in other areas, the influence of sociological and behavioural factors on oral health should be analyzed epidemiologically to promote child health. (J Oral Sci 51, 131-135, 2009)

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Introduction

Little published information is available on the prevalence of dental caries in Lao children. Tayanin et al. (1) reported high caries prevalence for 12-year-old Lao children in Vientiane and Luang Prabang provinces, and the mean number of decayed, missing, and filled teeth (DMFT) was 4.61 and 6.52, respectively. They concluded that oral health preventive programs are needed to prevent a possible caries epidemic in Laos. Chuckpaiwong (2) reported that the prevalence of healthy gingiva was nearly zero in all age groups and the most common periodontal problem was calculus deposits in the study samples (12 to 99 years old) in Savannakhet province Lao PDR. The scarcity of information on oral health in Laos makes it difficult to estimate the future trends in oral diseases and the need for preventive measures in many areas in Laos.

To develop preventive measures, an epidemiological approach that includes an analysis of the risk factors for dental caries and periodontal disease is essential. No analysis of the risk factors in the lifestyle and social environment in Laos has been reported. However, it is essential to clarify the characteristics and the sizes of health problems comprehensively before analytical epidemiological approach. We surveyed the oral health of children in a district in Laos cross-sectionally. The current study used an epidemiological approach to evaluate the prevalence of frequent oral diseases, abnormalities and tooth deposits of children in Laos and estimated problems in oral health promotion. All observations were from the viewpoint of descriptive epidemiology.

The prevalence of dental caries, gingivitis, malocclusion, and temporomandibular joint (TMJ) disorders was examined.

Materials and Methods

Subjects

As shown in Table 1, the study subjects were Lao school children living in Pakkading district of Bolikhamxai province in central Laos. A total of 59 (25 boys and 34 girls), 6 to 12 years old were studied. They attended Pakkading District Hospital through one of the primary schools in the district. Thirty-nine percent of the children from the primary school came and were given an oral examination on 24 February 2007. The subjects were examined for dental caries, gingivitis, TMJ disorder and tooth deposits (dental plaque and dental calculus). As a result of exclusion because of inadequate records, the

sample included 54 subjects for the malocclusion study and 46 for the analysis of tooth deposits.

Data and oral examination

Three dentists collected data on 4 oral diseases and abnormalities and 2 forms of tooth deposits. The oral examinations were based on visual observations with the aid of a head light and an explorer No.9. Each dentist examined one condition in all subjects to avoid inter-examiner measurement error. The World Health Organization (WHO) criteria described in the 4th edition of Oral Health Surveys Basic Methods (3) were used for caries. Early caries lesions were recorded as caries only when a lesion had an unmistakable cavity. White, chalky, or discoloured spots on a smooth surface with no visible cavity were not recorded. Gingivitis was scored using the papillary, marginal, and attached (PMA) index (4). Gingivitis was examined for the limited gingival portion of the upper and lower anterior teeth. Malocclusions were judged using defined criteria. TMJ disorders were determined by checking for pain at the joint or masticatory muscles, disturbed mouth opening, joint sounds, and abnormal jaw movement. The maximum mouth opening with and without pain was measured. Plaque and calculus were determined using a modified oral hygiene index, which defines the individual score as Maximum scores for the buccal and lingual surfaces of the teeth present.

Results

Table 2 summarizes the indices used to determine caries. Of the children, 94.9% had caries. They had an average

Table 1 Distribution of study subjects according to age and sex

Age in years	Male	Female	Total
6	1	1	2
7	2	0	2
8	7	6	13
9	4	5	9
10	6	11	17
11	3	8	11
12	2	3	5
Total	25	34	59

Table 2 Dental caries status of the subjects

Index of dental caries	Value
Rate of children with DMF tooth or teeth	94.9%
DMFT index	1.6
dft index	4.1

n = 59

of 1.6 decayed, missing, and filled teeth (DMFT) and 4.1 decayed and filled deciduous teeth (dft).

Table 3 shows the distribution of children according to the condition of their teeth. Of the children, 3.4% had restored teeth, while 91.5% of the children with caries had no restored teeth.

Table 4 shows the distribution of children according to the level of gingivitis, evaluated using the PMA index. PMA scores ranged from 0 to more than 21. Of the children, 11.9% scored 0 while 25.4% had scores from 16 to 20.

As shown in Table 5, 16 children (29.6%) had 1 or more occlusal abnormality. Six children had edge-to-edge occlusion, which was defined as an overjet of 0 for the central incisors. Anterior crowding was defined as buccolingual divergence at more than 2 sites, including the incisors. Upper anterior crowding and lower anterior crowding were found in 4 and 3 children, respectively. Four children had at least one malpositioned tooth. Maxillary protrusion was defined as positive overjet exceeding 6 mm. Mandibular protrusion was defined as negative overjet involving more than 3 upper incisors. Maxillary and mandibular protrusion were found in 2 children each. No signs of TMJ disorder were found in any subject.

As Table 6 shows, all children had plaque accumulation scores greater than 1. More than 93.5% of the children had 1 or more buccal or lingual tooth surface with plaque on more than 2/3 of the surface area.

Table 3 Number and percent of children in each group classified by tooth condition

Tooth condition	Number	Percent
Caries free children	3	5.1
Children with decayed tooth or teeth	54	91.5
Children with both decayed and restored tooth or teeth	2	3.4
Children with restored tooth or teeth	0	0.0

n = 59

Table 4 Distribution of children according to the levels of gingivitis evaluated with PMA index

Levels	Number	Percent
0	7	11.9
1 ~ 5	12	20.3
6 ~ 10	8	13.6
11 ~ 15	10	16.9
16 ~ 20	15	25.4
21 ≤	7	11.9

n = 59

Table 7 shows the distribution of children according to the level of calculus accumulation. Of the subjects, 32.6% had dental calculus scores exceeding 1, and 21.7% had 1 or more tooth surfaces with calculus scores exceeding 2.

Table 5 Number of children with malocclusions

Occlusal condition	Number
Normal occlusion	38
With one or more occlusal abnormalities	16
Maxillary protrusion	2
Mandibular protrusion	2
Edge-to-edge occlusion	6
Anterior crossbite	0
Lateral posterior crossbite	0
Bilateral posterior crossbite	0
Deep overbite	0
Open bite	0
Upper anterior crowding	4
Lower anterior crowding	3
Lateral upper canine malposition	0
Bilateral upper canine malposition	0
Tooth malposition	4
Midline diasthema	0

n = 54

Table 6 Percent of children in each group classified by the area of plaque accumulation

Criteria	Area of plaque accumulation on the tooth surface	Percent
Score 0	Almost no accumulation	0.0
Score 1	Less than 1/3	2.2
Score 2	From 1/3 to 2/3	4.4
Score 3	More than 2/3	93.5

n = 46

Table 7 Percent of children in each group classified by the area of calculus accumulation

Criteria	Area of calculus accumulation on the tooth surface	Percent
Score 0	No accumulation	67.4
Score 1	Less than 1/3	10.9
Score 2	From 1/3 to 2/3	15.2
Score 3	More than 2/3	6.5

n = 46

Discussion

This study evaluated the oral health of Lao children as comprehensively as possible. Dental caries and the need for treatment are thought to be good indicators of oral health. We compared the dental caries prevalence in the Lao children we studied with the reported prevalence in children from Japan. As shown in Table 2, 94.9% of the children in our study had at least one tooth with caries. In comparison, 67.8% of 6- to 11-year-old Japanese children surveyed in 2006 had caries (5). The prevalence of dental caries was much higher in Lao children in Pakkading district. The mean DMFT of the Lao children studied was 1.6, while it was 1.7 in the 12-year-old Japanese children in 2006 (5). Considering the difference in the age distribution of the two groups, Lao children in Pakkading district have a greater prevalence of permanent teeth caries than Japanese children.

Table 3 shows the condition of teeth among these Lao children. Almost all of the primary and permanent teeth had untreated caries. A similar need for caries treatment has been reported for children in Vientiane and Luang Prabang (1). Any long-term comprehensive oral health program for children in these areas should prioritise caries prevention programs and caries treatment.

There are no recent reports on applications of the PMA index to children the age of our study subjects for other areas in Laos or for other countries. In 1987, Motohashi et al. (6) evaluated gingivitis in 6- to 12-year-old Japanese girls using the PMA index and estimated that 75.0% of 427 Japanese children had gingivitis versus 88.1% of the Lao children in Pakkading district. That study also estimated that 91.7% of the Japanese children had PMA scores of 5 or less, compared with 32.2% for the Lao children. Among the Lao children, 54.2% had a PMA score exceeding 10. In the Japanese study, no children had a score exceeding 10. It is difficult to explain the difference in the prevalence and severity of gingivitis because of a lack of information. However, it is likely that the higher rate of gingivitis in Lao children is due mainly to differences in tooth cleaning behaviour.

Among children in the present study, sixteen (29.6%) had one or more occlusal abnormality. Edge-to-edge occlusion, anterior crowding, and tooth malposition were observed in more than 3 children each. Susami et al. (7) reported that 58.4% of 824 Japanese primary school children had at least one occlusal abnormality or tooth malalignment. Since Susami et al. included abnormalities of individual teeth, such as rotation or malposition, the Lao school children in Pakkading district were unlikely to have a lower frequency of malocclusion than Japanese children. The existence of a variety of malocclusions

shown in Table 5 seems to be similar among Lao and Japanese children. As the sample size of this study is not large, a greater number of study subjects should be examined to obtain generalisable information on the frequency distribution of each malocclusion. As Susami et al. (8) indicated, untreated carious teeth can be a causal factor in malocclusions. Future studies should examine how dental caries affect certain types of malocclusion in Lao children.

The plaque scores in the study group were high, with 93.5% of the children having a plaque score of 3 (Table 6), which means that the subjects had at least one buccal or lingual surface with plaque covering more than two thirds of the total surface area. Motohashi et al. (9) surveyed the plaque accumulation of 6- to 12-year-old Japanese school girls in metropolitan Tokyo from 1994 to 2001 and found that the percentages of Japanese schoolgirls judged needing oral cleaning instruction (plaque scores 1 to 3) ranged from 16.4 to 31.4% in each year of the study. Thus, fewer than 1/3 of the Japanese children had at least 1 buccal or lingual tooth surface where at least 1/3 of the surface was covered by plaque.

We observed a large difference in plaque accumulation between Lao and Japanese children. The difference also suggests that plaque control in Lao children is a very important issue for community dental health. A future analysis of the sociological factors causing the difference in dental plaque accumulation between the two countries would help in finding effective measures to improve the oral health of Lao children.

Dental calculus was detected in 32.6% of the Lao children examined. In a study of Japanese school girls (9), dental calculus that should be removed or followed up was detected in 3.3 - 16.7% of the primary schoolgirls in yearly checkups from 1994 to 2001. Like plaque accumulation, there was a large difference in calculus deposition between Lao and Japanese children. The main reason for the higher frequency of calculus deposition in Lao children is thought to be the high level of plaque accumulation. Although unknown factors may influence calculus deposition, plaque control could effectively control calculus.

Regarding the study of malocclusions and tooth deposits, some subjects were excluded for reasons independent of the prevalence of malocclusions and level of tooth deposits. Consequently, the generalisability of the results was not weakened. However, as the sample size is not large, the generalisability of each result should be discussed in terms of the many sociological and natural factors that can influence the oral health of Lao children. Further descriptive epidemiological studies in other areas will help provide information on differences in oral health among Lao

children. The distinct differences in the caries and gingivitis prevalence in school children between Laos and Japan imply that the oral health of Lao children can be improved by taking appropriate measures based on epidemiologic evidence. It is also necessary to analyze the sociological and behavioural factors influencing the oral health of Lao children in order to promote child health.

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