

Oral Health Condition of School Children in Nawalparasi District, Nepal

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ABSTRACT

Background: Oral diseases and feeding habits are inextricably linked. Significance of assessing oral health conditions among the school children therefore exists. The current study investigated the oral health condition among 5-6 years and 12-13 years children in Nawalparasi district, Nepal.

Methods: Recruiting 1,000 school children aged (5-6) and (12-13) years in Nawalparasi district, a cross-sectional study was carried out from November to December, 2014. Data assembled from standard instrument was entered in Epi-Data 3.1, cleaned in SPSS version 16.0, and analyzed in Epi Info 3.5.4.

Results: Of 12-13 years children, three out of ten (32.0%, 95% CI: 27.8-36.4) suffered from occasional dental discomfort and pain, and 8.1% (95% CI: 5.9-11.0) often experienced dental discomfort and pain during the last 12 months. It was 73.6% (95% CI: 69.3-77.4) who brushed teeth at least once a day, while another 20.7% (95% CI: 17.2-24.7) brushed twice a day. Among all children, 86.1% (95% CI: 82.6-89.1) used toothpaste to brush the teeth. A three-fourth (73.8%, 95% CI: 69.5-77.7) drank tea with sugar daily. Dental caries was visible on 42.2% (95% CI: 37.7-46.8) (mean DMFT score 2.3 ± 1.5). Likewise, a quarter (24.1%, 95% CI: 20.3-28.3) had gingival bleeding, 10.9% (95% CI: 8.3-14.1) questionable enamel fluorosis, 4.5% (95% CI: 2.9-6.9) dental trauma, and 1.7% (95% CI: 0.8-3.5) oral mucosal lesion. Referral for preventive/routine treatment was observed in 40.5% (95% CI: 36.1-45.1).

Among 5-6 years old children, a remarkable proportion of dental caries (64.4%, 95% CI: 59.2-69.4 and mean DMFT score 4.4 ± 3.0) was noted. Statistics of enamel fluorosis, dental trauma, and oral mucosal lesions in this age group were: 3.1% (95% CI: 1.6-5.6), 1.7% (95% CI: 0.7-3.8), and 1.1% (95% CI: 0.4-3.0) respectively. About 40.1% (95% CI: 35.0-45.4) were referred for preventive treatment, and the rest for prompt treatment.

Conclusions: Oral health of the children was poor, chiefly dental carries remained widespread. Dental hygiene awareness should be promoted in schools in active coordination and collaboration with education authorities.

Keywords: Dental caries; nepal; oral health; school children; 5-6 years; 12-13 years.

INTRODUCTION

Oral diseases stand as one of the widely prevalent public health problems in the developing world, though underrated. Dental caries is the major one

affecting 60-90% of world's school-aged children.¹

Dental caries touched six out of ten 5-6 years old Nepalese school children in the year 2004.² Counting on National Oral Health Policy 2070,³

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limited literatures do exist regarding oral health problems; despite its major presence, mostly hitting the children.²

Early days in school count as a vital time to initiate and establish healthy oral behaviors.⁴ An assessment of school children's oral health status therefore counts a lot. Mostly, it would generate evidence to plan targeted and tailored oral health programs for young children's oral health promotion. This study is thus an attempt to reveal the oral health situation among 5-6 years and 12-13 years school going children in Nawalparasi district, Nepal.

METHODS

A cross-sectional, descriptive study was conducted in Nawalparasi district. The study populations for this study were 5-6 years and 12-13 years old children as recommended by the World Health Organization (WHO).

Sample size of 1000 was calculated using the recommendation by WHO for sample size of school based studies.⁵ The recommendation is 25 students in each age group from every school. It was decided to take 15 schools out of the 719 schools in the district, and hence the initial sample size was 750. Further considering a response rate of 75%, the final sample size computed was 1000.

Systematic random sampling was applied to select the 15 schools (7 public and 8 private) out of the total 719 schools in the district. All students in the age group 5-6 years as well as 12-13 years were identified through school records and enrolled in the study.

The field supervisors of the field team visited the selected schools in advance and sent the information sheet and consent form to the parents through the children. Those with parental consent were only included in the study. A onetime reminder was sent to those who did not bring back the consent form in the first visit to the school. Those who did not bring the consent form even after the reminder were considered non-respondents for the study.

Two days training was held to facilitate survey research assistants and dental hygienists with study tool, prior to stepping for the data collection. With

a standard survey instrument, a team of dental hygienists, under the supervision of a senior professor on oral health, assessed the oral health condition of the selected children. In addition, another group of research assistants (public health graduates) interviewed 12-13 years children regarding oral hygiene related behaviors.

As for 5-6 years age children, only examination of oral health was done by the dental hygienists in the school premises. In coordination with the school, one of the rooms of the school was used to create a temporary dental examination set up. The study team carried all the necessary equipments and sterilizing chemicals required for dental examination with them.

Each child was taught of correct brushing techniques and provided with a toothbrush and fluoridated toothpaste after being examined for their oral health condition. Children, who required prompt and/or urgent treatment were given a referral slip to visit a nearby health facility for needful consultation. A mass education session with practical demonstration on oral hygiene practices including brushing techniques was also organized following the completion of the interview, and oral examination of the school children for the 12-13 years old children. Whereas, for 5-6 years old children only individual training was provided following the dental examination.

Data entered in Epi-data 3.1 were cleaned using SPSS full version 16. Descriptive analysis was done using Epi Info 3.5.4 for frequency distribution including 95% Confidence Interval (CI). With regards to the dental examination, status of Decayed, Missing, and Filled Tooth (DMFT) was calculated using the individual status of teeth as found during examination.

Ethical approval was sought from an independent Ethical Review Board (ERB) of Nepal Health Research Council (NHRC). Before implementing the study, Department of Education (DoE) at the central level was requested for necessary support for implementing the study in selected schools of Nawalparasi. Following that, District Education Office (DEO) was approached and formal permission was received to carry out the study in selected

schools. Written consent was obtained from the parents of children prior to data collection, sending the information sheet and consent form to the parents with the children through school teachers.

RESULTS

The overall response rate for the survey was 82.6% (93.8% for 12-13 years and 71.4% for 5-6 years children).

Nearly 55.0% children were from government (public) schools and remaining from the private. Of the total respondents (826 students), there were 357 from 5-6 years and 469 belonged to 12-13 years. Around one-third represented disadvantaged janajati in both the age groups (5-6 years: 29.1% and 12-13 years: 28.8%) (Table 1).

Table 1. Background characteristics of the school children.

Characteristics	5-6 years (n=357)		12-13 yrs (n=469)	
	Percent	95% CI	Percent	95% CI
Sex				
Men	51.8	46.5-57.1	52.7	48.0-57.2
Women	48.2	42.9-53.5	47.3	42.8-52.0
Ethnicity				
Dalit	16.5	12.9-20.9	19.2	15.8-23.1
Disadvantaged Janajatis	29.1	24.5-34.2	28.8	24.8-33.2
Disadvantaged non-Dalit Terai caste groups	21.0	17.0-25.7	23.2	19.5-27.4
Religious minorities	5.3	3.3-8.3	2.8	1.5-4.8
Relatively advantaged Janajatis	4.5	2.7-7.3	5.3	3.5-7.9
Upper caste	23.5	19.3-28.3	20.7	17.2-24.7
Types of the school				
Government school	46.8	41.5-52.1	61.2	56.6-65.6
Private school	53.2	47.9-58.5	38.8	34.4-43.4

With regards to the oral health status of 12-13 years children, 32.0% (95% CI: 27.8-36.4) experienced occasional dental discomfort and pain in the last 12 months. It was six out of 10 (61.0%, 95% CI: 56.4-65.4) who never received any dental care. Out of the 469 children in 12-13 years age group, only 57 children visited dentist/dental care provider in the last 12 months. Among those, the most common

(91.2%, 95% CI: 80.7-97.1) reason cited was pain or trouble with teeth, gums or mouth indicating very low routine checkup (Table 2).

Table 2. Oral health status of 12-13 years children.

Characteristics	Percent	95% CI
Dental discomfort and pain during the last 12 months (n=469)		
Often	8.1	5.9-11.0
Occasionally	32.0	27.8-36.4
Rarely	2.3	1.2-4.3
Never	57.6	52.9-62.1
Missing of classes due to dental discomfort and pain during the last 12 months (n=469)		
Yes	10.2	7.7-13.4
No	89.8	86.6-92.3
Number of times of dental visit during the last 12 months (n=469)		
Once	5.8	3.9-8.4
Twice	2.8	1.5-4.8
Three times	1.5	0.7-3.2
Four times	1.3	0.5-2.9
More than four times	0.9	0.3-2.3
I had no visit to dentist during the past 12 months	26.9	23.0-31.2
I have never received dental care	61.0	56.4-65.4
Reason behind last dental visit (n=57)		
Pain or trouble with teeth, gums, or mouth	91.2	80.7-97.1
For follow-up treatment from an earlier visit	3.5	0.4-12.1
Routine check-up treatment	5.3	1.1-14.6

The 73.6% (95% CI: 69.3-77.4) 12-13 years old children brushed their teeth at least once a day, while just 20.7% (95% CI: 17.2-24.7) made it twice or more a day. Almost nine out of 10 (86.1%, 95% CI: 82.6-89.1) used toothpaste for teeth cleaning (Table 3).

Table 3. Oral hygiene practice among 12-13 years children.

Characteristics	Percent	95% CI
Number of times of brushing (n=469)		
Never	1.1	0.4-2.6
Once a month	1.1	0.4-2.6
2-3 times a month	0.4	0.1-1.7
Once a week	0.9	0.3-2.3
2-6 times a week	2.3	1.2-4.3
Once a day	73.6	69.3-77.4

Twice or more a day	20.7	17.2-24.7
Product used for teeth cleaning (n=469)		
Toothpaste	86.1	82.6-89.1
Toothpowder	11.5	8.8-14.8
Others	2.3	1.2-4.3
Materials used for teeth cleaning (n=469) (Multiple responses)		
Tooth brush	97.4	95.4-98.6
Wooden toothpick	29.2	25.2-33.6
Charcoal	14.3	11.3-17.9
Chewstick/miswak	26.4	22.6-30.7
Neem	20.5	17.0-24.5
Others	8.1	5.9-11.0

With regards to the food habits, three-fourth (73.8%, 95% CI: 69.5-77.7) of 12-13 years children consumed tea with sugar every day. Other dietary habits of this age group showed that 40.1% (95% CI: 35.6-44.7) consumed biscuit, cake, cream, sweet pie, buns etc several times a week, and 42.9% (95% CI: 38.3-47.5) consumed lemonade, coca-cola, or other soft drinks once a week (Table 4).

The point prevalence of dental caries stood at 42.2% (95% CI: 37.7-46.8) among the 12-13 years children. Among those with dental caries, 77.8% (95% CI: 71.3-83.4) had DMFT score of 1-3 (mean DMFT score: 2.3±1.5) (Table 5).

Table 4. Consumption of sugary foods and drinks by 12-13 years children.

Characteristics (multiple responses)	Never		Several times a month		Once a week		Several times a week		Everyday		Several times a day	
	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI	Percent	95% CI
Biscuits, cakes, cream cakes, sweet pies, buns etc	1.3	0.5-2.9	12.2	9.4-15.5	35.6	31.3-40.2	40.1	35.6-44.7	10.0	7.5-13.2	0.9	0.3-2.3
Lemonade, Coca Cola or other soft drinks	11.9	9.2-15.3	31.1	27.0-35.6	42.9	38.3-47.5	13.0	10.2-16.5	1.1	0.4-2.6	0.0	-
Jam/honey	51.4	46.8-56.0	15.8	12.7-19.5	23.0	19.3-27.2	7.0	5.0-9.8	2.8	1.5-4.8	0.0	-
Chewing gum containing sugar	8.7	6.4-11.8	4.1	2.5-6.4	20.3	16.8-24.2	36.0	31.7-40.6	23.5	19.7-27.6	7.5	5.2-10.3
Sweets/candy	3.0	1.7-5.1	3.0	1.7-5.1	15.1	12.1-18.8	34.5	30.3-39.1	26.9	23.0-31.2	17.5	14.2-21.3
Milk with sugar	51.4	46.8-56.0	2.8	1.5-4.8	10.4	7.9-13.7	15.6	12.5-19.2	19.0	15.6-22.9	0.9	0.3-2.3
Tea with sugar	4.7	3.0-7.1	1.7	0.8-3.5	3.6	2.2-5.9	12.8	10.0-16.2	73.8	69.5-77.7	3.4	2.0-5.6

Table 5. Dental caries and DMFT score among 5-6 and 12-13 years children.

Age group	Percent of dental caries	95% CI
5-6 Years (n=357)	64.4	59.2-69.4
12-13 Years (n=469)	42.2	37.7-46.8
Proportion of children with different DMFT scores		
DMFT Category	Percent	95% CI
5-6 Years (n=230)		
1-3 DMFT	48.7	42.1-55.4
4-5 DMFT	19.1	19.1-67.8
6-10 DMFT	27.4	21.7-33.6
11-15 DMFT	4.8	2.4-8.4
12-13 Years (n=198)		
1-3 DMFT	77.8	71.3-83.4
4-5 DMFT	18.2	13.1-24.3
>5 DMFT	4.0	1.8-7.8

A quarter (24.1%, 95% CI: 20.3-28.3) had gingival bleeding. The prevalence of other oral disease conditions was respectively: questionable enamel fluorosis (10.9%, 95% CI: 8.3-14.1), very mild fluorosis (1.3%, 95% CI: 0.5-2.9), dental trauma (4.5%, 95% CI: 2.9-6.9), and oral mucosal lesion (1.7%, 95% CI: 0.8-3.5). Within 12-13 years children, 40.5% (95% CI: 36.1-45.1) required preventive/routine treatment, nearly half (47.1%, 95% CI: 42.5-51.8) required prompt treatment, and another 12.4% (95% CI: 9.6-15.8) needed immediate treatment.

An assessment of oral condition of 5-6 years children revealed 64.4% (95% CI: 59.2-69.4) dental caries sufferer. A half (48.7%, 95% CI: 42.1-55.4) out of those with dental caries had 1-3 DMFT score (mean DMFT score: 4.4±3.1) (Table 5).

Having looked at other oral disease conditions, a mere had enamel fluorosis (3.1%, 95% CI: 1.6-

5.6) and dental trauma (1.7%, 95% CI: 0.7-3.8). The study found 40.1% (95% CI: 35.0-45.4) children requiring preventive/routine treatment, while 45.7% (95% CI: 40.4-51.0) and 14.3% (95% CI: 10.9-18.4) were in need of prompt and immediate treatment respectively.

DISCUSSION

This study gives a picture of oral health condition of school going children mainly in the two age groups: 5-6 years and 12-13 years. Apart from the oral health condition, it also presents the evidence on oral health related behaviors, especially those of elder age group children. Being a school based survey and the due ethical consideration of enrolling the children only with the parental consent; we had a response rate of 82.6%.

Study findings demand for integration of oral health promotion packages into school health program, as it unveils 64.4% dental carries in 5-6 years and 42.2% in 12-13 years children. An earlier Nepalese study reported 67.0% caries in 5-6 years and 41.0% in 12-13 years old children.⁶

As is revealed by literature, moderate to high prevalence of dental caries prevail in Asian and African countries. National Oral Health Survey of India provided the figure of 51.9% dental caries in 5 years and 53.8% in 12 years old children.⁷ A Chinese study showed an evidence of 76.6% dental caries at age five;⁸ whereas it was 38.0% among age six at Africa.⁹ Variation in study methodology, site, sample, and socio-cultural environment could have resulted into inconsistent reports.

Pain and discomfort from teeth, as reported by 12-13 years children was common, which is in line with other study.¹⁰ Dental visit was limited to urgency (teeth and gum problems) only, illustrating an evidence of low preventive treatment. Less than half of the children in both the age groups underwent preventive/routine treatment. This can be marked as a serious concern. Frequent dental visits, particularly routine treatment are important in mitigating dental caries.¹¹⁻¹³

Positive oral health behavior: use of fluoridated tooth paste and regular tooth brushing is rare

among children in low-income countries.^{10, 14} Brushing teeth at least once a day and use of toothpaste was nearly widespread in current study, an acknowledgeable finding. Promoting teeth brushing from the early ages could be one of the best ways to combat against dental caries.¹⁵ Especially resource poor settings would benefit most, as oral diseases outweigh many diseases, when compared with cost.¹⁶

Important to note, feeding habits of most of the 12-13 years children included cuisine stuffed with sugar. In ongoing contexts of higher availability of junk foods highly loaded with sugar, across many parts of Nepal, such dietary pattern are expected to rise even more. Documentation also reveals high intake of sugary items among school children.^{13, 17} It's evident that consuming such items especially sweets heighten the problem of dental caries further.^{10, 13}

Poor oral health needs a considerable attention, as it leaves intense effect on general health, and they are related to chronic diseases as well.¹ Besides, children are the one to pay harder, as caries hits their nutritional status and growing ability.¹⁸ Negative impact on school attendance and performance is also one of the outputs of poor oral health.^{19, 20} As the country faces triple burden of disease, promoting oral health would be a significant approach rather than investing a huge sum on treatment. Figure says, the costs of dental caries in third world children alone would exceed the total health care budget for children.²¹

Taking into account the present findings of substantial problem of dental caries, promoting oral health in schools is justifiable,⁴ as schools powerfully influence children's development and well-being.¹ This could be achieved through integrating dental health education into school curriculum and oral examination in periodic basis.⁴ Oral health promotion campaigns targeting parents and teachers would be of worth too, as studies found limited knowledge of causes and prevention of oral disease among these groups.²²⁻²⁴ Active involvement of parents in oral health promotional activities is crucial, as oral behavior of parents may influence child's oral habit.²⁵ Further, increasing knowledge of school children on oral health also prevents fu-

ture occurrence of dental problems.^{10, 26} Children's and parent's attitudes toward oral health also need to be addressed by such school programs, as this predisposing factor influences child's oral health.²⁷ Strengthening of oral health services at the primary health care level would also be important to ensure care provision for those having oral health problems.

This small-scale study carried noteworthy strengths: use of standard tool and objective dental examination. This study, however suffered from some limitations. As it stood as a small scale study covering only one district, external validity of the study could not be assured. Chances of selection bias too existed, as we missed some of the children not attending school during the day of survey.

Findings depicted carry significant implication on oral health promotion and Non Communicable Disease (NCD) prevention. Being a pilot study, the results may provide a basis for further scale up. A timely completion of the study with a small group of trained human resource indicates feasibility of a nationwide oral health survey in school settings. Oral health assessment beyond school settings in future would also be constructive so as to highlight oral health status of the general population.

CONCLUSIONS

Given the high prevalence of dental caries, a blend approach of dental health education and healthy school environment, particularly encouraging healthy food habits may result in oral health promotion. Schools are the best platform for providing oral health promoting environment.

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REFERENCES

1. 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 Dentistry and oral epidemiology*. 2003;31(s1):3-24.

2. Yee R, Mishra P. Nepal national oral health pathfinder survey 2004. Kathmandu, Nepal: Oral Health Focal Point. 2004.

3. DoHS. National Oral Health Policy 2070. In: Department of Health Services, editor. Kathmandu: Oral Health Focal Point, Management Division; 2070.

4. Kwan SY, Petersen PE, Pine CM, Borutta A. Health-promoting schools: an opportunity for oral health promotion. *Bulletin of the World Health organization*. 2005;83(9):677-85.

5. World Health Organization. Oral health surveys: basic methods: World Health Organization; 1987.

6. Yee R, McDonald N. Caries experience of 5–6-year-old and 12–13-year-old schoolchildren in central and western Nepal. *International dental journal*. 2002;52(6):453-60.

7. National Oral Health Survey and Fluoride Mapping. An Epidemiological Study of Oral Health Problems and Estimation of Fluoride Levels in Drinking Water. Dental Council of India, New Delhi; 2004.

8. Hong-Ying W, Jin-You B, Bo-Xue Z. The second national survey of oral health status of children and adults. *International dental journal*. 2002;52(4):283.

9. Varenne B, Petersen PE, Ouattara S. Oral health status of children and adults in urban and rural areas of Burkina Faso, Africa. *International dental journal*. 2004;54(2):83-9.

10. Varenne B, Petersen PE, Ouattara S. Oral health behaviour of children and adults in urban and rural areas of Burkina Faso, Africa. *International dental journal*. 2006;56(2):61-70.

11. Peng B, Petersen P, Fan M, Tai B. Oral health status and oral health behaviour of 12-year-old urban schoolchildren in the People's Republic of China. *Community Dental Health*. 1997;14(4):238-44.

12. Hoerup N, Poomviset N, Prommajan J, Watanapa A. Oral health status and oral health behaviour of urban and rural schoolchildren in Southern Thailand. *International dental*

- journal. 2001;51(2):95-102.
13. David J, Wang N, Åström A, Kuriakose S. Dental caries and associated factors in 12-year-old schoolchildren in Thiruvananthapuram, Kerala, India. *International Journal of Paediatric Dentistry*. 2005;15(6):420-8.
14. Petersen PE, Razanamihaja N. Oral health status of children and adults in Madagascar. *Int Dent J*. 1996 Feb;46(1):41-7.
15. Harris R, Nicoll AD, Adair PM, Pine CM. Risk factors for dental caries in young children: a systematic review of the literature. *Community Dental Health*. 2004;21(1):71-85.
16. Sheiham A. Dietary effects on dental diseases. *Public health nutrition*. 2001;4(2b):569-91.
17. Yabao R, Duante C, Velandria F, Lucas M, Kasso A, Nakamori M, et al. Prevalence of dental caries and sugar consumption among 6–12-y-old schoolchildren in La Trinidad, Benguet, Philippines. *European journal of clinical nutrition*. 2005;59(12):1429-38.
18. Acs G, Lodolini G, Kaminsky S, Cisneros G. Effect of nursing caries on body weight in a pediatric population. *Pediatric dentistry*. 1992;14(5):303.
19. Jackson SL, Vann Jr WF, Kotch JB, Pahel BT, Lee JY. Impact of poor oral health on children's school attendance and performance. *American Journal of Public Health*. 2011;101(10):1900-6.
20. Blumenshine SL, Vann WF, Gizlice Z, Lee JY. Children's school performance: impact of general and oral health. *Journal of public health dentistry*. 2008;68(2):82-7.
21. Yee R, Sheiham A. The burden of restorative dental treatment for children in third world countries. *International dental journal*. 2002;52(1):1-9.
22. Petersen PE, Esheng Z. Dental caries and oral health behaviour situation of children, mothers and schoolteachers in Wuhan, People's Republic of China. *International dental journal*. 1998;48(3):210-6.
23. Al-Tamimi S, Petersen PE. Oral health situation of schoolchildren, mothers and schoolteachers in Saudi Arabia. *International dental journal*. 1998;48(3):180-6.
24. Rajab L, Petersen P, Bakaeen G, Hamdan M. Oral health behaviour of schoolchildren and parents in Jordan. *International Journal of Paediatric Dentistry*. 2002;12(3):168-76.
25. Okada M, Kawamura M, Kaihara Y, Matsuzaki Y, Kuwahara S, Ishidori H, et al. Influence of parents' oral health behaviour on oral health status of their school children: an exploratory study employing a causal modelling technique. *International Journal of Paediatric Dentistry*. 2002;12(2):101-8.
26. Smyth E, Caamaño F, Fernández-Riveiro P. Oral health knowledge, attitudes and practice in 12-year-old schoolchildren. *Medicina Oral, Patología Oral y Cirugía Bucal (Internet)*. 2007;12(8):614-20.
27. Al-Omiri MK, Al-Wahadni AM, Saeed KN. Oral health attitudes, knowledge, and behavior among school children in North Jordan. *Journal of dental education*. 2006;70(2):179-87.