

Original Research Article

Oral hygiene status and its association with oral hygiene practices among school going children of rural and urban areas in Kamrup district, Assam

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Received: 04 October 2020

Revised: 14 December 2020

Accepted: 30 March 2021

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ABSTRACT

Background: Oral hygiene, a state in which the surfaces of all the teeth are plaque free, is highly important in the promotion of oral health and also for good health in general. The aim of the present study was to assess the oral hygiene status among 13-14 years old school children in rural and urban areas in Kamrup Metropolitan (M) district, Assam.

Methods: A total 1501 school children in the age group of 13-14 years were included in the study and oral hygiene status was assessed using oral hygiene index-simplified (OHI-S) given by Greene and Vermilion 1964. The children were asked to fill in the basic information in the proforma by themselves. The following statistical tests were used unpaired t test, Chi square test, one-way analysis of variance (ANOVA) test, post-hoc Bonferroni test to compare the oral hygiene status among the different age groups, gender and location.

Results: The OHI-S values were found to be more among the males (2.72 ± 1.50) as compared to the females (2.31 ± 1.48) and the difference was highly significant (0.0001). The rural population and urban population constituted 50% of the total study sample each. Mean values of OHI-S index were more among rural children as compared to children residing in urban areas. The mean values showed that the p value was highly significant.

Conclusions: Oral hygiene status was found to be poorer among rural school children compared to urban school children. Oral hygiene worsened as age advanced and found to be poorer in males than females.

Keywords: Dentifrices, Oral health, Oral hygiene index-simplified, Preventive dentistry

INTRODUCTION

Oral diseases are the neglected area of international health which can have a negative impact over the general health of the population. A healthy mouth and a healthy body go hand in hand because of the bi directional relationship between the oral and general health.¹ The two major public health concerns and global burden of oral diseases are the dental caries and periodontal diseases which show striking geographic variations, socioeconomic patterns and severity of distribution all over the world.^{2,3}

Oral hygiene, a state in which the surfaces of all the teeth are plaque free, is highly important in the promotion of oral health and also for good health in general. Dental caries and periodontal problems are due to poor oral hygiene practices.^{4,5} Adolescents who brush their teeth more than once a day by the time they are 12 years old are more likely to continue to do so throughout their teenage years.⁶

Oral hygiene practices may vary in children of rural and urban areas resulting in different oral health status among them due to awareness and knowledge regarding oral hygiene practices. To deliver the knowledge regarding

maintenance of oral hygiene to the children, schools can be considered as an important site. Conducting a survey or an educational program in the schools can let us reach the children and their parents from urban and rural areas. Children are more receptive during the school age as they are more influenced by peer pressure, hence during this period and the earlier the habits are established, the longer lasting the impact. Moreover, the messages can be reinforced regularly throughout the school years.⁷ Thus, the aim of the present study was to assess the oral hygiene status among 13-14 years old school children in rural and urban areas in Kamrup (M) district, Assam.

METHODS

This cross-sectional study was conducted to determine the oral hygiene status among 13-14 years old school going children in Kamrup (M) district, Assam. Before starting the survey, the ethical approval for the study was obtained from the institution review board and official permission was obtained from district elementary education officer, Kamrup (M), Guwahati and school principal/headmaster/headmistress of concerned schools.

The sample size was calculated from the pilot study done before the commencement of this survey on sample of 50 children which were not included as a part of the final sample. A total sample of 1501 school children from rural and urban areas of Kamrup (M) district of Assam were collected from different schools. The data collection was scheduled during the school working hours with an average of 30-35 children examined per day. The study period in which data was collected was from the month of August 2014 till March 2015.

Sample size for this cross-sectional study was calculated as follows using the following formula for cross-sectional studies based on the prevalence of disease.

$$\text{Sample size} = Z^2 \times (p) \times (1 - p) \div c^2$$

Where, Z=Z value (1.96 for 95% confidence level), p=percentage of picking a choice, expressed as decimal and c=precision, expressed as decimal.

There was 20% prevalence of decayed, missing, and filled teeth (DMFT) ≥ 1 . So, this was expressed as 0.20.

$$\text{Absolute precision} = 16.4\% \text{ of } c$$

So, the sample size was calculated as per formula= $(1.96)^2 \times 0.8 \times 0.2 \div (0.05)^2 \times 0.164$

So, the sample size was calculated to be 1501.

School going children belonging to the age group of 13-14 years old were included in the study. The following children were excluded from the study who were suffering from any serious systemic health problems that can affect their oral health or any intellectual developmental disorder,

children with disorders like attention deficit hyperactive disorder (ADHD), obsessive compulsive disorder (OCD) and also with impaired audio, speech or visual acuity.

A specially designed pretested proforma for the purpose of collecting data was used in the study. The proforma consisted of three parts. The first part had provision to collect data related to basic information of the child, the second and third part collected data related to oral hygiene practices and food habits respectively. The children were asked to fill in the basic information in the proforma by themselves.

Oral hygiene status was assessed using oral hygiene index-simplified (OHI-S) given by Greene and Vermilion 1964. The OHI-S has two components: debris index (DI-S) and calculus index (CI-S). There are six index teeth selected with one surface each to be examined for both the components. The data collection was scheduled during the school working hours.

A preliminary visit was made to these schools in order to obtain consent from the respective school authorities, for information as to when the school is in session, when the children will be available for examination, to obtain head count of the number of students in the required age groups and whether there is a suitable area or room that could be used for the examination prior to commencement of the study. The area for conducting examinations was planned and arranged for maximum efficiency and ease of operation. The children were seated in an ordinary chair that was positioned to ensure adequate day light to facilitate the examination. Lighting—wherever electricity was available it was used and if electricity or battery-operated lights were not available, natural light was used.

The examiner was assisted by an alert and co-operative recorder who was able to follow instructions exactly and legible writing. The examiner gave clear instructions about recording data on the assessment form and to enter general descriptive information on the record forms. The armamentarium used were plane mouth mirror, dental probes, explorers and tweezers. After each day's survey all the instruments were autoclaved. Used instruments were placed in disinfectant solution, then washed and drained well before sterilization. For the infection control, current national recommendations and standards were followed for infection control and waste disposal.

Children who were suffering from pain or infection and those who needed immediate care or routine treatment were to nearby dental hospital. After the examination dental health education class was held daily for the students, teachers or caregivers so that children could be educated with regards to maintaining their oral health and hygiene.

All the collected data was entered in the Microsoft Word Excel sheet 2007 version and subjected to statistical analysis using statistical package for the social sciences

(SPSS) version 21. The following statistical tests were used unpaired t test, Chi square test, one-way analysis of variance (ANOVA) test, and post-hoc Bonferroni test.

Ethical approval

All the procedures have been performed as per the ethical guidelines laid down by the Declaration of Helsinki (2013). The Institutional Review Board approval was obtained from institution review board, K. D. Dental College and Hospital, Mathura, India.

RESULTS

A total 1501 school children in the age group of 13–14 years were included in the study to determine and compare the prevalence of oral hygiene status of rural and urban areas of Kamrup (M) district of Assam. Out of 1501 children, 655 (43.6%) were of 13 years and 846 (56.3%) were 14 years of age. Among them 709 (47.2%) were females and 792 (52.8%) were males. The rural population and urban population constituted 50% of the total study sample each.

Mean values of OHI-S index were more among rural children as compared to children residing in urban areas. The mean values were compared using unpaired t-test which showed that the p value was highly significant (Table 1).

Table 1: Comparison of mean values of DI-S, CI-S and OHI-S indices based on the location.

Indices with location	Mean	Standard deviation	t-test value	P value
DI-S				
Rural (R)	1.89	0.68	20.557	0.000
Urban (U)	1.11	0.79		
CI-S				
Rural (R)	1.41	0.72	23.971	0.000
Urban (U)	0.65	0.47		
OHI-S				
Rural (R)	3.30	1.35	23.005	0.000
Urban (U)	1.76	1.23		

Table 2 shows the mean values of DI-S, CI-S and OHI-S index among 13- and 14-years old children. When the data was compared using unpaired t-test, the p value came out to be highly significant (0.0001). The OHI-S values were found to be more among the males (2.72±1.50) as compared to the females (2.31±1.48) and the difference was highly significant (0.0001) (Table 3).

It was found that 80.8% of the total population was using tooth brush for cleaning their teeth while 19.2% were using finger as a cleaning aid. Among which the children residing in urban areas were using tooth brush as a tooth cleaning aid whereas only 61.7% of rural children were using tooth brush whereas 38.3% were using finger to

clean their teeth. Overall frequency of brushing was 66.4% once daily and 33.6% twice daily. It has been observed that majority of the 14 years old children were brushing twice daily as compared to 13 years old. Majority of the population was using tooth paste as the dentifrices and only 7.9% were using tooth powder, which were mostly from rural areas. Out of the total population, 33.7% of the children were changing their brush in every six months, amongst which 54.5% were from urban and 12.9% were from rural areas.

Table 2: Comparison of mean values of DI-S, CI-S and OHI-S indices based on the age of the children.

Indices with age (years)	Mean	Standard deviation	t-test value	P value
DI-S				
13	1.36	0.80	-5.874	0.000
14	1.61	0.84		
CI-S				
13	0.94	0.67	-4.204	0.000
14	1.10	0.74		
OHI-S				
13	2.30	1.44	-5.172	0.000
14	2.70	1.53		

Table 3: Comparison of mean values of DI-S, CI-S and OHI-S indices based on the gender of the children.

Gender	Mean	Standard deviation	t-test value	P value
DI-S				
Male	1.60	0.82	4.977	0.000
Female	1.39	0.83		
CI-S				
Male	1.12	0.73	5.347	0.000
Female	0.93	0.69		
OHI-S				
Male	2.72	1.50	5.321	0.000
Female	2.31	1.48		

Table 4: Comparison of mean values of DI-S, CI-S and OHI-S indices based on the tooth cleaning methods.

Teeth cleaning method	Mean	Standard deviation	t-test value	P value
DI-S				
Brush	1.27	0.76	-25.448	0.000
Finger (F)	2.44	0.25		
CI-S				
Brush	0.76	0.50	-47.170	0.000
Finger (F)	2.17	0.18		
OHI-S				
Brush	2.04	1.22	-35.240	0.000
Finger (F)	4.61	0.40		

The mean OHI-S score for those who clean their teeth with finger was higher (4.61 ± 0.40) than those who clean their teeth with brush (2.04 ± 1.22), it was also higher among those who were brushing their teeth once (3.42 ± 1.01) as compared twice daily (0.77 ± 0.24). A higher OHI-S value was found for those who were using toothpowder (4.58 ± 0.37) for cleaning their teeth as compared with tooth paste (2.35 ± 1.43). The mean values of the OHI-S index among all the groups based on the various factors was subjected to unpaired t-test for comparison and the differences were found to be highly significant (Table 4-6).

Table 5: Comparison of mean values of DI-S, CI-S and OHI-S indices based on the frequency of the tooth brushing.

Frequency of teeth cleaning	Mean	Standard deviation	t-test value	P value
DI-S				
Once (1)	2.00	0.54	59.961	0.000
Twice (2)	0.51	0.18		
CI-S				
Once (1)	1.42	0.56	46.107	0.000
Twice (2)	0.26	0.11		
OHI-S				
Once (1)	3.42	1.01	57.852	0.000
Twice (2)	0.77	0.24		

Table 6: Comparison of mean values of DI-S, CI-S and OHI-S indices based on the dentifrices used.

Material	Mean	Standard deviation	t-test value	P value
DI-S				
Tooth paste	1.42	0.82	-13.427	0.000
Tooth powder	2.43	0.24		
CI-S				
Tooth paste	0.94	0.66	-19.864	0.000
Tooth powder	2.15	0.17		
OHI-S				
Tooth paste	2.35	1.43	-16.857	0.000
Tooth powder	4.58	0.37		

DISCUSSION

The present study was conducted to assess and compare the prevalence of oral hygiene status among 13-14 years old school going children from rural and urban areas of Kamrup (M) district, Assam. As the highest priority risk group is between 11-14 years of age, 13-14 years old age children were chosen for the study.⁸ Research of Lewis and Ismail claims that one of the peaks for dental caries experience is 14 years.⁹ According to the World Health Organization (WHO), the global monitoring ages are 12

and 15 years. Age 12 years has been universally accepted as global monitoring age for caries since all permanent teeth except third molars would most likely have erupted by this age and by the age of 15, the dietary habits of the individuals are more or less established and the permanent teeth have been exposed to the oral environment for 3-9 years, thus making the assessment of caries prevalence is even more meaningful at this age. In addition, this particular age group of people has longer outdoor stay leading to greater consumption of in-between snacks, cariogenic diet and consequently to be considered to be at high risk in terms of dental caries.¹⁰

The oral hygiene status was found to be poorer in rural children than the urban for above age groups which were correlating with the study done by Babu et al and Saha.^{11,12} The high oral hygiene status among the urban children could be due to parent's dental awareness which is reflected in the child's oral hygiene maintenance and the educational level of family members. Poor oral hygiene status among rural school children could be attributed to poor oral hygiene practices, use of finger instead of tooth brush and tooth paste being substituted with tooth powder and other substitutes. Rural children do not have access to restorative or any other dental treatment due to lack of professional dental care in rural India, also the parental literacy and lack of awareness of dental health measures is the contributing feature. Oral hygiene worsened as age advanced which is similar to the study conducted by Amid, Yonemitsu and Tewari who reported that oral hygiene index and its components has increased with age.¹³⁻¹⁵ In contrast, study done by Ramesh et al in Jabalpur showed that there is improved oral hygiene in the older children as there is increase in the level of manual dexterity and also the increased awareness amongst them regarding oral health and hygiene.¹⁶

Oral hygiene was also found to be poor in males as compared to females. The probable reason for lower OHI-S score and its components in females was perhaps the increased grooming habits of girls in this age group. Similar results were obtained in a study done by Seth et al among Indian children and Yazdani et al on Iranian children where girls seem to have better oral hygiene practices when compared to boys.^{17,18}

On contrary, study done by Ganesh et al among Chennai children and Zhu et al in China where there was no difference in toothbrushing behaviour according to gender.^{19,20}

The mean OHI-S score for those who used finger for cleaning their teeth was higher than those who used tooth brush for cleaning. In the present study it has been seen that 100% of the urban children used tooth brush for cleaning their teeth while only 61.7% of the rural children used tooth brush and the remaining 38.3% use finger as a cleaning aid. This could be a contributing factor for the poorer oral hygiene among rural children compared to the urban counter parts.

The study demonstrated that the mean OHI-S score for once cleaning of teeth was higher than those for twice cleaning of teeth. Overall frequency of brushing was 66.4% once daily and 33.6% twice daily. The results were in contrast with the study done by Ganesh et al where 59.4% of the children brushed twice daily and also de Almeida et al in 2003 on Portuguese children (55.6%).^{19,21}

It has been found in the study that frequency of teeth cleaning decreased as the age advances. This could be one of the reasons for poorer oral hygiene among advanced age groups. The study also showed that the frequency of cleaning teeth was higher among females than the males and also higher among the urban than the rural counterparts. The mean OHI-S score was found to be higher for those who used tooth powder than those who used tooth paste as the dentifrices. It has been seen that 100% of the urban children used tooth paste while only 84.3% of the rural children used tooth paste.

Limitations

The limitation of the study was the cross-sectional studies cannot be generalized to the other population. School dental camps should be organized in all schools to treat, train, and educate all the school children, teachers, and parents. Regular screening camps should be mandatory to check up the oral health as well as general health. There should be the training of teachers so that they can implement the preventive programmes in schools regularly. Parents should be aware to maintain the oral hygiene by understanding the preventive measures such as proper brushing techniques, preventive procedures such as pit and fissure sealants. The uneducated children should also take benefitted by learning proper brushing techniques through school dental health programmes.

CONCLUSION

The present study provides objective data which will be required for dental health programs to be formulated and implemented in future to control and prevent dental diseases by the authorities. In the end, the conclusions drawn from this study are that the oral hygiene status was found to be poorer among rural school children compared to urban school children. Oral hygiene worsened as age advanced and found to be poorer in males than females. Higher OHI-S score for those clean their teeth with finger and once daily compared with those who clean their teeth with tooth brush and twice daily. Oral hygiene was better in tooth paste user rather than the tooth powder user. Oral hygiene was also found to be better in those who change their tooth brush six monthly and those who rinse their mouth after every meal.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Doley S, Srivastava M. Oral hygiene status and its association with oral hygiene practices among school going children of rural and urban areas in Kamrup district, Assam. *Int J Community Med Public Health* 2021;8:2245-50.