

Oral Health Literacy among School Students in Jodhpur City, Rajasthan, India

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ABSTRACT

Background: In India, only 25% community health centers have dentists available, but these infrastructures do not carry adequate instruments and other dental materials. This study aimed to examine the level of oral health knowledge, attitudes and practice behaviors among school students.

Subjects and Method: This was a cross-sectional study conducted in Jodhpur City, Rajasthan, India. A total of 684 students of grade 9th & 10th from a private school were selected for this study. The data were collected by semi-structured questionnaire. The data were analyzed using a logistic regression.

Results: 297 (43.42%) participants reported wrong number (32 teeth) of teeth during teenage. 620 (90.64%) participants answered 'Yes' that sweet food items, soft drinks and chewing gums are responsible for tooth decay. 377 (55%) students agreed that fluoridated toothpaste helps in prevention of tooth decay. The correct technique of tooth brushing reported by 325 (48%) participants is circular direction and up-down

vertical direction by 223 (33%) of them. 621 (90%) said that 'bleeding gums is the primary sign of bad oral health'. Dentist is the major source of information of 462 (68%) participants. 58 (8.5%) of them used other cleaning aids such as tongue cleaners, chewing gums, 120 (17.5%) did not use any cleaning aid. The regression analysis showed significant association between gender and regular dental visits ($p=0.021$), once and twice brushing habits daily, ($p=0.015$, $p=0.020$) respectively.

Conclusion: Oral health literacy levels among students were good to fair.

Keywords: oral health behavior, health promotion, oral health literacy

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BACKGROUND

World Health Organization (WHO, 2012) stated that oral health is a state of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay and tooth loss, and other diseases and disorders that affect the oral cavity.

Health Literacy has been defined as the cognitive and social skills which determine

the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health. Health literacy merely does not include being able to read pamphlets and make appointments. Health literacy empowerment can be made critical, by upgrading people's approach towards health-related information and at the same time, by increasing their potential to use it efficaciously (WHO, 2017b).

Worldwide, 90% of school children and 100% of adults are the victims of dental problems. An unhealthy diet, tobacco use, harmful alcohol use, poor oral hygiene, and social determinants are the possible risk factors for oral diseases. Up to 30% of senior citizens (65 years -74 years) in this world have no natural teeth. Children and adults belonging to poor and disadvantaged population groups, develops more oral diseases. Professional dental care is needed to treat most of oral diseases and conditions. Due to constrained accessibility, the utilization of professional dental carries very little among older population, rural population, and those with low income and education status. Customary therapeutic dental care is remarkably economic freight in various high-income countries, where 5%–10% of public health expenses associates with oral health. Public oral health programs are sparse in low- and middle-income countries. Thus, elevated costs of dental treatment can be kept under control, by productive prevention and health promotion plans (WHO, 2017b).

India's 65% of population lives in rural areas, where the dentist to population ratio is about 1:2,00,000. Oral health services are available at district, subdivision and tehsil level. Up to 90% of school children and approximately 85% of adults have dental problems, leading to frequent experience of pain and uneasiness. At village level and primary health care center level, there is no dental infrastructure available. Only 25% community health centers have dentists available, but these infrastructures do not carry adequate instruments and other dental materials (Welfare Ministry of Health and Family, 20-12). Only a small proportion of school students in India possess good oral hygiene status when compared to large population from developed countries (Kuppuswamy et al., 2014). In Jodhpur, Rajasthan more than half of school students have dental plaque, and

more than one third of them have bleeding gums (John et al., 2017).

The harmful risk factors and practices related to oral health could be perpetual from childhood or can be commenced during adolescent age related to an emerging autonomy from parental influence. Indeed, adolescence is a pivotal period of conversion with personal liability of preventing dental disease and regulating future oral health problems. The school years cover an age from childhood to adolescence which is a leading stage in every child's life during which permanent self-sustaining oral health related attitudes, behavior, as well as beliefs are developed. Children are especially open-minded during this stage and the earlier the habits are developed; the impact lasts longer. Children also get furnished with other personal skills that empower them to take healthy decisions, to acquire a healthy lifestyle and to handle other stressed situations related to their studies and career (Sanadhya et al., 2014).

World Health Organization has proposed oral health related education and promotion in schools, so as to improve children's knowledge, attitudes and behavioral practices which will in turn help them to prevent and control dental problems (Mehta and Kaur, 2012). Now, throwing some light on India's oral health, the Government of India has launched National Oral Health Programme (NOHP) to provide comprehensive and united oral health care. The Indian central government is also assisting its state governments to enable them for providing dental services at different levels of the primary health care system (Welfare Ministry of Health and Family, 2012).

The dental professionals from all the states of India are also the members of Indian Dental Association (IDA) which also includes dental students as well. They act as a united voice to address major oral health issues in the country. IDA focuses on oral

health of the public through various health initiatives and NOHP (Indian Dental Association, 2017). However, the situation is gloomy with large voids in execution of oral health programs in schools of India.

Oral health is fundamental to general health and well-being. Nurturing environment can be provided by the schools for promotion of oral health. School health policies and health education are crucial and essential to achieve good oral health and to control the related risk behavioral practices (WHO, 2017a). Education, motivation and promotion of good oral health is critical for school children because they are the vulnerable populations who remains at the highest risk of developing oral diseases (Kuppuswamy et al., 2014).

Good oral hygiene is the most notable factor in prevention of oral diseases. The attitude of a person depends on his/her oral health concern. These attitudes are the reflections of their experiences, perceived knowledge from culture, and family which strongly affects their behavior too (Sanadhya et al., 2014). By the age of 12 years, a child gets all his permanent teeth except for third molars, therefore 12 years of age has been set as the global indicator for the comparisons and surveillance of disease trends at global levels. By the age of 15 years, the permanent teeth remain exposed into the oral cavity for up to nine years. Therefore, for these reasons, this study was conducted among students of mid teenage (Gilli et al., 2011).

SUBJECTS AND METHOD

1. Study Design

This was a cross-sectional study conducted in a private school of Jodhpur city, Rajasthan, India, during March 2017 to October 2017.

2. Population and Sample

The target population was all the students studying in standard 9th and 10th of the school. Total number of sample was 684 students was selected for this study.

3. Study Variables

The independent variables were age of the students, gender, class of studying, parent's education. The dependent variables were knowledge of oral health, oral health practice/ behavior, and attitude toward oral health.

4. Operational Definition of Variables

Health education was an aggregate of studying experiences which are designed with an intention to improve health status of individuals and communities by influencing their attitudes towards health.

Health literacy based on learning and social skills of an individual which decide the ability of individual to get benefit from their own understanding and use it to promote their own health.

Knowledge defined as proficiency and capabilities developed by a person through professional guidance.

Oral health was a state of being unaffected by different mouth pain due to tooth decay and, or loss of tooth, oral cavity disorders and oral cancer.

Oral health attitude was people's own past experiences related to oral health, own beliefs and cultural perceptions which strongly affect the oral health behavior.

Oral health behavior was act of an individual done with an intention to maintain own oral health in order to prevent getting diseased.

5. Study Instruments

All the study subjects were requested to complete a semi-structured questionnaire in the classroom. It was a pretested self-administered questionnaire with four sections addressing demographics, oral health knowledge, attitude, and practice behavior of study subjects respectively.

The questionnaire had 24 questions with multiple answers given, from which the participant had to tick the correct answer without any external help. The questionnaire

was in English language. All the study subjects were given a total time of 20 minutes, to complete the form. In order to minimize the effects of recall bias to control the quality of data, the questions based on past experiences were framed within specific time period that was not beyond 12 months.

The scoring scheme of the questionnaire simply stated that if the participant has scored between 15-20 out of 24 questions, then he/she must have marked all the answers correctly (good oral health literacy levels) and those who scored less than 15, must have answered majority of the questions wrongly (poor oral health literacy levels).

Data Analysis

Sample characteristics were described in n and %. Multivariate analysis was conducted by a multiple logistic regression.

6. Research Ethics

Ethical approval was taken from ethical committee of Maulana Azad University, Head of

Department of Public Health. Recommendation letter was given to the Principal of the school with signature of the HOD and Principal of the Maulana Azad University. Informed consent was taken from the Principal on behalf of all the study subjects before initiating the study. The Principal of the school and the study subjects were ensured that the confidentiality will be maintained with the information collected from the study and the name of the study subjects and school will not be disclosed in any situation.

RESULTS

1. Sample Characteristics

The age range of the total study subjects was 13-16 years with the mean age of 14.8 years in both the genders. There were 71 (10.38%) study subjects of age 13 years, 235 (34.36%) study subjects of age 14 years, 120 (17.54%) study subjects of age 15 years, and 267 (37.57%) study subjects of age 16 years.

Table 1. Sample characteristic

Characteristic Study	n	%
Sex		
Male	393	57.40%
Female	291	42.50%
Paternal Education		
Graduate Degree	208	30.41%
Post Graduate	201	29.39%
Senior Level Education	112	16.37%
Junior Level Education	55	8.04%
No Education	4	0.58%
None	88	12.87%
Maternal Education		
Graduate Degree	184	26.9%
Post Graduate	172	25.15%
Senior Level Education	132	19.3%
Junior Level Education	88	12.87%
No Education	16	2.34%
None	78	11.4%
Age		
13 years	71	10.38%
14 years	235	34.36%
15 years	120	17.54%
16 years	257	35.57%

Out of the students, majority 30.41% students had father with graduate degree education. As many as 184 (26.9%) students had mother with graduate degree education.

2. Multivariate analysis

Table 2 showed the results of a multiple logistic regression analysis of socio-demographic factors associated with brushing teeth once in a day among students.

Table 2. The results of logistic regression analysis of socio-demographic factors associated with brushing teeth behavior among students

Variables	OR	95% CI		p
		Lower Limit	Upper Limit	
High paternal education	0.97	0.85	11.03	0.646
High maternal education	1.00	0.88	11.27	0.940
Younger age	0.99	0.85	11.56	0.923
Sex (male)	14.77	1.06	20.65	0.023

Table 2 showed that there was no different effect between high and low maternal education in brushing teeth behavior in students (OR= 1.00; 95% CI= 0.88 to 11.27; p= 0.940).

Male students had higher likelihood to brush their teeth regularly than female students (OR=14.77; 95%CI=1.06 to 20.65; p= 0.023).

Table 3. The results of logistic regression analysis of socio-demographic factors associated with dental visit within 6 months among students

Independent Variables	OR	95% CI		p
		Lower Limit	Upper Limit	
High paternal education	1.00	0.86	11.59	0.974
High maternal education	0.97	0.86	10.98	0.622
Younger age	10.68	0.95	12.07	0.292
Sex (male)	0.60	0.43	0.83	0.002

Table 3 showed the results of a multiple logistic regression analysis of socio-demographic factors associated with dental visit within 6 months among students.

Table 3 showed that there was no different effect between high and low paternal education in dental visit within 6 months among students (OR= 1.00; 95% CI= 0.86 to 11.59; p= 0.974).

Male students had higher likelihood to visit the dentist within 6 months than female students (OR=0.60; 95%CI= 0.43 to 0.83; p=0.002).

gained since their childhood, their perceived knowledge about oral health and their behavior practices which they must be practicing in their day-to-day life.

In this study, the total study subjects of size 684 were constituted by 393 male study subjects and 291 female participants, who were studying in standards 9th and 10th. The number of study subjects in this study is very similar to another study conducted by (Amaral et al., 2013) in Chennai, India with its similar participant size of 592, which was constituted by majority of female study subjects (373), in contrast to my study.

1. Oral Health Knowledge

In this study, the majority of the study subjects reported wrong answer to the question about number of permanent teeth during

DISCUSSION

The intent of this study was to obtain extensive information about the student’s oral health knowledge, which they must have

teenage. Only 37% of them answered the correct number while 43% answered the wrong number. These results are in contrast to a similar study conducted in Chennai, India in which 63% of the study subjects answered the correct number of permanent teeth (Amarlal et al., 2013).

Similar contrasting results can be observed in another study, conducted in Udaipur, Rajasthan where more than half of the study subjects gave correct answer for correct number of permanent teeth (Sharda et al., 2011). Majority of students (90%) agreed that sweet food items, drinks and chewing gums causes tooth decay. The results as obtained are similar to that of another study conducted in Galicia, Spain in which half of the study subjects (47%) knew that sweet food items provoke tooth decay at a greater extent (Smyth, Caamano, and Fernández-Riveiro, 2007).

Similar results can be seen in studies conducted in Chennai where 81.8% study subjects knew the effects of sugary food (Amarlal et al., 2013) and in Udaipur, more than 50% study subjects knew the effects of soft/fizzy drinks on teeth (Sharda et al., 2011). 55% study subjects knew the use of fluoridated toothpaste for preventing tooth decay, in this study. Similar results were seen in study conducted in Galicia, Spain in which 74-87% study subjects knew the effect of fluoride on teeth (Smyth et al., 2007).

Study conducted in Chennai, India showed that 55.6% students knew that use of fluoride can prevent dental caries (Amarlal et al., 2013). The study subjects in this study, were also asked about the correct technique of tooth brushing, and it was found that 48% of them reported wrong answer that was 'circular direction' as the correct technique while only 33% reported correct answer that was 'up-down' as correct direction of tooth brushing. Similar results have been reported by a study conducted in Pakistan, in which majority of respondents were not knowing the cor-

rect brushing technique and reported the wrong techniques (Chand and Hadyait, 2014).

In this study, majority (91%) of the respondents knew that bleeding gums is a primary sign of oral health, they also agreed that oral health affects general health as reported by 76% of participants, 76% agreed that dental cavity is caused by bacteria and 90% knew that tooth brush should be changed once in every 3 months. Similar results were reported by a study done in North Jordan, which revealed only 30% of its study study subjects were not aware that gingivitis or bleeding gums is a primary sign of bad oral health (Al-omiri, Al-Wahadni, & Saeed, 2006). 30% of study subjects had a perception that oral health can affect general health while the same number of study subjects (30%), did not agree on this statement, in a study in rural Chennai of South India (Kuppuswamy et al., 2014).

2. Oral Health Attitude

To know about the student's perceived information and their attitudes towards oral health, the study subjects of this study were asked to describe the status of their teeth and gums on the rating of 0 to 5 (Excellent to very poor). Majority (26%-30%) of them, thought that their teeth and gum status is 'good' while only 20%-23% of them thought that they have 'excellent' status of their teeth and gums. These results are similar to that of a study conducted in rural schools of Chennai, South India (Kuppuswamy et al., 2014).

In my study, none of them reported 'very poor' teeth status but 1% of them reported 'very poor' gum status which is in contrast of results from similar study in Andavadoaka village, Madagascar, where 7.8% students perceived 'very poor to poor' status (Scaglia and Niknamdeh, 2017). Up to 95% study subjects of my study had a perception that dental check-up in every six months is important to maintain good oral health. Similar perception was reported by 71% of

study subjects in a study, conducted in Chennai, India((Amarlal et al., 2013).

Up to 64% study subjects of my study strongly agreed that caring for mouth is as important as caring for other parts of body while only 1.6% showed their disagreement on the same statement. Similar agreements by 39%-50% study subjects were observed in a study conducted in Andavadoaka village, Madagascar, where in they had a perception that taking care of teeth is very important and important, respectively (Scaglia and Niknamdeh, 2017).

Interestingly, 79% study subjects of my study revealed that they do not avoid dental visits due to any fear or past bad experiences. Contrasting results were seen in similar study done in Andavadoaka village, Madagascar where 40.8% study subjects avoided dental visits due to long distance to the clinic and the second reason reported by them was due to fear of pain 27.6 (Scaglia and Niknamdeh 2017).

It was pleasant to know that 68% study subjects reported 'dentist' as their source of information while 61.4% received their information from their respective families and 'school' was the third most common source of information. In contrast to these results, the majority (47.4%) of study subjects from a study in Andavadoaka village, Madagascar reported 'schools' as their source of information while their second most common source was 'dentist/hospital' (13.2%) (Scaglia and Niknamdeh, 2017).

3. Oral Health Behavior and Practices

This section of my study was intended to gather information about the behavioral practices which students apply in their day-to-day life. 69% study subjects of my study reported about their daily brushing practices 'twice daily' while 26% brushed their teeth 'once daily'. Surprisingly, 4.6% reported to brush their teeth thrice daily.

The results are contrasting to similar studies done in Madagascar where 57.9% study subjects brushed their teeth once daily, at least while only one-third brushed twice daily (Scaglia and Niknamdeh, 2017) and similarly in a study done in Himachal Pradesh where its baseline study results revealed that only 39.1% study subjects brushed their teeth twice in a day (Pathania et al., 2015).

Extensive use of 'mouthwash' as cleaning aid has been reported by 65% of study subjects while 9.5% used dental floss, 8.4% reported other cleaning aids such as tongue cleaner, and chewing gum. 17.5% reported no use of any type of cleaning aid. Similar results were seen by study done in rural Chennai, South India where 82% study subjects were not using dental floss (Kuppuswamy et al., 2014).

These results are contrary to similar study conducted in North Jordan where only 6% study subjects reported the use of mouthwash, 2% reported the use of floss and 7% reported the use toothpicks as their additional cleaning aid (Al-Omiri et al., 2006). Majority (87.5%) of study subjects in this study reported that they use tooth brush and tooth paste to clean their teeth while 4.5% reported the use of 'neemstick' and 3% used 'charcoal', 2% used 'meswak' and 1.5% used 'finger' to clean their teeth. A baseline study conducted in Himachal Pradesh revealed that 95.8% of its study subjects were using brush to clean their teeth (Pathania et al., 2015).

Similar study results, obtained from Chennai, India reported the use of toothbrush and tooth paste by its 98% of study subjects (Amarlal et al., 2013) Contrasting results were seen in a study done in Madagascar where the (10.5%) second most common method to clean their teeth was 'finger' while the first most common remains the 'toothpaste and brush (Scaglia and Niknamdeh, 2017).

The study subjects in this study, were also asked about the use of fluoridated toothpaste, among which majority (42.4%) of them reported the use of fluoridated toothpaste while 30.2% reported that they do not use fluoridated toothpaste. Surprisingly, 24% among them did not know whether they use fluoridated toothpaste or not. These results are in contrast to that of a baseline study done in Himachal Pradesh where only 9.7% study subjects reported the use of fluoridated toothpaste while majority (76.9%) of them did not know what kind of toothpaste they are using (Pathania et al., 2015).

In this study, 96.7% study subjects did not report for any adverse oral habits but remaining 3% study subjects reported their adverse oral habits such as smoking, alcohol, hukkah, snuff, and other habits (nail biting). Contrasting results were reported by a study done in rural Chennai, South India where 100% study subjects did not have any bad oral habits (Kuppuswamy et al., 2014).

Lastly, only 33.4% study subjects reported their last dental visit was within 6 months while majority (43.2%) did not remember when their last dental visit was. Only 14.6% study subjects had their dental visit before 6 months. These results are in contrast to that of similar study done in Chennai, India which reported that its 41.2% study subjects visited dentist before 6 months while 30.2% reported that they never had any dental visits (Amarlall et al., 2013).

Based on these results and findings, it can be said that in general, the students of age 13-16 years studying in a private school of Jodhpur, Rajasthan, had good oral health literacy levels including good to fair oral health knowledge, with a positive attitude towards oral health and are also having good behavioral practices. If the results are compared with similar studies done in low-income African countries, it is very evident that the oral health literacy levels of children

with similar age are bad with low knowledge and bad practices. The overall oral health related status of children living in middle to high income countries is far better than those living in low-income countries. The results of my study represent that family and/or parent's education plays important role in maintaining children's good oral health as well as general health too. The results also prove that regular dental visit in every 6 month gives the children good oral health literacy status too because regular dental visits to a dentist, enables the students to gain new knowledge, discuss their problems and even they get all the answers related to their queries.

4. Association between socio-demographic variables and frequency brushing teeth by the study subjects

Table 2 and 3 are illustrating the existence of significant association between the socio-demographic variables and frequency brushing teeth by the participants. From the analysis results it is evident that there is association of gender and brushing frequency by the participants. On the other hand, Table 4 is depicting no significant association between the socio-demographic variables and frequency brushing teeth by the participants, thrice daily.

Similar studies from literature review suggest that females are more likely to brush their teeth more than once daily as compared to males. Thus, this is suggestive of the possible association of both the variables with each other, in such a way that the chances of brushing teeth more than once daily may get increased if the participant is a female and vice-versa. A contrasting result were seen from a similar study done in rural Chennai, South India which applied the regression analysis between independent variables and oral hygiene status of children and showed no significant association between them) (Kuppuswamy et al., 2014).

Similar associations were tested to see the statistical significance using chi-square test, and only 'gender' was found to be significant with brushing teeth daily ($p=0.001$) in a study done in Riyadh city (Al Subait et al., 2016). From this study, it was evident that the oral health literacy levels of the school children of age 13 years to 16 years in Jodhpur, Rajasthan were fair to good but at the same time, they carry a potential to improve the levels by their own efforts, efforts from family and school as well. This study was limited to only one school of the city which may not depict the original status of all the mid-teenage students of the entire region or state. Special council of students should be made, and students should be encouraged to be a part of it, so that they can organize and participate in events and activities related to oral health promotion. This will help in enhancing the awareness of students regarding oral health and at the time it will inspire them to improve their knowledge and attitudes towards the same, thus this will also help in improving their behavioral practices.

AUTHOR CONTRIBUTION

Anahita Ali raised the initial research question, managed data collection, ran statistical analysis, and drew tables and graphs.

CONFLICT OF INTEREST

There is no conflicts of interest in this study.

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