

Original Article

Dental awareness and dental hygiene practices in school students in Ludhiana

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ABSTRACT:

Introduction: The aim of this study was to assess the dental knowledge and the hygiene practices of school children in the age range of 12-15 years belonging to Ludhiana, a city in Punjab state of India. **Material and Methods:** A cross-sectional study was carried out in Ludhiana, Punjab from March 2021 to June 2021. A total of 30 schools were selected at random of different areas and approached via E-mail out of which, 8 were willing to participate. A total of 3277 students in the age group of 12-15 years participated in the survey out of which, 3000 students were randomly selected to make the sample size equal for each age. To obtain the information, on dental awareness and oral hygiene practices, an online questionnaire in the form of Google forms was administered to the students. Data management and statistical analysis was done. **Results:** About 48.5% of students reported a high level of knowledge about oral health and oral hygiene practices. Only 45.3% of the students brushed twice daily while 37.2% of the students practiced flossing of teeth along with brushing. About one-fifth of the children (20.9%) thought incorrectly that one must visit the dentist only in case of pain in ones teeth. About 49% of children were not aware about the cariogenic potential of soft drinks. Less than half (39.5%) of children were not aware about fluoride. Slightly more than half (51.8%) of students correctly recognised all the signs of tooth decay. **Conclusion:** The dental awareness and dental hygiene knowledge in Ludhiana is below satisfactory level. Less than half of the surveyed students had adequate oral health knowledge.

Keywords: dental awareness, dental practices, dental hygiene, oral health, Ludhiana, google form, online survey, school children

Received: 22 June, 2021

Accepted: 28 July, 2021

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This article may be cited as: Dhaliwal JK, Arora A, Walia NK. Dental awareness and dental hygiene practices in school students in Ludhiana. J Adv Med Dent Scie Res 2021;9(8):96-103.

INTRODUCTION

The health of a child is the result of a combination of his social surroundings, cultural background, beliefs, physical conditions and education. [1] Dental caries and periodontal problems are the most common global health problem of the modern era. Oral diseases are a major health problem for many countries and affect citizens throughout their lifetime, causing pain, discomfort and other health diseases. Nearly 3.5 billion people are affected with oral diseases throughout the world. [2] Prevalence of dental caries in primary teeth is more than 530 million. [2] Periodontal diseases affect about 20-50% of global population. [3] Adolescents, adults and older individuals show high prevalence of periodontal disease. [3]

Dental caries affect 60-90% of school going children in Asian countries. It is recommended that oral health promotion at school level should be done to develop better oral health awareness and oral hygiene habits in children. [4] Thus, one of the best ways to provide oral health education is through schools, as children from a variety of socioeconomic backgrounds have equal chances of learning about their oral health.

The hygiene practices of children are also highly influenced by parents/guardians. Parents' oral health behaviour could influence their children's gingival health and dental caries directly and/ or indirectly through its effect on children's oral health behaviour. [5] Parents with good oral habits can encourage their offspring to follow the same and can also increase their knowledge on the consequences of

bad oral hygiene. The dental health of children was found to be associated with those of their parents and to their parents' professional status. [6] To create such oral health education, the assessment of knowledge and attitude is essential. [7] Knowledge means that the children know and understand what oral disease is and how it arises, as well as to understand the protective measures that need to be adopted. This knowledge results in a change in attitude, which helps the individuals to make changes in their daily life. School education programs will enable children to make decisions about oral health regarding their own children in the future or even their community. [8]

The hypothesis that oral health education can improve the oral health knowledge further improving their oral hygiene practices is still under debate. The decline of dental caries in Europe and the USA during the past years have been primarily associated with factors such as fluoridated water, fluoridated toothpaste, and the use of sealants.[9,10,11,12,13] Therefore, oral health education may not be the main cause for the decline in dental caries, but it cannot be disregarded either. Children must be knowledgeable of not only the causes of oral diseases but also the current preventive measures to avoid them, such as fluoridation of drinking water. [14]

In India, the level of oral health knowledge is different among the children depending on the region/state of India they belong to. Hence, the aim of this study was to assess the dental knowledge and the hygiene practices of school children in the age range of 12-15 years belonging to Ludhiana, a city in Punjab state of India.

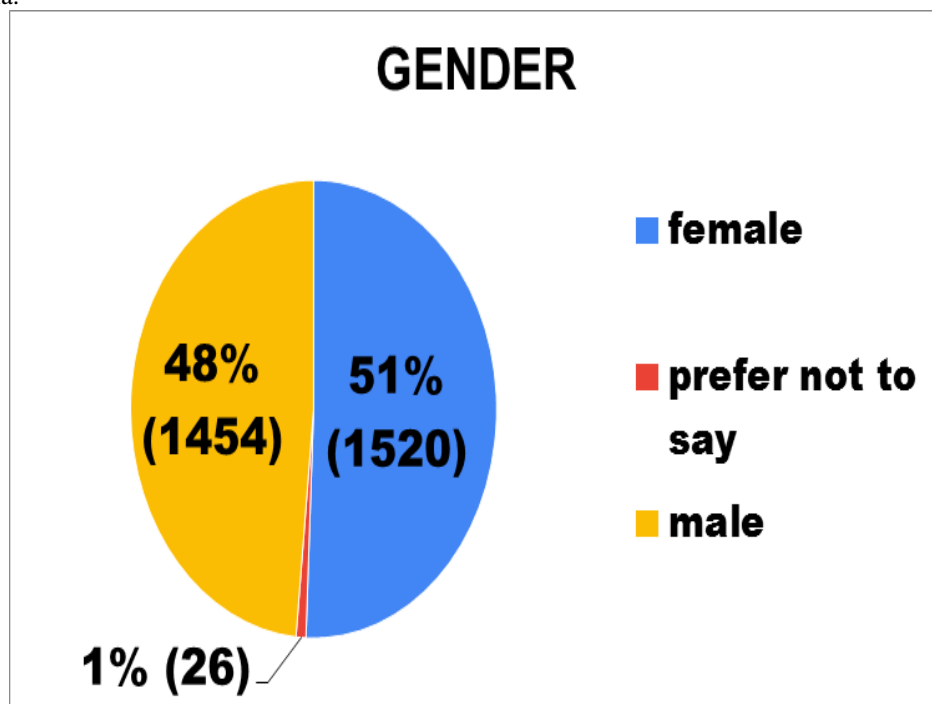
MATERIAL AND METHOD

SAMPLE SIZE (THE SELECTION OF SCHOOLS AND CHILDREN WITHIN THE SCHOOL)

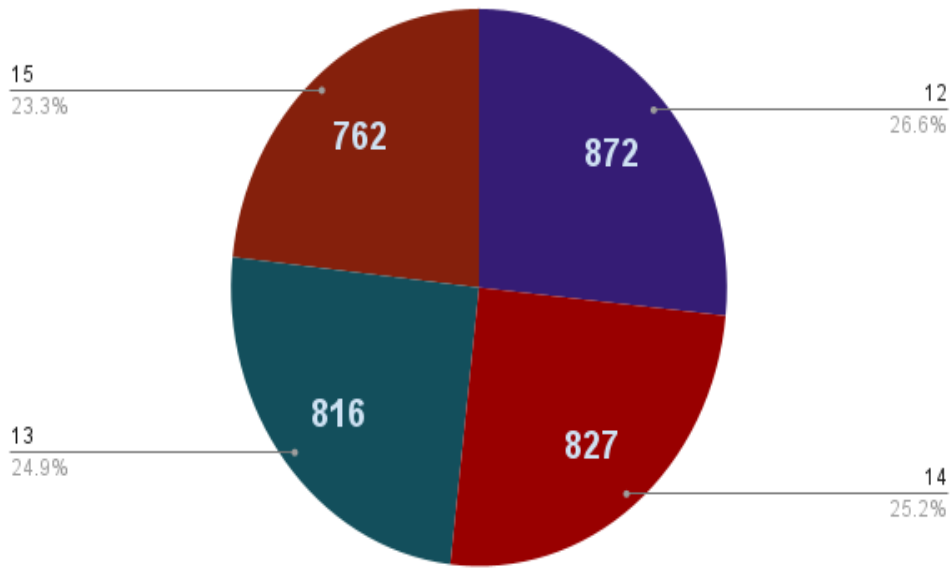
The research work was carried out between March 2021 and June 2021. There are approximately following affiliated private schools in Ludhiana 1.PSEB- state (Punjab) board affiliation (approximately =326) and 2. CBSE- Central Board of Secondary Education (approximately = 125) which have 12-15 years of students. [15][16] These boards were selected because of their national uniformity in education, so they represent the education level of Ludhiana in relation to India as a whole. Due to COVID-19 pandemic restrictions, it was impractical to approach the schools physically. Hence, an online survey questionnaire was prepared. This questionnaire was prepared in the form of Google forms. An online request for the participation of school children in the survey as an application was sent to 30 schools selected at random from different areas via E-mail out of which, 8 schools were willing to participate.

The total number of children who responded to the survey was 3,304 between April 2021 to June 2021, out of which, only 3,277 students agreed to participate in the survey by reading and agreeing to the consent form which specified that the students were doing the survey in the presence or with the permission of a parent/guardian.

The students who participated in the survey were divided on the basis age.



AGE



To create an equal sample size for each age, a random sample size of 750 children for each age (12, 13, 14, 15 years) were selected from the students who participated.

The principals of each of the interested schools had signed a consent form. The school children who were below 12 years or over 15 years were not invited to participate in the study

QUESTIONNAIRE

The research had a quantitative approach constituting close ended questions in an online questionnaire format via Google form. The questionnaire included ten questions, 5 of which were aimed at understanding the dental awareness while the other 5 were asked about the oral hygiene practices of students. Children were made aware that for some questions, children were free to choose more than one answer. Furthermore, after the survey, the children through the schools were shown an online video which provided them with all the necessary knowledge for the betterment of oral hygiene of students and the right answers to the questions in the survey.

The questions in the survey were selected from the information about oral health knowledge and practices which were a part of previously surveyed questionnaires used in formerly conducted oral health research.[7,17, 18, 19, 20, 21] The questions were also in consideration with the guidelines given by WHO regarding oral health promotion and education in school children.[22, 23]

The questionnaire was written in English. The questionnaire was designed such that coherent for the school going children in the 12-15 age group. To ensure this, the questionnaire was sent to the principals of selected schools along with the consent forms via E-mail. Minor changes were made in the

terminologies in the questionnaire as suggested by the school authorities before conduction of the actual survey.

Consent form for the participation and acknowledgement of the parents/guardians of the participating students was included in the survey in the beginning of the Google form. The consent form was mandatory to fill for the participation in the survey and to submit a response. The questions aimed at evaluating the students' oral health knowledge, habits which included brushing and flossing, use of oral hygiene aids, attitude towards regular dental visits, fluorides, signs of gum diseases, signs of tooth decay and importance of a balanced diet.

DATA MANAGEMENT AND STATISTICAL ANALYSIS

The responses were stored securely in the Google document format in a Google drive. The responses were assessed for comprehensiveness and simplicity before entering the data in the computer. All the data was entered in Microsoft Office Excel 2010 and a spread sheet was created. The spread sheet created by the researchers was matched with the spread sheet created by Google documents with the Google survey form. The copies of the data were stored on a password protected computer by the researchers. The collected data was kept confidential.

Microsoft Office Excel 2010 released in 2010 was used to analyse the data. Descriptive statistics were obtained, and Chi-square test was done to compare the proportions. Statistical significance was fixed at $P < 0.05$.

FORMAL CONSENT

A formal consent to conduct the survey was obtained from principal at Baba Jaswant Singh Dental College,

Hospital and Research Institute. Consent forms were also obtained from the principals of the participating schools. In order to participate in the survey, it was made mandatory for the students to fill a digital consent form in the beginning of the survey that acknowledged that the students were doing the survey in the presence of a parent/guardian or with the permission of a parent/guardian.

RESULTS

A total of 27 children did not complete the responses in their questionnaire, so they were excluded from the study while 3,277 completed the study. To keep the sample size equal for each age, 277 students in total were also excluded from the study at random.

RESPONSES TO THE DENTAL AWARENESS AND DENTAL HYGIENE PRACTICES QUESTIONNAIRE

Children's responses to dental awareness and dental hygiene practices questions by age are presented in Table 1.

Majority of children considered tooth pain (63.4%) and cavities in teeth (61.3%) the major signs of tooth diseases, however, a large number 1098 (36.6%) of children thought incorrectly that yellowing of teeth was a sign of tooth disease. More than half of the children 2073 (69.1%) did not consider blackish colouration of teeth as a sign of tooth decay. A large amount of children 1460 (48.6%) considered bleeding gums as a sign of tooth disease.

Nearly half, 1360 (45.3%) of the children brushed twice a day and only 990 (33.0%) actually recognised flossing once daily as an oral hygiene practice along with brushing their teeth two times a day. Almost all of the respondents (96.7%) knew that brushing once every other day was not a healthy habit. A statistically significant difference with $P = 0.02$ when comparing the oral hygiene habits among the age group 12-15 years was seen.

About one-fifth of the children 629 (20.9%) thought incorrectly that one must visit the dentist only in case of pain in ones teeth. Almost 39.3% of students had a very casual approach to visiting a dentist answering that they visited only when they felt the need to. While a small number, 32.1% of total students knew correctly that the dentist should be visited once every six months.

Nearly half of the total students 1464 (48.8%) visited the dentist for regular check-up. Most of the students visited the dentist only due to pain in their teeth 1226 (40.8%). While 23.3% of the children went to get a filling or cleaning of teeth done, only a few of the students (10.2%) went to get braces. A significant statistical difference of 0.02 among the 12-15 year students was seen when they were asked about their purpose of visiting a dentist.

Approximately, 2310 (77.0%) knew that the best way to brush their teeth was a combination of horizontal, vertical and rotational brushing movements on the other hand, 11.9% of students believed in brushing their teeth in rotational motion.

A high number of students 1906 (63.5%) identified tooth brush, mouthwash and floss all together as best tooth cleaning measures. Very few students 66 (2.2%) and 34 (1.1%) believed that dental floss and mouthwash individually were best teeth cleaning measures respectively.

A large amount of students 2768 (92.2%) knew that tooth decay was caused by eating sweets like chocolates and candies. Almost half of the students also recognised soft drinks (51%) and fast food like burger and pizzas (45%) caused tooth decay.

Less than half 1189 (39.5%) of children were not aware about fluoride while on the other hand, 889 (29.6%) had heard about fluorides. A statistically significant difference ($P=0.01$) was observed while comparing the knowledge of children in the age group 12-15 years about fluorides. This means that the awareness about fluorides depends on age.

Most of students 2440 (81.3%) and 1604 (53.4%) respectively recognised blood from the gums and redness of gums as a sign of gum diseases however, 2106 (70.2%) of students were unaware of bad breath being a sign of same.

About 49.4% of children correctly identified blood on their toothbrush as a sign of gum disease and not due to tooth decay which was perceived as a cause by 268 (8.9%) students. However, 406 (13.5%) of students were heedless to the reason behind the same.

Overall, there was not a huge difference among the children about oral health knowledge based on age. Furthermore, a higher proportion of children in all age groups (12-15 years) demonstrated below satisfactory level of awareness and oral hygiene practices.

Table 1 – Distribution of dental awareness and dental hygiene knowledge by age

Questions	Total(n=3000)(%)	Age-12years (n=750)(25%)	Age-13years(n=750)(25%)	Age=14years(n=750)(25%)	Age=15years(n=750)(25%)	p value
Tooth diseases can have which of the following signs?(more than one option can be selected)						
						0.7
tooth pain	1902(63.4%)	458(61%)	490(65.3%)	483(64.4%)	471(62.8%)	
yellowing of the teeth	1098(36.6%)	273(36.4%)	273(36.4%)	286(38.1%)	266(35.4%)	
blackish coloring of teeth	927(30.9%)	208(27.7%)	259(34.5%)	246(32.8%)	214(28.5%)	
cavities in teeth	1840(61.3%)	448(59.7%)	456(60.8%)	483(64.4%)	453(60.4%)	
bleeding gums	1460(48.6%)	330(44%)	365(48.6%)	381(50.8%)	384(51.2%)	
How do you practice oral hygiene ?						
						0.02
brush once and floss once daily	127(4.2%)	27(3.6%)	36(8.4%)	33(4.4%)	31(4.1%)	
brush only once daily	423(14.1%)	82(10.9%)	93(16.5%)	124(16.5%)	124(16.5%)	
brush twice daily	1360(45.3%)	342(45.6%)	339(45.8%)	344(45.8%)	335(44.6%)	
brush twice and floss once daily	990(33.0%)	269(35.8%)	262(30.2%)	227(30.2%)	232(30.9%)	
brush once every other day	100(3.3%)	30(4.0%)	20(2.9%)	22(2.9%)	28(3.7%)	
How many times do you visit a dentist ?						
						0.6
once every six months	965(32.1%)	258(34.4%)	241(32.1%)	229(30.5%)	237(31.6%)	
once a year	225(7.5%)	65(8.6%)	52(6.9%)	59(7.8%)	49(6.5%)	
whenever I feel the need to	1181(39.3%)	273(36.4%)	301(40.1%)	300(40.0%)	307(40.9%)	
only in emergency or in pain	629(20.9%)	154(20.5%)	156(20.8%)	162(21.6%)	157(20.9%)	
What have you visited the dentist for?(more than one option can be selected)						
						0.02
for regular check up	1464(48.8%)	372(49.6%)	363(48.4%)	373(49.7%)	356(47.4%)	
to get a filling done	699(23.3%)	180(24.0%)	170(22.6%)	163(21.7%)	186(24.8%)	
to get cleaning of teeth done	700(23.3%)	184(24.5%)	156(20.8%)	171(22.8%)	189(25.2%)	
Due to pain in my teeth	1226(40.8%)	295(39.3%)	307(40.9%)	314(41.8%)	310(41.3%)	
To get braces	307(10.2%)	45(6.0%)	90(12.0%)	86(11.4%)	86(11.4%)	
How do you brush your teeth ?						
						0.6
A combination of all the above	2310(77.0%)	570(76.0%)	578(77.1%)	581(77.4%)	581(77.4%)	
horizontal direction	194(6.4%)	42(5.6%)	51(6.8%)	52(6.9%)	49(6.5%)	
vertical direction	138(4.6%)	42(5.6%)	27(3.6%)	37(4.9%)	32(4.2%)	
rotationally	358(11.9%)	96(12.8%)	94(12.5%)	80(10.6%)	88(11.7%)	
Which of the following is the best teeth cleaning measures ?						
						0.3
tooth brush	994(33.1%)	269(35.8%)	236(31.4%)	241(32.1%)	248(33.0%)	
floss	66(2.2%)	20(2.6%)	17(2.2%)	10(1.3%)	19(2.5%)	
mouthwash	34(1.1%)	8(1.0%)	10(1.3%)	11(1.4%)	5(0.6%)	
all the above	1906(63.5%)	453(60.4%)	487(64.9%)	488(65.0%)	478(63.7%)	
Which of the following causes tooth decay?(more than one option can be selected)						
						0.7
sweets (chocolates/ candies)	2768(92.2%)	699(93.2%)	690(92.0%)	699(93.2%)	680(90.6%)	
soft drinks	1531(51.0%)	394(52.5%)	386(51.4%)	393(52.4%)	358(47.7%)	
fast food (burgers/pizzas)	1396(46.5%)	376(50.1%)	358(47.7%)	349(46.5%)	313(41.7%)	
vegetables	103(3.4%)	29(3.8%)	26(3.4%)	20(2.6%)	28(3.7%)	
milk	136(4.5%)	27(3.6%)	38(5.0%)	33(4.4%)	38(5.0%)	
Have you heard about fluorides ?						
						0.01
yes	889(29.6%)	226(30.1%)	242(32.2%)	222(29.6%)	199(26.5%)	
no	1187(39.5%)	323(43.0%)	285(38.0%)	274(36.5%)	305(40.6%)	
maybe	924(30.8%)	201(26.8%)	223(29.7%)	254(33.8%)	246(32.8%)	
Gum diseases can have which of the following signs?(more than one option can be selected)						
						0.9
blood from the gums	2440(81.3%)	618(82.4%)	606(80.8%)	617(82.2%)	599(79.8%)	
bad breath	894(29.8%)	237(31.6%)	218(29%)	214(28.5%)	225(30%)	
redness of gums	1604(53.4%)	398(53%)	402(53.6%)	403(53.7%)	401(53.4%)	
Blood on your toothbrush may be due to?						
						0.3
gum disease	1483(49.4%)	365(48.6%)	364(48.5%)	374(49.8%)	380(50.6%)	
tooth decay	268(8.9%)	61(8.1%)	58(7.7%)	72(9.6%)	77(10.2%)	
I don't know	406(13.5%)	118(15.7%)	103(13.7%)	91(12.1%)	94(12.5%)	
both of the above	843(28.1%)	206(27.4%)	225(30%)	213(28.4%)	199(26.5%)	

DISCUSSION

This study presented an informative overview about the dental awareness and dental hygiene practices among 12-15 year old school going students in

Ludhiana, Punjab. To the best of our knowledge, this study speaks for the first of its kind in Ludhiana to explore this topic among school children.

DESIGN AND METHODOLOGICAL ISSUES

The research had a quantitative approach constituting close ended questions in an online questionnaire format via Google form. The questionnaire included ten questions, 5 of which were aimed at understanding the dental awareness while the other 5 were asked about the oral hygiene practices of students. Children were made aware that for some questions, children were free to choose more than one answer. Furthermore, after the survey, the children through the schools were shown an online video which provided them with all the necessary knowledge for the betterment of oral hygiene of students and the right answers to the questions in the survey. Close-ended questions are comparatively superior to open-end questions and these have been differentiated in the literature. [24] The close ended question have an edge that they are easier to evaluate (statistical interpretation can be easily perceived). On the other hand, responses to open ended questions are difficult to evaluate because respondents are allowed to use their own words in their own handwriting which can be illegible and might be time-taking.

DENTAL AWARENESS AND HYGIENE PRACTICES

Oral health practices can be understood on two broadly defined sets of behaviours, firstly; oral habits such as maintain a good oral hygiene, eating balanced diet and knowledge about fluorides, secondly; use of dental health services like visiting a dentist regularly and oral health education.[25]

In the present study, regarding the oral hygiene habits, 78.3% children performed the recommended habit of brushing the teeth twice daily, this is more than that observed in Chennai, India (2014)[26] This survey found that a high per cent of children in this study brushed their teeth twice a day, this in contrast to the study done in Jordanian children where majority of them brushed only once a day. [7] Brushing once preferable in the morning may indicate that such habits are difficult to change just by mass education. [27] Majority of children nearly 90% of them used tooth brush for cleaning their teeth. Similar results were reported (WHO)[28] The discrepancy of using toothbrush maybe due to modern lifestyle of children living in cities rather in rural areas. [26] In our study, 37.2% of children were aware that tooth brushing and flossing could be an effective tool in preventing dental problems which is similar to the study in Chennai, India [26] and higher than that done by Punitha and Sivaprakasam where only 14.81% of children are aware of the same fact. [29]

The awareness of periodontal disease seems fair among the children in Ludhiana. Most of the students were aware of bleeding gums as a sign of gum disease whereas, only a few children were aware of that in Chennai [26] However; about 29.8% of children did not know that bad breath was also a sign of gum disease.

According to the children's opinion major factors that caused dental problems were sweets (92.2%) and fizzy drinks (51.0%) which is parallel the observations made by Al- Omiri et al. in Jordanian children that is 87.4% and 77.4% respectively [7] and to that done in Chennai that is 81.8% and 77.1% respectively. [26]

In general, it is seen that children are less aware about major oral diseases; this may be seen in the light of the fact about the regular visit to their dentist. [26] Almost half 48.8% children were aware of the importance of regular dental visits but only 32.1% practiced it by visiting the dentist every six months whereas, according to a study done by Zhu et al. 73.6% of the children in China knew that regular dental check up are necessary.[30] Similarly, 71.6% of children in Chennai agreed with the same but in reality only 19.1% of them practiced it.[26,7]

There were 20.9% of children who would seek dental service only when they suffered from pain in contrast to 39.2% in Chennai [26] and 58.97% in a study done by Punitha and Sivatrakasam among rural children in kanchipuram. [29] Only 32.1% of children in our study used dental services once in every six months which is still less than Canadian schools where 50% of the children used dental services once in every six months. [31]

It is seen in this study that less than half of the children 889 (29.6%) had actually heard about fluoride which is similar to the study in Qatar 822 (38.9%). [21] These results are similar to studies carried out in other countries such as Saudi Arabia and Canada. [19, 32]

In Ludhiana city, the knowledge of school going children about dental hygiene practices and behaviour is below satisfactory and can be improved by better oral health education. Hence, the purpose of this study was to assess the existing level of dental awareness and oral hygiene practices among school children in the age group of 12-15 years in Ludhiana, which allows us to compare it among other states at national level and children's oral health knowledge in other nations.

CONCLUSION

The dental awareness and dental hygiene knowledge in Ludhiana is below satisfactory level. Majority of the students lacked the use of dental floss in their daily routine and were unaware about regular visits to the dentists, fluorides and bad breath as a sign of gum disease.

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