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# Assessment of Oral Health Literacy, Attitudes, Behavior and Oral Health Related Quality of Life among primary school children in Punjab: A Cross- Sectional Survey

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## Abstract

General oral health has a great impact on the individual's overall health and well-being. Oral disease is a health problem of considerable burden which often leads to pain and more significantly tooth loss; a condition that affects the appearance, quality of life, nutritional intake, and consequently the growth and development in children and among these, Dental caries and periodontal disease are the most widespread in the human population. There are a number of contributing factors; however diet and oral hygiene contribute most to oral health. Oral hygiene is the single most important factor in the prevention of oral health conditions. The relation between better oral health and increased knowledge is well known, but the exact relationship between oral health awareness, health-related attitudes and behavior is not so linear and a lot of other factors may play quite a significant role. Limited studies have been done to assess the Knowledge, Attitude and Practice scores in children in India

Therefore, this study was aimed to assess the Oral Health Literacy, Attitude, Behavior and Oral Health Related Quality of Life among Private primary school students aged 9-12 years in Dera Bassi city of Mohali District.

**Keywords:** Attitude, Dental Caries, Hygiene, Literacy,

**Introduction**

Oral health is a window of an individual's overall health. Oral diseases affect nearly 3.9 billion people globally. (1) Unfortunately, globally the prevalence of dental caries and periodontal disease are amongst the most widespread health conditions in children, affecting from about 67.5% to over 80% of school children in some countries which amounts to a great public health burden. (2-5)

According to WHO, Oral Health is defined as "a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing." (6) Historically, oral disease has been a major public health problem with a high prevalence and incidence, especially in developing countries (7). In India, a national health survey conducted by Dental Council of India found a high prevalence (85%) of children with dental caries. The mean prevalence of dental caries in India among World Health Organization's index age groups: are 5, and 12 years and 15 years was 49%, and 60%, respectively. (8)

A number of factors namely; diet, hygiene, stress, exercise and lifestyle form the fundamental basis of the common risk factor approach of the WHO in preventing a range of conditions including oral diseases.(9). While, oral hygiene is one of the most important factors, Oral health literacy is also crucial for understanding how to prevent oral diseases. Adequate OHL is essential to instill appropriate oral health behaviors needed in preventing oral diseases resulting in overall better oral health outcomes. (10)

In recent years, globally there has been an increased emphasis on the educational approach in the prevention and control of health problems. A considerable challenge in India has been to impart knowledge through health promotional programs. Population size and meagre economic and health care resources to cater its rapidly growing population makes it a difficult task. (11)

Therefore, assessment of OHL (knowledge), attitudes and oral hygiene behavior in a child population allows us to determine the risk factors for preventable oral diseases and to develop behavior modification strategies. (12) Schools have great and lifelong influence on children's physical development and mental well-being [13]. During the formative elementary school years, children can be provided with information to improve their health literacy empowering them in making better choices, adopting healthier lifestyle and to resolve conflicting pieces of information. However, as witnessed in many developing countries, children typically have limited health literacy regarding the causes and prevention of oral diseases [14-15].

Very few studies have been done to assess the level of OHL and the attitudes and practices of children in India and none in Mohali district as per the data available. Therefore, this study was aimed to assess the OHL, Attitude, Behaviour and Oral Health Quality of Life (OHQoL) and associations if any with familial and social factors among school children, ages 9-12 years, in Dera Bassi city of Mohali District.

**Materials and methods**

A cross-sectional questionnaire survey was conducted amongst 125 primary level school students, in Dera Bassi, Punjab India. A simple random sampling was done to select the students for the purpose of the study.

- Inclusion and exclusion criteria

Inclusion – Subjects with good general health at the primary school level.

Exclusion - medically compromised subjects and those who were unable to communicate were excluded from the study.

Ethical approval and official permission: Before starting the survey ethical approval was obtained from the institutional ethical committee of National Dental College and Hospital and official permission was obtained from the authorities (Principal/Director) of the school included in the study. The principal of the school was asked to inform the children and their parents about the study. After taking Parental consent, a day was set for each school to collect the data.

Survey Form: Pretested self-administered questionnaires were divided into four domains addressing OHL, attitudes toward dental services, oral hygiene behavior, and OHQol three out of four survey forms consisted of 15 questions, while the attitudes survey consisted of only six questions. (16). Questionnaires were administered to all study participants. Pilot testing of the questionnaire was carried out by initially administering it to randomly selected group of 10 students.

Methodology: Informed consent was obtained from participants' parents before the administration of the questionnaire, explaining the need and the purpose of the study. The response format included multiple-choice questions in which the students who agreed to participate and available on the days of the survey were instructed to choose only one response from the provided list of options. The students were given instructions regarding filling the questionnaire. Furthermore, the investigator was present while the questionnaire was being filled and all queries of participants were addressed by the investigator. The students were asked to fill in the questionnaire without discussion. Time taken by students for completing the survey was 15- 18 minutes (9 years) and 10-12 minutes (10-12 years).

Assessment of a participant's OHL included questions on benefits of fluoride, the necessity of regular dental visits, the role of sugar in causing dental caries, the importance of teeth in the health of body, misalignment of teeth on oral health and importance of regular dental check-ups. Assessment of the participants' oral health-related attitude included items on the frequency of visits to a dentist and reasons for visiting and not going to the dental office. Assessment of a participant's oral health-related behavior included questions on frequency, duration and time of cleaning, cleaning aids used and replacement, type of toothbrush and brushing technique if used, use of fluoridated toothpaste, and amount of dentifrice used. Assessment of a participant's OHQoL included questions on toothache, discoloration of teeth, sore spots in mouth, and bad breath.

**Statistical Analysis**

The data were coded and analyzed using the Statistical Package for the Social Sciences software (SPSS).Descriptive statistics were obtained, and frequency distributions were calculated. The Chi-square test was used; $P < 0.05$ was considered as statistically significant.

**Results**

A total of 125 primary school children participated in this assessment. Each child participating in the study completed all four domains: Oral Health Literacy, Attitude, behaviour and Oral Health Related Quality of Life in the form of the questionnaires. Response rate was 100%.

The sociodemographic characteristics of the schoolchildren are shown in Table 1. More boys (n = 71; 56.8%) participated in this assessment as compared to girls (n = 54; 43.2%). The average age of the children was 9.09 years. With regard to the level of education, 42 (33.6%) of students were in Grade 3, 26 (20.8%) in Grade 4, 28 (22.4%) in Grade 5 and the rest 29(23.2%) were Grade 6 students.

Table 1: Socio-demographic factors of Children's considered in the study

| Socio-demographic factors | | Children (n) | N (%) |
|---|---|---|---|
| Age | 9 yrs. | 51 | 40.8% |
| | 10 yrs. | 26 | 28.8% |
| | 11 yrs. and above | 38 | 30.4% |
| Gender | Male | 71 | 56.8% |
| | Female | 54 | 43.2% |
| Grade | 3rd | 42 | 33.6% |
| | 4th | 26 | 20.8% |
| | 5th | 28 | 22.4% |
| | 6th | 29 | 23.2% |

**Knowledge on oral hygiene**

Among participants, 60.8% had accurate knowledge regarding the problems associated with dental plaque; 45.6% knew that gum bleeding (inflamed gum) was a sign of an unhealthy mouth. Most (84.8%) of the children knew the correct way/ways to brush their teeth and 40% of the children knew the correct way of using toothbrush for cleaning their teeth. A little over one-third (37.6%) of the children had knowledge regarding the importance of using dental floss, while 60.8% knew that brushing the tongue is equally important. Only 15.2% of the school children indicated knowledge about dental sealants while and 52% knew how frequently one should visit the dentist. About 64% children correctly answered about which foods and beverages (sweets, soda) have a negative impact on the teeth; whereas, 45.6% of the children knew the purpose of fluoride in keeping will keep their teeth healthy.

Table 2: Respondents knowledge on oral health

| Questions | Correct answer N (%) | Incorrect answer/ I don't know answer N (%) |
|---|---|---|
| How often should children clean their teeth? | 89(71.2%) | 36(28.2%) |
| When children clean their teeth, which way(s) is/are best? | 106(84.8%) | 19(15.2%) |
| Drinking water with fluoride in it keeps my teeth healthy? | 57(45.6%) | 68(54.4%) |
| It is normal for a person's gums to bleed when cleaning teeth. | 57(45.6%) | 68(54.4%) |
| How often should children visit the dentist? | 65(52%) | 60(48%) |
| What do dental sealants do? | 19(15.2%) | 106(84.8%) |
| When a child cleans his/her teeth, which teeth should be cleaned? | 42(33.6%) | 83(66.4%) |

| | | |
|---|---|---|
| Which of the foods and drinks are bad for your teeth? | 80(64%) | 45(36%) |
| What type of water is best for your teeth? | 49(39.2%) | 76(60.8%) |
| When cleaning with toothbrush, how long should the teeth is brushed? | 55(44%) | 70(56%) |
| How often should a child get a new toothbrush? | 41(32.8%) | 84(67.2%) |
| When cleaning with toothbrush, Which is/are the best way(s)? | 50(40%) | 75(60%) |
| Dental plaque can cause which types of problems? | 76(60.8%) | 49(39.2%) |
| When cleaning your teeth, it is important to use dental floss. | 47(37.6%) | 78(62.4%) |
| It is important to brush the top and sides of your tongue. | 76(60.8%) | 49(39.2%) |
| After eating a meal, it is best to brush your teeth right away. | 63(50.4%) | 62(49.6%) |

**Gender Differences in Oral Health Literacy**

Gender comparisons were conducted on the OHL items. A total of 84.8% of the students (44.8% male and 40% female) knew the best ways to clean their teeth, with a significant difference between genders. In terms of knowledge regarding bleeding gums, significant gender differences (19.2% male and 26.4% female students) existed regarding knowledge that bleeding from the gums was not considered to be normal in the oral cavity (P =0.002). Significantly, more male children (23.2% %) compared to female children (14.4%) had current knowledge regarding how frequent regular dental visits should be (P =0.004). Awareness regarding fluorinated water as being best for healthy teeth showed statistically significant differences between male (29.6%) and female (9.6%) students (P =0.001).

**Table 3: Respondents knowledge on oral health based on gender difference**

| Questions | Correct answer N (%) | | Incorrect answer/ I don't know answer N (%) | | Chi-Square | P |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | | |
| How often should children clean their teeth? | 52(41.6%) | 37(29.6%) | 19(15.2%) | 17(13.6%) | 0.333 | .564 |
| When children clean their teeth, which way(s) is/are best? | 56(44.8%) | 50(40%) | 15(12%) | 4(3.2%) | 4.479 | .034 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Drinking water with fluoride in it keeps my teeth healthy? | 21(16.8%) | 8(6.4%) | 50(40%) | 46(36.8%) | 3.752 | .053 |
| It is normal for a person's gums to bleed when cleaning teeth. | 24(19.2%) | 33(26.4%) | 47(37.6%) | 21(16.8%) | 9.221 | .002 |
| How often should children visit the dentist? | 7(5.6%) | 9(7.2%) | 64(51.2%) | 45(36%) | 27.98 | 0.000 |
| What do dental sealants do? | 8(6.4%) | 11(8.8%) | 63(50.4%) | 43(34.4%) | 1.972 | .160 |
| When a child cleans his/her teeth, which teeth should be cleaned? | 26(20.8%) | 16(12.8%) | 45(36%) | 38(30.4%) | 0.672 | .412 |
| Which of the foods and drinks are bad for your teeth? | 49(39.2%) | 31(24.8%) | 22(17.6%) | 23(18.4%) | 1.793 | .181 |
| What type of water is best for your teeth? | 37(29.6%) | 12(9.6%) | 34(27.2%) | 42(33.6%) | 11.498 | .001 |
| When cleaning with toothbrush, how long should the teeth is brushed? | 33(26.4%) | 22(17.6%) | 38(30.4%) | 32(25.6%) | 0.410 | .522 |
| How often should a child get a new toothbrush? | 24(19.2%) | 17(13.6%) | 47(37.6%) | 37(29.6%) | 0.075 | .784 |
| When cleaning with toothbrush, Which is/are the best way(s)? | 32(25.6%) | 18(14.4%) | 38(30.4%) | 37(29.6%) | 2.712 | .258 |
| Dental plaque can cause which types of problems? | 46(36.8%) | 30(24%) | 25(20%) | 24(19.2%) | 1.097 | .295 |
| When cleaning your teeth, it is important to use dental floss. | 30(24%) | 17(13.6%) | 41(32.8%) | 37(29.6%) | 1.517 | .218 |
| It is important to brush the top and sides of your tongue. | 48(38.4%) | 28(22.4%) | 23(18.4%) | 26(20.8%) | 3.194 | .074 |
| After eating a meal, it is best to brush your teeth right away. | 36(28.8%) | 27(21.6%) | 35(28%) | 27(21.6%) | 0.006 | .938 |

**Gender Differences in Oral Health Attitudes**

Approximately 24.8% of boys and 25.6% girls reported that, it is important to have white teeth and pleasant breath; and only 14.4% boys and 8.8% girls believed that there should be no cavities in the mouth. . A little less than one-third (29.6%) of children reported to enjoy brushing their teeth while 36% of children did not. . Nearly 35.2% of the male and 20% female children reported that they

felt angry when they were visiting the dentist while 42.4% (26.4% male and 16% female) stated they were happy. Most of the children reported to not like the injection used for their treatment, while 19.2% boys and 16% girls were afraid of instrumentation commonly used in dental procedures. There was no significant difference between girls and boys in the proportion of their overall attitudes towards oral health services.

Table 4: Gender Differences in Children's attitudes on oral health

| Questions | Male N (%) | Female N (%) | P |
|---|---|---|---|
| *When I think about going to the dentist, the feeling I have is: | | | |
| • Happy | 33(26.4%) | 20(16%) | .290 |
| • calm and relaxed | 26(20.8%) | 20(16%) | .962 |
| • afraid | 24(19.2%) | 9(7.2%) | .031 |
| • angry | 44(35.2%) | 25(20%) | .081 |
| • sad | 16(12.8%) | 8(6.4%) | .278 |
| • upset | 37(29.6%) | 11(8.8%) | .000 |
| • scared | 19(15.2%) | 19(15.2%) | .310 |
| • feeling helped | 22(17.6%) | 22(17.6%) | .258 |
| • pleased | 20(16%) | 25(20%) | .036 |
| • worried | 29(23.2%) | 27(21.6%) | .276 |
| • feeling ok | 28(22.4%) | 19(15.2%) | .627 |
| • healthy | 38(30.4%) | 21(16.8%) | .105 |
| Which best describes you regarding brushing your teeth: | | | |
| • I don't enjoy brushing my teeth | 20(16%) | 25(20%) | |
| • I brush my teeth because I have to | 28(22.4%) | 15(12%) | |
| • I enjoy brushing my teeth | 23(18.4%) | 14(11.2%) | .108 |
| My parent(s): | | | |
| • often watch me brush my teeth | 27(21.6%) | 22(17.6%) | .300 |
| • often remind me to brush my teeth | 20(16%) | 13(10.4%) | |
| • expect me to brush my teeth, but don't remind me | 13(10.4%) | 5(4%) | |
| • don't talk with me about brushing my teeth | 11(8.8%) | 14(11.2%) | |

| | | | |
|---|---|---|---|
| Think of the last time you went to the dentist. What was one thing you liked most when you visited the dentist? | | | |
| • Clinic setup | 10(8%) | 17(13.6%) | .164 |
| • Demeanour of the dentist | 21(16.8%) | 14(11.2%) | |
| • Playroom | 24(19.2%) | 13(10.4%) | |
| • Gifts | 10(8%) | 8(6.4%) | |
| • No response | 6(4.8%) | 2(1.6%) | |
| Still thinking about the last time you went to the dentist, what was one thing you didn't like when you visited the dentist? | | | |
| • Injection used for LA | 32(25.6%) | 23(18.4%) | .455 |
| • Airotor and its voice | 24(19.2%) | 20(16%) | |
| • Nature of the dentist | 12(9.6%) | 11(8.8%) | |
| • No response | 3(2.4%) | 0 | |
| *Below are ways to describe children's mouths. Which THREE do you think are most important to have? | | | |
| • White teeth | 31(24.8%) | 32(25.6%) | .084 |
| • Straight teeth | 18(14.4%) | 9(7.2%) | .242 |
| • Healthy gums | 17(13.6%) | 20(16%) | .112 |
| • Pleasant breath | 31(24.8%) | 11(8.8%) | .006 |
| • No cavities | 18(14.4%) | 11(8.8%) | .513 |
| • Clean teeth | 26(20.8%) | 18(14.4%) | .703 |
| • Having big teeth | 21(16.8%) | 26(20.8%) | .034 |
| • Having a nice smile | 24(19.2%) | 18(14.4%) | .956 |

***1st and last question were multiple choice questions, so level of significance was checked for each option**

**Behaviour on oral hygiene based on gender difference**

It was found that 18.4% (10.4% male, 8% female) of the schoolchildren brushed their teeth at least twice daily and only 12% of them had their own used toothbrush. Almost half of the schoolchildren i.e. 46.4% (28.8% male & 17.6% female) reported using a toothbrush and toothpaste for cleaning their teeth and only 9.8% reported using dental floss. About 40.8% of children brushed their teeth in the morning during weekdays and slightly less so 33.6% during weekends. About 32% of the school children reported taking at least 1 min to brush their teeth, whereas, 21.6% took 2 minutes. Overall, no significant

difference was seen in oral hygiene behavior of boys and girls.

Table 5: Gender Differences in Oral Health Behavior

| Questions | Male N (%) | Female N (%) | P |
|---|---|---|---|
| Which answer below best describes you?<br>• I don't use a toothbrush to clean my teeth. | 48(38.4%) | 37(29.6%) | 0.57 |
| • I share a toothbrush with someone else | 18(14.4%) | 7(5.6%) | |
| • I have my ow toothbrush | 5(4%) | 10(8%) | |
| How often do you get a new toothbrush?<br>• Once every few years | 15(12%) | 4(3.2%) | .233 |
| • Once a year | 21(16.8%) | 16(12.8%) | |
| • Once every 6 months | 20(16%) | 17(13.6%) | |
| • Once every 3 to 4 months | 5(4%) | 4(3.2%) | |
| • Once a month | 10(8%) | 13(10.4%) | |
| • I don't know | 0 | 0 | |
| During the weekdays, Monday through Friday, how often do you brush your teeth?<br>• Less than once per day | 11(8.8%) | 12(9.6%) | .593 |
| • Once per day | 39(31.2%) | 29(23.2%) | |
| • Twice per day | 13(10.4%) | 10(8%) | |
| • More than twice per day | 8(6.4%) | 3(2.4%) | |
| If you do brush your teeth, what time of the day is this done?<br>• Morning | 36(28.8%) | 37(29.6%) | .661 |
| • Noon | 0 | 0 | |
| • Night time | 0 | 0 | |
| • Other times | 0 | 0 | |
| During the weekends, Saturday and Sunday, how often do you brush your teeth?<br>• Less than once per day | 11(8.8%) | 12(9.6%) | .552 |
| • Once per day | 39(31.2%) | 29(23.2%) | |
| • Twice per day | 13(10.4%) | 10(8%) | |
| • More than twice per day | 8(6.4%) | 3(2.4%) | |

| | | | |
|---|---|---|---|
| If you do brush your teeth, what time of the day is this done?<br>• Morning | 25(20%) | 17(13.6%) | .662 |
| • Noon | 0 | 0 | |
| • Night time | 0 | 0 | |
| • Other times | 0 | 0 | |
| What do you use for cleaning your teeth?<br>• Toothbrush and toothpaste | 36(28.8%) | 22(17.6%) | .269 |
| • Dental floss | 8(6.4%) | 4(3.2%) | .468 |
| • My fingers | 3(2.4%) | 1(0.8%) | .455 |
| • Salt water | 15(12%) | 8(6.4%) | .367 |
| • Wash cloth | 15(12%) | 19(15.2%) | .080 |
| • Mouth wash | 37(29.6%) | 11(8.8%) | .000 |
| • Baking soda | 27(21.6%) | 20(16%) | .910 |
| • Tooth picks | 15(12%) | 8(6.4%) | .367 |
| • Other ways | 29(23.2%) | 19(15.2%) | .519 |
| Think about when you brush your teeth. For how long do you brush your teeth?<br>• Less than one minute | 22(17.6%) | 5(4%) | .004 |
| • One minute | 19(15.2%) | 21(16.8%) | |
| • Two minutes | 18(14.4%) | 9(7.2%) | |
| • More than two minutes | 12(9.6%) | 19(15.2%) | |
| When you clean your teeth, which teeth and parts of the teeth do you clean?<br>Upper<br>• 1 | 21(16.8%) | 18(14.2%) | .680 |
| • 2 | 36(288%) | 27(21.6%) | |
| • 3 | 14(11.2%) | 9(7.2%) | |
| Lower<br>• 1 | 19(15.2%) | 20(16%) | .386 |
| • 2 | 48(38.4%) | 30(24%) | |
| • 3 | 4(3.2%) | 4(3.2%) | |

| | | | |
|---|---|---|---|
| When you clean your teeth, which teeth and parts of the teeth do you clean?<br>Upper<br>• 1 | 23(18.4%) | 17(14.2%) | .327 |
| • 2 | 35(28%) | 31(24.8%) | |
| • 3 | 13(10.6%) | 5(4%) | |
| Lower<br>• 1 | 18(14.4%) | 24(19.2%) | .041 |
| • 2 | 50(40%) | 26(20.8%) | |
| • 3 | 3(2.4%) | 4(3.2%) | |
| Regarding brushing my teeth, my parent(s)<br>• Often watch me while brushing my teeth | 36(28.8%) | 22(17.6%) | .269 |
| • Often check to see if I brushed my teeth | 10(8%) | 1(0.8%) | .017 |
| • Remind me to brush my teeth | 37(29.6%) | 22(17.6%) | .207 |
| • Don't remind me to brush my teeth | 2(1.6%) | 4(3.2%) | .234 |
| How often do you go to the dentist to get a check-up or teeth cleaning?<br>• More than once every 6 months | 5(4%) | 6(4.8%) | .016 |
| • Once every 6 months | 15(12%) | 18(14.4%) | |
| • Once every 6 to 12 months | 13(10.4%) | 16(12.8%) | |
| • Once every 1 to 2 years | 13(10.4%) | 2(1.6%) | |
| • Once every 3 to 5 years or longer | 11(8.8%) | 9(7.2%) | |
| • Never | 14(11.2%) | 3(2.4%) | |
| Which best describes you?<br>• I have never had a cavity | 36(28.8%) | 22(17.6%) | .269 |
| • I have had a cavity fixed by a dentist | 6(4.8%) | 1(0.8%) | .112 |
| • I have a cavity that needs to be fixed by a dentist | 1(0.8%) | 1(0.8%) | .845 |
| • I have toothaches or teeth pain | 1(0.8%) | 1(0.8%) | .845 |
| Out of 7 days in a week, think about how many days you eat candy<br>• 1 | 31(24.8%) | 26(20.8%) | .305 |
| • 2 | 16(12.8%) | 11(8.8%) | |

| | | | |
|---|---|---|---|
| • 3 | 9(7.2%) | 9(7.2%) | |
| • 4 | 8(6.4%) | 1(0.8%) | |
| • 5 | 6(4.8%) | 4(3.2%) | |
| • 6 | 1(0.8%) | 3(2.4%) | |
| • 7 | 0 | 0 | |
| Out of 7 days in a week, think about how many days you drink soda, or sugary drinks. | | | |
| • 1 | 5(4%) | 6(4.8%) | .052 |
| • 2 | 20(16%) | 23(18.4%) | |
| • 3 | 12(9.6%) | 11(8.8%) | |
| • 4 | 16(12.8%) | 2(1.6%) | |
| • 5 | 11(8.8%) | 9(7.2%) | |
| • 6 | 4(3.2%) | 3(2.4%) | |
| • 7 | 3(2.4%) | 0 | |
| When drinking water at home, which best describes you? | | | |
| • I drink tap water from the faucet | 1(0.8%) | 0 | .381 |
| • I drink bottled water | 16(12.8%) | 11(8.8%) | .771 |
| • I drink water that is filtered | 36(28.8%) | 22(17.6%) | .269 |
| Have you ever heard of dental sealants? | | | |
| • No | 55(44%) | 16(12.8%) | .771 |
| • Yes | 43(34.4%) | 11(8.8%) | |
| Has the dentist given you dental sealants? | | | |
| • No | 46(36.8%) | 25(20%) | .827 |
| • Yes | 36(28.8%) | 18(14.4%) | |
| • Not sure | 0 | 0 | |
| If you have gone to the dentist, which of the following dental services or problems have you had? | | | |
| • none of these | 36(28.8%) | 22(17.6%) | .269 |
| • teeth cleaning | 1(0.8%) | 0 | .381 |
| • x-rays of my teeth | 1(0.8%) | 1(0.8%) | .845 |
| • a cavity or cavities filled or fixed | 1(0.8%) | 1(0.8%) | .845 |

| | | | |
|---|---|---|---|
| • a tooth or teeth pulled due to decay | 2(1.6%) | 0 | .214 |
| • gums that bleed when I brush | 6(4.8%) | 9(7.2%) | .161 |
| • a tooth that got chipped or broken | 8(6.4%) | 0 | .011 |

Table 6: Gender Differences in Oral Health Related Quality of Life

| Questions | Male N (%) | Female N (%) | P |
|---|---|---|---|
| You have had pain in your teeth or a toothache? | | | |
| • None | 52(41.6%) | 33(26.4%) | |
| • 1 | 8(6.4%) | 4(3.2%) | 0.326 |
| • 2 | 0 | 3(2.4%) | |
| • 3 | 2(1.6%) | 5(4%) | |
| • 4 | 1(0.8%) | 1(0.8%) | |
| • 5 | 3(2.4%) | 1(0.8%) | |
| • 6 | 1(0.8%) | 1(0.8%) | |
| • 7 | 4(3.2%) | 6(4.8%) | |
| You had discolored teeth or spots on your teeth? | | | |
| • None | 46(36.8%) | 33(26.4%) | |
| • 1 | 9(7.2%) | 3(2.4%) | |
| • 2 | 4(3.2%) | 5(4%) | |
| • 3 | 4(3.2%) | 1(0.8%) | |
| • 4 | 2(1.6%) | 3(2.4%) | |
| • 5 | 0 | 1(0.8%) | |
| • 6 | 3(2.4%) | 1(0.8%) | |
| • 7 | 3(2.4%) | 7(5.6%) | 0.362 |
| Had sores/sore spots in or around your mouth? | | | |
| • None | 46(36.8%) | 30(24%) | |
| • 1 | 6(4.8%) | 3(2.4%) | |
| • 2 | 5(4%) | 3(2.4%) | |
| • 3 | 3(2.4%) | 7(5.6%) | |
| • 4 | 2(1.6%) | 1(0.8%) | |
| • 5 | 2(1.6%) | 3(2.4%) | |
| • 6 | 4(3.2%) | 4(3.2%) | 0.687 |
| • 7 | 3(2.4%) | 3(2.4%) | |

| | | | |
|---|---|---|---|
| Had bad breath most of the day?<br>• None | 43(34.4%) | 37(29.6%) | 0.016 |
| • 1 | 9(7.2%) | 0 | |
| • 2 | 6(4.8%) | 7(5.6%) | |
| • 3 | 7(5.6%) | 0 | |
| • 4 | 2(1.6%) | 3(2.4%) | |
| • 5 | 0 | 0 | |
| • 6 | 0 | 0 | |
| • 7 | 4(3.2%) | 7(5.6%) | |
| Had gums that bleed (when you brush your teeth)?<br>• None | 42(33.6%) | 30(24%) | 0.987 |
| • 1 | 10(8%) | 7(5.6%) | |
| • 2 | 3(2.4%) | 2(1.6%) | |
| • 3 | 3(2.4%) | 3(2.4%) | |
| • 4 | 4(3.2%) | 2(1.6%) | |
| • 5 | 1(0.8%) | 2(1.6%) | |
| • 6 | 2(1.6%) | 2(1.6%) | |
| • 7 | 6(4.8%) | 6(4.8%) | |
| Had pain, teeth hurt when eating, or drinking something hot or cold?<br>• None | 41(32.8%) | 28(22.4%) | 0.854 |
| • 1 | 8(6.4%) | 6(4.8%) | |
| • 2 | 4(3.2%) | 4(3.2%) | |
| • 3 | 6(4.8%) | 4(3.2%) | |
| • 4 | 1(0.8%) | 4(3.2%) | |
| • 5 | 2(1.6%) | 1(0.8%) | |
| • 6 | 2(1.6%) | 2(1.6%) | |
| • 7 | 7(5.6%) | 5(4%) | |
| Had days when your mouth was dry or your lips were dry?<br>• None | 34(27.2%) | 25(20%) | 0.238 |
| • 1 | 21(16.8%) | 7(5.6%) | |

| | | | |
|---|---|---|---|
| • 2 | 5(4%) | 7(5.6%) | |
| • 3 | 1(0.8%) | 5(4%) | |
| • 4 | 4(3.2%) | 3(2.4%) | |
| • 5 | 1(0.8%) | 1(0.8%) | |
| • 6 | 2(1.6%) | 2(1.6%) | |
| • 7 | 3(2.4%) | 4(3.2%) | |
| Had trouble falling asleep or staying asleep due to pain in your mouth?<br>• None | 38(30.4%) | 23(18.4%) | 0.014 |
| • 1 | 11(8.8%) | 10(8%) | |
| • 2 | 8(6.4%) | 4(3.2%) | |
| • 3 | 7(5.6%) | 1(0.8%) | |
| • 4 | 2(1.6%) | 3(2.4%) | |
| • 5 | 1(0.8%) | 6(4.8%) | |
| • 6 | 0 | 3(2.4%) | |
| • 7 | 4(3.2%) | 4(3.2%) | |
| Had trouble biting/chewing something hard like an apple or carrot or firm meat?<br>• None | 40(32%) | 25(20%) | 0.022 |
| • 1 | 12(9.6%) | 11(8.8%) | |
| • 2 | 6(4.8%) | 1(0.8%) | |
| • 3 | 0 | 5(4%) | |
| • 4 | 3(2.4%) | 3(2.4%) | |
| • 5 | 3(2.4%) | 1(0.8%) | |
| • 6 | 0 | 4(3.2%) | |
| • 7 | 7(5.6%) | 4(3.2%) | |
| Had difficulty speaking or saying words clearly because of your teeth or problems in your mouth?<br>• None | 43(34.4%) | 24(19.2%) | |
| • 1 | 12(9.6%) | 13(10.4%) | |
| • 2 | 6(4.8%) | 2(1.6%) | |
| • 3 | 2(1.6%) | 4(3.2%) | |
| • 4 | 3(2.4%) | 0 | |

| | | | |
|---|---|---|---|
| • 5 | 0 | 0 | |
| • 6 | 3(2.4%) | 5(4%) | |
| • 7 | 2(1.6%) | 6(4.8%) | 0.095 |
| Had difficulty keeping your teeth clean because food gets stuck in between your teeth? | | | |
| • None | 34(27.2%) | 25(20%) | |
| • 1 | 20(16%) | 8(6.4%) | |
| • 2 | 7(5.6%) | 5(4%) | |
| • 3 | 3(2.4%) | 1(0.8%) | |
| • 4 | 1(0.8%) | 3(2.4%) | 0.302 |
| • 5 | 0 | 1(0.8%) | |
| • 6 | 3(2.4%) | 5(4%) | |
| • 7 | 3(2.4%) | 6(4.8%) | |
| Been unhappy or sad because of how your teeth or mouth looks? | | | |
| • None | 38(30.4%) | 26(20.8%) | |
| • 1 | 10(8%) | 11(8.8%) | |
| • 2 | 10(8%) | 2(1.6%) | |
| • 3 | 6(4.8%) | 1(0.8%) | |
| • 4 | 4(3.2%) | 4(3.2%) | |
| • 5 | 0 | 1(0.8%) | 0.088 |
| • 6 | 1(0.8%) | 2(1.6%) | |
| • 7 | 2(1.6%) | 7(5.6%) | |
| Avoided smiling, showing your teeth or laughing with other children due to how your teeth or mouth looks? | | | |
| • None | 38(30.4%) | 24(19.2%) | |
| • 1 | 12(9.6%) | 11(8.8%) | |
| • 2 | 4(3.2%) | 2(1.6%) | |
| • 3 | 4(3.2%) | 3(2.4%) | |
| • 4 | 1(0.8%) | 0 | |
| • 5 | 5(4%) | 2(1.6%) | |
| • 6 | 1(0.8%) | 3(2.4%) | |
| • 7 | 6(4.8%) | 9(7.2%) | 0.682 |

| | | | |
|---|---|---|---|
| Been teased, bullied or called names by other children due to how your teeth or mouth looks? | | | |
| • None | 34(27.2%) | 26(20.8%) | |
| • 1 | 8(6.4%) | 9(7.2%) | |
| • 2 | 11(8.8%) | 3(2.4%) | 0.238 |
| • 3 | 4(3.2%) | 4(3.2%) | |
| • 4 | 2(1.6%) | 5(4%) | |
| • 5 | 0 | 2(1.6%) | |
| • 6 | 4(3.2%) | 2(1.6%) | |
| • 7 | 8(6.4%) | 3(2.4%) | |
| Missed class or school because of problems with your teeth or mouth | | | |
| • None | 37(29.6%) | 24(19.2%) | |
| • 1 | 14(11.2%) | 13(10.4%) | 0.353 |
| • 2 | 7(5.6%) | 3(2.4%) | |
| • 3 | 3(2.4%) | 8(6.4%) | |
| • 4 | 2(1.6%) | 0 | |
| • 5 | 3(2.4%) | 2(1.6%) | |
| • 6 | 1(0.8%) | 0 | |
| • 7 | 4(3.2%) | 4(3.2%) | |
| Had problems with paying attention in class due to problems with your teeth or mouth? | | | |
| • None | 31(24.8%) | 22(17.6) | |
| • 1 | 21(16.8%) | 14(11.2%) | |
| • 2 | 8(6.4%) | 3(2.4%) | |
| • 3 | 4(3.2%) | 5(4%) | |
| • 4 | 2(1.6%) | 5(4%) | 0.279 |
| • 5 | 1(0.8%) | 2(1.6%) | |
| • 6 | 1(0.8%) | 1(0.8%) | |
| • 7 | 3(2.4%) | 2(1.6%) | |
| Did not want to speak/read aloud in class due to problems with your teeth or mouth? | | | |

| | | | |
|---|---|---|---|
| • None | 36(28.8%) | 26(20.8%) | 0.741 |
| • 1 | 13(10.4%) | 9(7.2%) | |
| • 2 | 9(7.2%) | 3(2.4%) | |
| • 3 | 3(2.4%) | 5(4%) | |
| • 4 | 2(1.6%) | 3(2.4%) | |
| • 5 | 3(2.4%) | 3(2.4%) | |
| • 6 | 1(0.8%) | 0 | |
| • 7 | 4(3.2%) | 5(4%) | |
| Did not want to go to school due to problems with your teeth or mouth?<br>• None | 36(28.8%) | 28(22.4%) | 0.063 |
| • 1 | 12(9.6%) | 8(6.4%) | |
| • 2 | 13(10.4%) | 2(1.6%) | |
| • 3 | 3(2.4%) | 6(4.8%) | |
| • 4 | 1(0.8%) | 1(0.8%) | |
| • 5 | 2(1.6%) | 1(0.8%) | |
| • 6 | 1(0.8%) | 5(4%) | |
| • 7 | 3(2.4%) | 3(2.4%) | |
| I think my teeth and mouth are good looking.<br>• Yes | 52(41.6%) | 43(34.4%) | 0.389 |
| • No | 19(15.2%) | 11(8.8%) | |
| I think I have a nice smile.<br>• Yes | 43(34.4%) | 33(26.4%) | 0.950 |
| • No | 28(22.4%) | 21(16.8%) | |
| I think my teeth are healthy.<br>• Yes | 47(37.6%) | 41(32.8%) | 0.319 |
| • No | 24(19.2%) | 13(10.4%) | |
| I like the color of my teeth.<br>• Yes | 45(36%) | 37(29.6%) | 0.827 |
| • No | 26(20.8%) | 17(13.6%) | |
| My teeth are straight.<br>• Yes | 44(35.2%) | 32(25.6%) | 0.477 |
| • No | 27(21.6%) | 22(17.6%) | |

**Discussion**

The present investigation aimed to provide a comprehensive assessment of the oral health literacy, attitudes, oral health behavior and OHQoL among primary level school students of Derabassi, Mohali District. This assessment will help in the planning and evaluation of the oral health promotion programs in this region.

On the OHL, when asked about how the teeth should be properly brushed, majority of the respondents (60%) i.e. 30.4% males and 29.6% females used a non-directional brushing method with a combination of brushing strokes. Thus, there is need to educate school children on the correct motion for teeth brushing to ensure that the teeth are thoroughly brushed which will reduce or eliminate the chance of oral diseases.

There was lack of awareness regarding periodontal diseases as compared to dental caries as, more than half of the respondents (54.4%) did not know the significance of bleeding of the gums and almost 40% were unaware that dental plaque is a negative indicator for oral health. This finding was lower as compared to previously reported by Al Omiri et al., and Humagain in similar populations in North Jordan and Nepal respectively though similar to what has been reported by Gupta et al. (17, 18, 19)

Most of the respondents (64%) were aware of detrimental effects of sweets, drinks etc. on dental health, whereas, Ansari et al. in his study found that it to be 93.8%; thus, showing higher level of awareness compared to our study participants. (20)

A total of 23.3% of our male students and 28.8% of female students felt the necessity of regular visits to a dentist. On the contrary, Al Kawas et al. reported that 46% of the students put off going to the dentist until they had toothache. (21)

In our study, no significant differences were seen overall in OHL when female participants were compared with their male counterparts. This finding was in accordance with Tseveenjan et al. who reported no differences between male and females in Mongolia. (22) On the contrary, Al Omari et al., Porat et al and Rashid et al., reported significant difference between male and female participants. (23, 24)

Low OHL in children might be due to the lack of an organized and systematic oral health education program in the schools and community at large. Lack of knowledge toward oral hygiene could reflect that the information on dental health is lacking, with a low level of understanding.

There was no significant difference between female and male students in the proportion of their attitudes, behaviour and OHQoL. This was contrary to a study done by Ostberg and Fukai that reported female students to have better oral health attitudes than males. (25, 26)

The main listed reasons indicated by schoolchildren for not liking dentists were being afraid from the dental needle (44%) and handpiece (35.2%). According to a study done in Mysore city, India; 52% of students had unfavorable attitudes toward oral hygiene. (27) Modification of attitudes is needed to allow a change in behaviors which prevent oral health problems. Children's attitudes not only affect their own oral hygiene behavior but also influence the oral hygiene behavior of family and community.

**Limitations**

- Our study is limited in the fact that the generalizations from this study may not be applicable to other areas as Dera Bassi is unique in its social and demographic factors. Further, there is a need for follow-up to find if the survey itself had any influence on the knowledge of participants.
- Another limitation of this study is that, even though the confidentiality is maintained, scores depends on

self-reported data, which may be over- or underreported due to social desirability.

- Moreover, the present study is limited to a questionnaire. Clinical examination of the students to substantiate the answers to the questionnaire would be more desirable.

**Conclusion**

Health promotion, with its core ideas of equity and equality, empowerment and advocacy, provides a novel though a complex approaches to improve not only general health but oral health also. It shifts the responsibility for health from the formal health care system to individuals, communities and decision- makers at all levels of society. Dental health education should be incorporated into the existing school curriculum. The program for dental health education and various didactic activities should be structured in such a manner as to gain the student's interest and obtain a high priority of social acceptance. The objective should be to maintain that level of acceptance throughout the student's lifetime. The education programs should thus be motivating, vibrant, and closely matched to the learning aptitude established by the child at each educational level. Community group effort can also reinforce interventions to endorse improved oral health. Efforts should be synchronized between school personnel, dental health care professionals, as well as parents to make certain long-term remuneration. In future more surveys on larger scale like that on state level or national surveys should be carried out and the data obtained be used to formulate better dental health programs for our country.

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