"KNOWLEDGE, ATTITUDE AND PRACTICE OF ORAL HEALTH AMONG SCHOOL CHILDREN AGED 11 – 16 YEARS OF AN URBAN AREA"

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KAHER J.N. MEDICAL COLLEGE BELAGAVI

Dr. Chandra S Metgud MD PhD
Professor and Head,
Department of Community Medicine,
J. N. Medical College, KAHER,
Belagavi – 590010,
Karnataka, India.

Dept. of Community Medicine J.N. Medical College Belagavi

Place: Belagavi
Date: 15/12/22

Dr.(Mrs.)N. S. Mahantshetti MD
Principal,
J. N. Medical College, KAHER,
Belagavi – 590010,
Karnataka, India.

PRINCIPAL
J.N. Medical College,
BELAGAVI- 590 010

Place: Belagavi
Date: 15/12/22

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Nehru Nagar, Belagavi- 590 010, Karnataka, INDIA

0831 - 2471350 0831 - 2470759 www.jnmc.edu principal@jnmc.edu

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Dr. (Mrs.) N.S. Mahantashetti.
Chairperson-Antiplagiarism Committee &
Principal,
J. N. Medical College, Belagavi.

To,
Reg. No. BD0120001.
Postgraduate Student,
2020-21 Batch,
Department of Community Medicine,
J. N. Medical College, Belagavi.

LIST OF ABBREVIATION USED

S. No	ABBREVIATION	EXPANSION OF THE ABBREVIATION
1	%	Percentage
2	>	Greater than
3	<	Lesser than
4	≤	Lesser than or Equal to
5	≥	Greater than or Equal to
6	$\chi 2$	Chi Square
7	CI	Confidence Interval
8	CPI	Consumer Price Index
9	Df	Degree of freedom
10	DMFT	Decayed, Missing, and Filled Teeth
11	FDI	Federation Dentaire Internationale
12	NFHS	National Family Health Survey
13	No.	Number
14	NGO	Non-Governmental Organization
15	NOHP	National Oral Health Programme
16	OHI-S	Oral Hygiene Index – Simplified
17	PUC	Pre-University Course
18	PPP	Public Private Partnership

19	SD	Standard Deviation
20	SES	Socio Economic Status
21	S.No	Serial Number
22	SPSS	Statistical Package for Social Science
23	WHO	World Health Organization

ABSTRACT

INTRODUCTION:

Oral health has a great impact on health and wellbeing of each and every individual in the society. Healthy oral cavity plays a vital role for an individual to talk and smile comfortably, interact and eat appropriately, without getting from any sorts of disease, entity, uneasiness, discomfort or an embarrassment. Oral disease, out of total world's population more than half of the (almost 3.58 billion people) are having dental caries as estimated by Global Burden of Disease Study done in 2019. Around the globe around 2 billion people suffer from dental caries of permanent teeth and 520 million children suffers from dental caries of primary teeth. More than 90% of school children world-wide have experienced dental caries, with the disease being most prevalent and common in Latin American and Asian countries.

OBJECTIVE:

1. To assess the Knowledge, Attitude and Practice of Oral Health among school children aged 11– 16 years.
2. To study the factors influencing Knowledge, Attitude and Practice of Oral Health.

MATERIAL AND METHOD:

The cross-sectional study was carried out among 800 co-educational school children of Belagavi city. The study was conducted from 1st January to 31st December 2021. The study participants were interviewed and data collection was carried out using predesigned and pretested questionnaire.

RESULTS:

The mean ± standard deviation age of the participant was 13.5 ± 1.87 years, median age was 13.5 years and range was 11 to 16 years. In our study 200 (25.00%) students were studying in 7th standard and more than half 410 (51.25%) were male participant. Majority of our study subject, 600 (75.00%) were Hindu by religion and 600 (75.00%) of the study participant were staying in nuclear family. Most of the parents' of the students: father 798 (99.75%) and mother 794 (99.26%) were literates. Study shows that majority 751 (93.88%) of the study participant, belonged to socio-economic class I according to modified BG Prasad classification.

More than 3/4th of our study participant had correct knowledge regarding: teeth are an important part of our body 792 (99.00%), brushing of teeth twice daily 784 (98.00%), use of toothbrush or mouthwash or dental floss all three for cleaning teeth 787 (98.40%), use of toothpaste or toothpowder for cleaning teeth 782 (97.70%), irregular brushing of teeth causes tooth ache 740 (92.50%), adverse effect of fizzy drink 655 (81.88%) & sweet on teeth 711 (88.88%), improper cleaning of tongue causing bad breath 706 (88.25%) and rinsing of mouth with water after every meal 604 (75.50%). Nearly ½ of the school children had correct knowledge regarding: necessity of regular visit to the dentist 474 (59.25%), fluoride containing toothpaste will help in strengthening of teeth 441 (55.12%), should brush teeth in front of their parent 406 (50.75%), dental plaque are hard and soft debris in the teeth 392 (49.00%), regular brushing of teeth will prevent oral health problems 364 (45.50%) and dental plaque leads to dental caries 320 (40.00%). About 1/3rd of the study subject had correct knowledge regarding: vitamin C is important for oral health 306 (38.25%), duration of brushing of teeth for two complete minutes 287 (35.88%) and number of

permanent teeth in adult 240 (30.00%) and child 159 (19.88%) respectively. Less than $1/10^{th}$ of the participant had correct knowledge regarding: changing toothbrush every three month 72 (9.00%), dental visit should be done every 6 months 71 (8.88%), gum bleeding means inflamed gum 31 (3.88%) and four different type of teeth in adult oral cavity 20 (2.50%). The mean knowledge score was 12.67 with standard deviation of 2.67, median was 11.5 and the range was 6 to 17. Out of 800 children, 219 (27.38%) had good knowledge, 490 (61.24%) had average knowledge and 91 (11.38%) had poor knowledge regarding oral health. None of the sociodemographic factors studied had an influence on knowledge score regarding oral health ($p > 0.05$).

More than $3/4^{th}$ of our study participant had positive attitude towards: maintaining healthy teeth is an individual responsibility 738 (92.25%), maintaining good oral hygiene prevents them from development of dental caries 680 (85.00%), dental caries will affect the overall appearance 665 (83.13%), oral health problem will force them to miss school 620 (77.50%), poor oral hygiene prevents them from smiling with friends 589 (73.63%) and dentist will help them in maintenance of oral health 605 (75.63%). More than ½ of study participant responded that they will not make fun of children who have dental health problem 529 (66.10%). With regards to bad breath, 605 (75.60%) of study participant felt that they will avoid talking or sitting next to whom who have bad breath whereas 195 (24.40%) did not feel so. The mean attitude score was 5.21 with standard deviation of 1.40, median was 5 and range was 2 to 8. Out of 800 children, 409 (51.12%) had positive attitude, whereas 391 (48.88%) had negative attitude score towards oral health. The positive attitude score towards oral health was significantly associated with sex of the study participant ($\chi^2=4.88$, $p = 0.02$) and literacy status of father ($\chi^2 = 5.42$, $p = 0.01$).

More than 3/4th of our study participant had correct practice regarding: rinsed mouth with water after every meal 787 (98.40%), used toothpaste for cleaning teeth 787 (98.38%), used toothbrush for cleaning teeth 776 (97.00%), brushed their teeth regularly 773 (96.70%), cleaned their tongue while brushing 635 (79.40%) and brushed teeth in front of parent 607 (75.90%). Nearly ½ of our study subject had correct practice regarding: use of tooth paste containing fluoride 448 (56.00%), brushed their teeth twice per day 405 (50.63%), brushed in the morning and night 410 (45.30%) and brushed their teeth for complete two minutes 361 (45.13%). Less than 1/10th of school children had correct practice regarding: change of toothbrush every 3 month 39 (4.88%) and dental visit in the recent past 19 (2.40%). Majority of our study participant 669 (83.62%) ate fruits several times a week whereas 560 (70.00%), 321 (40.12%), 300 (37.50%), 297 (37.13%), 244 (30.50%), 281 (35.13%), 215 (26.88%) and 204 (25.53%) ate bakery products, consumed coffee with sugar, tea with sugar, sweets/candy, chewing gum containing sugar, milk with sugar, jam/honey and aerated drinks several times a week respectively. The mean practice score was 8.31 with standard deviation of 1.51, median was 8.5 and the range was 5 to 12. Out of 800 study subject, 170 (21.25%) had good practice, 489 (61.12%) had average practice and 141 (17.63%) had poor practice score regarding oral health. The good practice score regarding oral health was significantly associated with age of study subject (χ^2 = 18.75, p = 0.04), standard of the study participant (χ^2 = 16.04, p = 0.04) and sex of the study participant (χ^2 = 7.43, p = 0.02).

CONCLUSION:

So, in conclusion, almost each and every risk factor which is associated with poor oral health among the school children are completely preventable with appropriate knowledge, attitude and practice behaviour. Based on the above findings it is clear that there is need for regular oral health education to children, parents and school teachers. This can be done by periodic orientation and training programmes organized by government health authorities / Non-Governmental Organizations / Dental College at individual school level.

Keywords: Knowledge, Attitude, Practice, Oral health, School children.

TABLE OF CONTENT

LIST OF TABLE

LIST OF GRAPH

LIST OF PHOTOGRAPH

I. INTRODUCTION

Oral health has a great impact on health and wellbeing of each and every individual in the society. Healthy oral cavity plays a vital role for an individual to talk and smile comfortably, interact and eat appropriately, without getting from any sorts of disease, entity, uneasiness, discomfort or an embarrassment.[1] World Health Organization (WHO) defined oral health 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."[2] Federation Dentaire Internationale (FDI)/ World Dental Federation defined Oral health as "multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex".[3]

Oral cavity is a courtyard for variety of organisms. Dental health carries equal importance as general health of a person. Oral caries (tooth decay), gum disease of severe type and disease which affect the oral mucosa are the commonest diseases of the oral cavity in developing countries.[4] Oral health equally affects the physical, mental, social and emotional well-being of a person. Management of oral diseases isn't that cost-effective when compared to general health related problems so that many of the people ignore their oral health problems, which later complicate and eventually leads to death.[5]

Oral disease, as estimated by Global Burden of Disease Study done in 2019, out of total world's population, more than half of the (around 3.58 billion) are affected with oral caries. Around the globe around 2 billion people suffer from oral caries of secondary teeth and 520 million with oral caries of decidious teeth.[6] More than ninety percent of children globally have experienced tooth decay and the condition being most common in countries of Latin America and Asia.[7] Prevalence of tooth decay are almost five times more common than Bronchial Asthma and seven times more common than hay fever according to WHO - The World Health Report 2003.[2] Out of school children, permanent dental caries is very common in 10 – 12 years of age. Severe Periodontal disease was estimated as eleventh most common and prevalent disease overall worldwide. It is estimated that around 14% of the global adult population has severe periodontal disease which constitutes more than one billion cases. [8] Globally around 140,000 new cases of Noma (severe gangrenous disease of the mouth and the face) are reported annually. Without treatment, Noma is fatal in 90% of cases and it usually affects children aged between 2–6 years.[6] Oral Plaque also is an important prevalent disease overall worldwide. Colonization of different bacterial species in the oral cavity is the most common cause of oral plaques and the organisms noted are streptococcus mutans, anaerobes like fusobacterium etc.

In India as per oral multicentric health survey conducted by Ministry of Health -WHO India collaborative (2007-2008), prevalence of tooth decay among 12-year-old was between 23.0 % to 71.5% and adults aged 35-45 years was between 48.1% to 86.4%. Among elderly in 65-74 years had oral caries in the range of 51.6% to 95.1% and the prevalence of untreated tooth decay in children below six years was around 49.6%.[7] Prevalence of Periodontal diseases among adults & elderly was in the range of 15.32% to 77.9% & 19.9% to 96.1% respectively.[8]

In India tooth decay and other common oral health problems among school children are mainly due to high level consumption of refined sugar and carbohydrates, ready to eat food, canned food and fizzy drinks. As per oral health survey conducted by WHO in India (2012) the per capita consumption of sugar in kilograms were around 20.5 [6] and also as per United States federal government's fiscal year (2022) data reference consumption volume of sugar were around 28.5 million metric tons. [9] Consumption of sugar in large quantity can directly or indirectly affect dental hygiene status of the community. The other important risk factors affecting oral health are inadequate awareness regarding oral health, poor attitude towards oral hygiene and health, unfair oral practices and habits. [2] The social risk factors include are low literacy status of the parents, poor socioeconomic status and less awareness among parents regarding oral hygiene. [10] Poor attitude and perceptions among parents also are an important risk factor for poor oral hygiene in their children. Literacy rate in India as per census 2011 is 74.04%. Male have a higher literacy rate of 82.14% whereas female have around 65.46%. [11] According to National Family Health Survey (NFHS) – 5 2019–2021 data a total of 23% of women and 11% of men have no schooling and are illiterate which also can lead to inadequate knowledge and awareness regarding oral hygiene among parents. [12]

Noma usually affects the children who are malnourished, experience repeated infections of the oral cavity, living in extreme poverty, have improper oral hygiene, and with poor body immune system. [6] Non communicable diseases especially childhood diabetes is also considered as risk factor in development and progression of severe periodontal disease. Link between high intake of sugar and diabetes, obesity and dental caries has also been proved by various oral health surveys conducted by WHO. [6]

In India National Oral Health Programme (NOHP) was launched during 2014 - 2015 with a goal to strengthen the public health facilities of the nation to deliver an accessible, affordable, equitable & quality oral health care. The main objective was to improve oral health, reduce morbidity due to dental diseases, promote oral health preventive services, integration of oral health with general health care system and also to encourage Public Private Partnership (PPP) model for achieving better oral health. Lack of implementation of such programmes from the health care providers at the grass root level is the main threat against creating adequate awareness regarding oral health in a developing country like India.

Oral health and its awareness in schools are not critically emphasized. Government health centres and health care providers do have access with schools as part of school health programme like routine vaccination session, weekly iron and folic acid supplementation programme, Adolescent friendly health clinics and various other activities. Along with tackling and creating awareness for general health issues an extra focus regarding oral health hygiene care practices and education among school children are not being given adequately as it is the most vulnerable age group. Fortunately, almost each and every risk factor which causes poor oral health is completely preventable with appropriate knowledge, attitude and practice, there lies the role of parents, school teachers and health care provider. It is believed that how much early they got exposed to adequate preventive dental health practices that much early the dental health diseases will be prevented. Major priority should be given to school children which is the high-risk group in the society. [13]

Even though the existing investigations and tests differs with respect to the category of age which were studied and with the kind of knowledge evaluated, the insufficiency of dental health knowledge amongst school children is evident. Various resources of oral health data for other age groups have been thoroughly examined, but the examination and evidence of children sources have been very much confined. [1] The association between good dental health and correct knowledge is very well noted. Good oral health knowledge is very much essential for appropriate practice to prevent oral diseases of children. Sustainability of good oral health behaviour and modifications which affects the life style can be attained by various interventions which can be done at younger age.[14] Hence the assessment of knowledge, attitude and practice regarding child dental health is important which helps the health care providers to know the various causes and risk factors for development of oral diseases in children. [15]

Keeping this in mind, the present study aims to assess the Knowledge, Attitude and Practice of oral health among school children aged 11– 16 years of an urban area. The essentiality of this research study will be to provide vital data to plan various preventive initiatives for dental disease in our study area.

II. OBJECTIVE OF THE STUDY

1. To assess the Knowledge, Attitude and Practice of Oral health among school children aged 11-16 years
2. To study the factors influencing Knowledge, Attitude and Practice of Oral health

III. REVIEW OF LITERATURE

Public health concerns of oral health disease among the population should be tackled by ensuring adequate knowledge, attitude and practice behaviour. Adequate knowledge regarding tooth brushing and its duration, materials used for cleaning teeth, importance of fluoride containing tooth paste, tongue cleaning and its importance, dietary patterns and food items affecting oral health is essential. Attitude towards tooth decay and bad oral breath, maintaining good oral hygiene, and regular practice of brushing teeth, duration of brushing and cleaning teeth, materials used for cleaning teeth, frequency of dentist visits and its reason and the various factors associated with it are also equally important and are to be assessed and surveyed among school children. Importance of such studies in the community level are essential and will be helpful for future planning and policy making in the field of oral health.

In Davangaree, a descriptive study was conducted among 700 school children aged between 10 to 14 years. Knowledge, attitude, and practice with regards to oral health was assessed using a predesigned questionnaire consisting of twenty-two questions. Oral Hygiene Index – Simplified (OHI-S) was assessed and noted. About 70% of the study subject showed poor dental hygiene before the start of survey. After doing OHI calculation, improvement was seen among 62.08% of the participant. Among 700 study participant, 46.80% of children knew irregular brushing causes dental caries and also 9.2% children knew that irregular tooth brushing can cause gum diseases. Only 8% of children knew irregular brushing causes bad breath. Around 99% of children felt that maintenance of good oral hygiene was an individual responsibility. More than 46% of children had done dental visit once in six months,

69% of children brushed teeth once daily and 30% of them had brushed twice daily. Only less than one percent of children have changed their toothbrush yearly once. Another 3.06% of children had no idea when they have to change the toothbrush. Dietary patterns which causes oral health problems were not assessed in this study. The study concluded that oral hygiene practices should be implemented in school syllabus and appropriate health education regarding oral health can be given for teachers to train the children. [19]

In a Questionnaire-based Survey, assessment of oral health awareness among 2,155 school children aged 9 and 13 years was conducted in South Bengaluru. Out of all study participant 1,039 were residential school children and 1,116 were day scholars. Both residential and day schoolchildren (89.2%) knew that healthy teeth are white in colour and strong and also, they knew about the importance of maintaining good oro-dental health. About 49.4% did not know about dental plaque and 75.7% knew that excessive sugar consumption cause tooth decay. About 11.7% study participant were not satisfied with their teeth appearance. About 71.5% of residential schoolchildren and 57.2% of day school children consumed fresh fruits daily and 62.5% of in both groups consumed hidden sugar every day. About 26.7% of study participant in both groups had a habit of mouth breathing and thumb sucking. Majority (99.8%) of children from both groups brushed their teeth regularly. Nearly 88.9% day scholar and 92.4% residential school children were not aware about fluoride containing tooth paste. About 89% from both the group were not aware about dental floss as a material to clean their teeth. Around 32% of both groups visited dentist twice a year and among both the group nearly 34.4% of them never visited a dentist. Both 28.4% of day scholar and 20.9% of residential schoolchildren were

afraid of visiting a dentist. Overall knowledge, attitude and practice regarding oral health and food habits was satisfactory among both the study participants. [20]

In a government-aided school of Bangalore city a study was conducted to assess knowledge, attitude, and practice towards oral health among 11 to 12-year-old 212 school children. Out of total study participant 108 were male and 104 were female. Statistical significance was measured using chi-square test. Around 20.9% knew the importance of oral hygiene. About 37% study participants knew that tooth decay makes them look bad and 36.3% knew that fluoride containing toothpaste prevents tooth decay. About 33% felt their oral health was excellent and 7% of study participants as poor. About 38.5% of the children brushed their teeth two or more times a day. Dental pain and discomfort (35.1%) were noted among study participant who had not done regular dental visits. About 46.1% of study participants had irregular dental visits due to fear of dentist. Nearly 21.9% study participants avoided smiling and laughing with their friends because of poor oral hygiene. Around 32.1% of study participants consumed soft drinks, milk with sugar (65.9%) and tea with sugar (56.1%). About 5.4% and 3.9% of study participants smoked and chewed tobacco respectively. The study conclude that community-oriented oral health promotion and prevention programs should be focused among school children. [21]

Another descriptive survey conducted in field practice area of Bengaluru, 140 government school students were selected using multistage random sampling. Among the study participant 47.85% of them were male and 52.15% of them were female. About 80.7% students were in the age group of 12-13 years. Nearly 97% children knew that teeth are an important part of body and 77% knew that oral health have good impact on general health. Majority of the children (97%) knew that oral caries

can be prevented by daily cleaning of teeth and also knew that regular visit to dentist was necessary. About 61% of students knew that gum disease can be prevented by regular brushing of teeth. Almost 40% knew that Vitamin C can prevent periodontal disease whereas 42% children knew that cleaning teeth with toothbrush twice daily will prevent oral caries. Out of study participant, 22% had correct knowledge that poor dental hygiene will lead to periodontal disease and 89% knew that it can cause foul breath. Almost 85% children felt that self oro-dental care is important to prevent oral health problems and 96% felt that regular dental visits will prevent oral health problems. In this study, 37% study subject brushed their teeth once a day and 58% children brushed twice a day. Around 69% ate junk foods, fizzy and processed food once a day, another 13% children ate twice a day and 18% children ate occasionally. Present study reveals that the knowledge and practice among study subject was fairly in the lower side. [4]

In the field practice of Sullia (Dakshina Kannada District) a cross-sectional study was conducted among 12-year-old 650 school children using random cluster sampling method. Knowledge, attitude and practice regarding oral hygiene was recorded through a self-administered, validated questionnaire and clinical examination was also done to assess the prevalence of dental caries. Among the study participant 53% were male,56% were residing in urban area and 58% studied in government school. Regarding knowledge among study participant, urban children were found to have significant higher scores when compared to rural and practice behaviour among private school students was found to have better when compared to government school students. Prevalence of dental caries was 48% (male- 40.2%, female-42.3%) with mean Decayed, Missing and Filled Teeth (DMFT) of 4.8±1.2, prevalence of bleeding on probing was 30.15%, dental trauma was 30% and enamel

fluorosis was 1.9%. The prevalence of oral caries was higher among the subjects who had average score of attitude & practice. Overall, in this study 58% had satisfactory knowledge where as 48% had implemented their knowledge in to practice. [22]

Another cross-sectional study was done among 858 seventh standard (11- to 13-year-old) students at 14 different schools in the city of Mangalore. Assessment of knowledge, attitude and practice along with association of knowledge with attitude, dental health care practice and tooth caries prevalence was done. Prevalence of dental caries was determined using DMFT index. Binary logistic regression analysis was used for association of different variables with knowledge. Study participant included 494 male and 364 female. Male students had high knowledge (60%) when compared to female (40%). Source for knowledge regarding oral health were parents (68.6%) followed by dentists (43.5%), teachers (13.5%) others were television (10.7%), newspapers (8.9%), and friends (6.1%) respectively. Majority (80%) of children felt that tooth decay makes them look bad. Sixty percent changed toothbrush every three months. Almost 78% were not aware whether they used fluoridated tooth paste or not. Visits to the dentist were significantly higher in children with high knowledge and the main reason for visit being dental pain. About 59.4% out of 858 study participant had tooth decay. Mean DMFT was low (1.5 ± 0.8) and the values ranged from 0 to 8. More than 70% of the children had DMFT between 1 and 3. The study concludes that knowledge alone does not make significant change in attitude and practice, henceforth a change from knowledge, attitude and practice model to other specific psychological models is necessary. [23]

A descriptive study was conducted among 100 school students studying in 5th to 7th standard from selected schools at Mangalore. Convenience sampling technique was used for this study. Reliability of the tool was tested by Cronbach's alpha. Out of 100 study participants 90% of school children belonged to 10-12-year age group, 40% studied in 5th class, 52% of students were female, 54% belonged to nuclear family, 93% consumed mixed diet, 46% of the student father's and 53% of mothers' had primary education, 52% of student's fathers were private employees and 71% of student's mothers were unemployed. Out of 100 study participants 45% had unhealthy oral health status, 41% had observed changes in the oral cavity and 14% belonged to healthy category. Forty-seven percent of them had poor oral hygienic practice, forty two percent had satisfactory oral hygienic practice and eleven percent had good oral hygienic practices. Relationship between dental health assessment and self-reported oral hygienic practice was observed. Majority of the school children suffered from oro-dental problems such as dental caries, gum diseases, dental pain and had poor oral health status. [24]

According to a cross sectional study conducted in Chennai, five schools were selected using simple random sampling method. A total of 592 children in the age group of 10-16 years were included, among them 37% were male and 63% were female. About 83% were in the age group of 10-14 years and 17% were in the age group of 15-16 years. The mean age was 13.26 years. Among them 58% of the children brushed teeth twice daily, 98% used tooth brush and tooth paste for cleaning teeth, while 90% of students brushed teeth in the morning. About 45% of them brushed teeth for more than two minutes and almost 41% of students were not aware of gum bleeding. Around 31% had correct knowledge that tooth brushing and dental flossing would help them to prevent gum inflammation. More than 68% reported that

they have no tooth decay and 74% were aware that tooth decay can affect overall dental appearance. Major food items which lead to oral health problems according to study participant were, consumption of sweets (81%) and fizzy drinks (77%). Study participant had correct knowledge regarding, cleaning teeth with toothbrush (73%) and fluoride containing toothpaste usage (55.6%) can prevent dental decay. Dental health knowledge among the students in this study was average.[1]

A cross-sectional study was performed in Chennai among 307 school students aged between 10-15 year to assess dental and hygiene practices. About 51.1% were boys and 48.9% were girls. About 98% of children used tooth brush for cleaning teeth and 1.9% cleaned teeth using fingers. Among the study participant, 20% ate sweets every day and only 5% children ate vegetables and fruits every day. Regarding oro-dental visits, 17% of the children visited for regular oral health check-up. Caries prevalence rate among study participant was 49%. Among 150 children with caries, 83% had decayed, 12% had filled and 5% had missing teeth. Prevalence rate regarding oral caries was higher among age group of 10-12 years. The association of consumption of sweets and tooth decay was found to be statistically significant ($p < 0.05$). Children who had not eaten vegetables and fruits daily had a significantly higher prevalence rate (76%) of tooth decay ($p < 0.05$). Overall tooth decay rate was higher among students who had poor oral hygiene practices in this study. [48]

A descriptive cross-sectional survey was conducted in children studying in private school in Chennai. Using a convenience sample method 103 children under the age group of 13-15years were selected. In this study all 103 children knew that good oral hygiene prevents tooth decay. About 44% of the children responded brownish discolouration of teeth as stains while 34% as calculus and 22% as food

particles. About 61% of the children knew that tooth decay is black spot and hole in the tooth. A total 41% of the children knew that fluorides prevent tooth decay and 34% responded that fluoride containing toothpaste do not prevent tooth decay. Sixty three percent of the children felt that dental treatment was expensive. Half of (50%) of the children felt that they should take care of teeth to prevent tooth decay. Sixty one percent of the children brushed their teeth once daily while thirty five percent of them brushed twice daily. About 46% of the children used tongue cleaner and 14% used dental floss. Almost 31% of the children brushed their teeth for 3-4mins whereas 26% of them brush their teeth for 1-2mins. Only nineteen percent of them changed their brush once in 3 months and 34% rinsed their mouth every time after every meal. Average knowledge, attitude, and practice scores were noted in this study. [25]

Another cross-sectional study was conducted in 200 children aged 13- 17 years attending outpatient department in Saveetha Dental College and Hospital, Chennai. Around 72% has the knowledge that there are 32 permanent teeth in the oral cavity of an adult. About 60% students knew that they will identify tooth decay with black spot and hole in tooth and 30% by pain. About 60% participants gained awareness about oral health through television and radio, 40% through newspaper and magazine and 20% through family and friends. Around 75% of study participants felt that dental treatment was expensive. For cleaning teeth 6% used tongue cleaner and 10% used dental floss. About 75% of study participants rinsed their mouth sometimes and 25% rinsed every time after eating. Out of 200 study participants, 49% ate sweets daily and 34% ate sweets occasionally. Majority of study participants (94%) used tooth paste in its full length to tooth brush and 6% used half size amount of tooth paste to toothbrush to clean teeth. Inadequate knowledge and practice regarding oral

hygiene were observed in this study and they concluded that more concentration should be given for dental health education program in school. [26]

A descriptive cross-sectional survey was conducted to evaluate the knowledge and practice regrading oral hygiene among 345 middle school students in Chennai, Tamil Nadu. Multistage sampling method was used in this study. Out of 5 zones in the study one school from each zone was selected using simple random sampling by lottery method. Statistical significance was determined by using Chi-square test. The study showed, 55% of students knew that tooth decay will make oral cavity in appearance as bad. Around 80% knew that brushing teeth prevents tooth decay and gum disease. Nearly 65% of study participants knew that fluoride containing toothpaste prevents tooth decay. Around 50% of study participants felt that they had good oral health. Almost one third of study participants were not satisfied with their teeth appearance. Out of study participants 74.2% brushed once a day and 25.2% brushed twice a day. About $1/5^{th}$ of study participants used fluorinated tooth paste to brush their teeth. About 60% of study participants used plastic tooth picks to clean their teeth. Significant association was noted between study participant's educational level and their knowledge regarding oral hygiene. Proportion of study participant with adequate knowledge were higher in the primary class compared to students studying in sixth to eighth standard. Increased knowledge level among the primary level students was not translated into good oral health practice. Study reveals that overall knowledge, attitude and practice regarding oral health among study participants was poor and needs to be improved. [27]

Another cross-sectional study which was carried out to assess oral hygiene practice and knowledge among 210 students aged between 10-13 years in a private school in Chennai, Tamilnadu. Study subjects from 5^{th} to 8^{th} standard were selected by using random sampling procedure. Pearson chi-square test of association was used to find out the association between the variables. Out of 210 study participants 37.6% were female and 62.4% were male. About 40% of study participant belonged to the 10-11-year-old category and 126 (60%) belonged to 12-13 years category. About 28.1% used both brush with toothpaste and dental floss for cleaning teeth and 58.6% of students brushed their teeth twice a day. Around 73.8% female study participant among 10-11 years brushed twice a day. Association between frequency of brushing and age groups was statistically significant in this study. Around half of the students used the full-length bristles whereas about $1/3^{rd}$ of study participants used half the bristles length. This study clearly shows that younger age group and female participant had better practice and knowledge when compared to other age groups. Hence forth equal importance must be given to both general and oral health by the health care providers. [28]

Another cross-sectional study conducted in an urban field practice area of Kancheepuram, a total of 250 school children who belonged to the age group of 8 to 10 years were selected. Among interviewed, around 66% of children had correct knowledge, 34% had positive attitude and 11% of children had good practice regarding dental hygiene. Almost 96% of the children had correct knowledge that they should clean their teeth with brush daily twice and 92% knew that having sweets or fizzy drinks can cause dental health issues. About 86% had correct knowledge regarding cleaning teeth with brush regularly will prevent oral health problems and 84% knew that good dental hygiene maintenance will help them to avoid oral caries.

Among the children who did not brush regularly 45.2% told they were lazy to brush, 40.5% did not like brushing and 14.3% gave the reason of getting up late. In this study overall knowledge regarding oral health was fair but the conversion of their knowledge to practice was poor. It has been clear that behavioural change communication and periodic reorientation with respect to dental hygiene practices should be given to the children at regular intervals. [29]

In a village of Kanchipuram district, Tamilnadu a total of 81 children aged between 5-10 year who attended the oral health screening programme, assessment of knowledge attitude and practice towards oral health was done using a cross-sectional survey. Convenient sampling method was followed and hygiene status was measured using oral hygiene index. More than 50% of children knew that dental caries was the common problem in the oral cavity and out of 81 study participant only one child was aware about gum disease. Almost 58% children knew that sweets and chocolates cause caries. Oral hygiene habits of 81 study participant was found to be poor. Around 58.97% children had consulted dentist only when there was tooth pain. Almost 75 (92.59%) children brushed once a day and six (7.40%) brushed their teeth twice-daily. About 51 (62.96%) children used brush while 30 (37.03%) used fingers to clean their teeth. About 55.55% children used tooth paste and 30 (37.03%) used tooth powder to clean their teeth. Parents (48.14%) were the important source of information to children when compared to the teachers (25.92%) and 76.54% out of 81 study participant had dental caries. Study concludes that oral hygiene practices were fair with an oral hygiene index of 1.42. [30]

According to a descriptive cross-sectional survey conducted with self-administered questionnaire which assessed the knowledge, attitude and practice regarding dental hygiene among 100 school going students residing in rural areas of Kanchipuram. The questionnaire containing 12 oral health practice questions which were explained whenever necessary, and the participants were given assurance regarding confidentiality of their responses and were requested to mark their answers and complete it individually. Almost 85 out 100 knew about the importance of dental hygiene. Knowledge about dental health was seen in 83% of them while 52% knew about interdental aids. All (100%) 100 school students brushed their teeth daily. Almost 74% cleaned their tongue and 44% of the students cleaned their teeth twice daily. Percentage of students using mouthwash daily were 48% and around 92% of them used toothpaste with fluoride. Around 32% of the students had experienced bleeding gums and about 51% visited the dentist for dental check-up. This study stressed the need for dental health promotion which helps in prevention of dental caries among school children. [31]

A population based cross – sectional study was conducted among secondary school going children in a private school in Thirunagar Colony Erode, Tamil Nadu to assess knowledge, attitude and practice of oral hygiene. Using simple random sampling technique 168 students were selected. Descriptive statistics was calculated for variables on knowledge, attitude, and practice of oral hygiene. About 54.1% of study subject belonged to the age group of 11–12 years and 45.9% of them were in 13-15 years age group. The mean age of the study participant was 12.43 years. About 36.9% study participants knew about the role of fluoride containing toothpaste in prevention of dental caries. Out of 168 study participant 52.3% were satisfied with the appearance of their teeth. About 43.4% of study participant consumed biscuits and

cake once a day and 39.2% of study participant consumed biscuits and cake at least once a week. Out of 168 students 51.8% of them had some dental problems and remaining never experienced any dental problems. This study concludes that poor dietary habits, inadequate oral hygiene practices, improper knowledge on importance of oral health were the factors contributing for the development of oro-dental diseases. [32]

A cross-sectional study was conducted in a private school, Malwani Malad, North West area of Mumbai city to study perception and practice regarding oral health among 9 -13 years old 299 students who were studying in 5^{th} to 7^{th} standard. Among them 53.1% were male and 46.9% were female. Around 95.7% study participant responded that daily brushing is good habit, 92.4% responded that eating sweets will leads to dental caries and 74.9% responded that one should avoid eating sweets at bedtime. More than 77% of them cleaned teeth with toothbrush regularly among them, 59% cleaned teeth daily once and 18% cleaned with brush two times a day. Around 62% of children cleaned teeth in the morning, 18% both in the morning and at night and other children cleaned their teeth at any time of the day according to their wish. Almost 81% used tooth paste with toothbrush for cleaning their teeth. More than 72% children consumed sweets and chocolates every day, among them 20% ate at least once, 26% ate twice and 24% consumed sweets more than two times a day. Among 272 children who felt that brushing teeth regularly is a good routine, 80% cleaned their teeth every day. Association between perception and practice with teeth cleaning was statistically significant ($p < 0.001$) in this study. [33]

In another descriptive survey conducted among 550 study subject aged between 11 and 14 years in Madhya Pradesh. Out of 550 study participants the response rate was 81.27%. About 55% knew the importance of maintaining teeth and gums. Around 67% knew that their teeth and gums were good. About 78% were worried about foul breath. Around 70% were aware of tooth decay and 35% knew the correct brushing technique to maintain good oral hygiene. Out of 550 study participants, 83% cleaned their teeth using tooth brush-paste and 17% cleaned using finger and tooth powder. Around 41% cleaned their teeth more than once daily. About 30% of participants informed parents about their change in the appearance of teeth. Only 20% felt that there is a need to visit dentist regularly. From the present study majority of study participant showed good oral health awareness. [34]

A prospective evaluation of oro-dental habits and hygiene among 100 school children aged between 6-12 years was conducted in Lucknow, Uttar Pradesh. Study participants were educated about various oral hygiene procedures using various motivational programmes in a sequential manner and oral hygiene score was obtained using simplified oral hygiene index before and after giving intervention. Chi square test was applied to find out the association of mean oral hygiene score before and after oro dental health education. Out of 100 study participants 60 and 40 were male and female respectively. The mean ± SD age of the study participant was 10.67 ± 3.85 years and the mean oral hygiene score ± SD among them was 2.08 ± 0.53. Around 84% children brushed early in the morning after waking up and 10% of the children brushed their teeth after having breakfast. Majority (80%) study participants brushed only once a day and 9% brushed twice a day. Around 52% brushed teeth for 1 minute, 33% brushed teeth for 2 minutes and 15% children brushed teeth for a time period of 3 minutes. Baseline mean ± SD oral hygiene of the subject was 2.08 ± 0.53 and after a

period of 4 months of oro-dental health education oral hygiene index improved to 1.11 ± 0.34. Baseline oral hygiene knowledge and practice was poor and significant improvement in oral hygiene status of children was noted after giving health education among study participant. This clearly indicates that necessary interventional programmes if implemented in a systematic manner will play a major role in behavioural change among school children regarding oral health. [35]

A cross sectional survey was performed among twelve-year-old students to assess the knowledge and practice regarding oral health in field practice of Haryana. A total of 440 study participants from twelve selected schools were included in this survey. Among them 49.09% and 50.91% were male and female respectively. About 25% of study subject said that they cleaned their teeth more than once in a day. Nearly 32% did not clean their teeth daily. Around 71% used toothbrush and toothpaste for cleaning and 83% said that regular cleaning of teeth can prevent tooth decay. Nearly 42% children felt that consumption of sweets will cause tooth decay. The response of male and female study participant with regards to use of toothbrush / toothpaste and consumption of sweets were not statistically significant . About 17% had correct knowledge that usage of fluoride containing toothpaste can prevent oral caries. Around 45.5% of the children had dental problem since one year , but 36% had visited dentist. Knowledge and practice regarding oral health among female was significantly higher when compared to male ($p = <0.05$). The study showed that the dental health knowledge, attitude, and practice among students was low. [36]

A cross-sectional descriptive survey in government and private schools among 12- and 15-years old children was conducted in Ambala, Haryana. A total of 992 study participants were selected by using two-stage cluster sampling method. Oral

caries and periodontal examination were done in this study using World health organization (WHO) standard criteria. Student's t-test and one-way ANOVA were used for statistical analysis. Nearly 23.7% were 12 years of age and 76.3% were 15 years of age. About 57% were male and 43.1% were female. Nearly 45.2% and 54.8% respectively belonged to private and government schools. Majority (90%) of study subjects in both the age groups used tooth brush to clean their teeth. Toothpaste was used by 96.7% of subjects who belonged to 12 years whereas 93% of subjects were of 15 years of age. About 68.6% of 12-year-old students and 77.4% of 15-year-old students brushed their teeth at least once a day. Among 12-year study participants around 31.8% used tooth brush as a cleaning aid to clean their teeth where as 41.4% 15-year-old study participants used tooth brush as a cleaning aid to clean their teeth. Prevalence of dental caries was 34.3% and 46.5% at 12 and 15 years respectively. Mean DMFT in 12 years and 15 years was 0.82 and 1.26 respectively. Around 69.4% in 12 years and 63.8% in 15 years old study participants gum bleeding was noticed followed by calculus. Very few among 15-year-old study participant had healthy gingival status in this study. Overall prevalence of dental caries noted in this study was low but the prevalence of gingivitis was high. [37]

Similar study was performed in a rural area of Amritsar regarding awareness of oral hygiene among 71 government school students of class 8^{th}, 9^{th}, and 10^{th} in Mallunanga, Punjab. About 78.9% belonged to 12–15 years of age and rest belonged to 16–18 years of age. Around 36.6% of students belonged to 10^{th} standard. Gender, class and literacy status of fathers' of study participants were significantly associated with the knowledge regarding oral health. About 90% of the study participants brushed their teeth once daily and 6% cleaned their teeth almost after having every meal. Out of 71 study participant 43.7% brushing their teeth for one minute. Nearly

89% students had never done dental visit in the past months. In this study, 11.3% of children had good knowledge, 52.1% had average and 36.6% had poor knowledge regarding oral health. The study shows that oral health practices regarding dental visit, frequency and time spent for brushing teeth and frequency of changing tooth brush were noted poor in this study. This study concludes that since adolescent age group is the most crucial period as that is the period in which concepts of knowledge and attitude should be conceptualized which later turns as their lifelong practice and habits for maintaining oral health, necessary actions are needed to be taken to improve oral hygiene practices. [38]

A cross sectional study was conducted among school-going children of rural and urban practice area in Kamrup District of Assam. A total of 1,501 schoolchildren in the age group of 13–14 years were included in the study. Dental caries was recorded by using DMFT index and status of oral caries and its association with oral hygiene practices was also studied. Unpaired t-test, Chi-square test, and one-way ANOVA test were done to compare the DMFT among different age groups and gender. Among study participant 792 (52.8%) were male and 709 (47.2%) were female, also 50% belonged to rural population and urban population each. Mean score of DMFT among 13 years old children was 187, 12, and 55 respectively, whereas in 14 years old children it was 287, 35, and 133 respectively. Overall DMFT index was higher in 14 years old children when compared to 13-year-old children and was more in girls with significant p value (0.000). The DMFT score of those who used toothbrush for cleaning teeth (0.98 ± 1.60) was higher than those who used finger for cleaning teeth (0.76 ± 1.13). The DMFT score among those who cleaned their teeth once daily (1.10 ± 1.62) was significantly higher than those who cleaned twice daily (0.62 ± 1.25). The mean DMFT score of those who consumed sweets in-between the

meals (1.56 ± 1.71) was significantly higher than those who consumed sweets during meals (0.24 ± 0.67). High statistically significant difference was found between the male (27.9%) and the female (35.7%) population regarding the prevalence of the decayed component and overall prevalence of dental caries among school children of Kamrup was average (33.6%) in this study. [39]

A cross-sectional study was conducted in Manipur, North India to evaluate knowledge, attitude and practice towards oral health among 810 (15-18 years) healthy adolescents from different primary health care centres of nine districts of Manipur. Stratified sampling methodology was used for data collection. WHO oral health questionnaire for children was used and a pilot study was conducted with 20 young adults before the study. Chi square test, Mann-Whitney U test, Kruskal Wallis test and Spearman's rank correlation were used for statistical analysis. Out of total participant, most of the respondents had high school level education and higher number of parents had university level education. Majority of the participants knew that tooth brush should be used for cleaning teeth. Also, most of the participants knew that teeth should be brushed twice a -day, in the morning and evening. About 90.9% had high knowledge, 79.8% had favourable attitude and 70.4% had adequate practice towards oral health. Significant and positive linear correlation between knowledge-attitude ($r=0.369$, $p<0.01$) knowledge practice ($r=0.405$, $p<0.01$), attitude-practice ($r=0.353$, $p<0.01$) was observed. Findings from this study reveals that raising awareness among school children regarding the value of oro-dental health and hygiene is the most vital and essential thing in improving oral health. [40]

A cross-sectional survey was carried out in 14 primary schools located in Derna city, Libya. A total of 1288 study subjects were included using systematic random sampling, in which 62.3% were female and 37.7% were male. Survey showed that 55% children had correct practice, 67% had poor knowledge, and 74% had bad attitude towards oral health. In this study 48% study subject brushed their teeth twice daily whereas 0.8% never used toothbrush for cleaning teeth. Majority (81%) used toothbrush and toothpaste and only 0.3% had used dental floss for cleaning teeth. Nearly 43% of the children had done dental visit within six months. Almost 47% had undergone tooth extraction as intervention. Nearly 2/3rd (76%) responded that tooth pain was the reason for their recent visit to dentist. Less than 10% had correct knowledge regarding dental plaque, 56% had correct knowledge regarding what is gum bleeding (inflamed gum), and 30% know that gum bleeding can be prevented using toothbrush, toothpaste, and dental floss. Nearly 17% of the study participant had correct knowledge that dental plaque will lead to inflammation of the gum, whereas 13% responded that that it is teeth staining. The study noted that knowledge and attitude among school children with regard to oral health was average and also motivation of study participants about the essentiality of maintaining good oral health in school and at home needs to be emphasized. [14]

A descriptive survey was conducted among 422 systematically selected students in Debre Town, North Central Ethiopia. Data was collected in 3 schools of Debre town using stratified random sampling, among them 51.2% were female students. Nearly 60% of the study subject had correct knowledge regarding oral hygiene, 66% of the students had positive attitude. More than half (61%) of the study subject had poor oral hygiene practice. Most of them (82%) responded that gum bleeding indicates gum disease, 4.3% had no idea whereas 5.7% said that it is healthy

gum. About 20% responded that using a toothpaste prevents bleeding gums, 13.3% using tooth brush prevents bleeding gums and 4.7% said that avoiding cleaning of teeth prevents bleeding gums. More than 87% of students responded that dental hygiene is essential for good oral health. Nearly (69%) responded that neither the parents nor the school teachers showed concern regarding dental hygiene. Among who cleaned their teeth, 89% brushed teeth once a day, 24% used a toothbrush, 20.92% used both chewing stick and toothbrush and 3.42% children used other material for brushing of teeth. More than 87% brushed their teeth before having food, 5% brushed teeth both prior and after food, and another 7% brushed teeth after food. Most of the participant in this study knew that teachers and parents had a vital role to play in their dental health. The study recommends that, introduction of various dental health education programs in the school syllabus will play a key role for improving dental hygiene practices amongst the students. [8]

IV. MATERIAL AND METHOD

Source of data:

Belagavi is a district which is located in north west region of the state of Karnataka. According to Census 2011 statistics the population of Belagavi city was 4,779,661 [11] and as per Aadhar Unique Identification Authority of India 2022 data, the population in the district was estimated to be 5,143,390. [16] For proper convenience and administration Belagavi district is divided into 10 taluks which have 18 municipalities, 22 towns, 35 hoblies, 485-gram panchayats having 1,270 villages. [17] Majority of people in Belagavi district speak Kannada, Marathi, Hindi and the rest speak other languages like Konkani, Urdu, Sindhi and Punjabi. All schools in the district are divided into six different blocks namely Belgaum city block, Belgaum rural block, Bailhongal block, Khanapur block, Ramdurg block and Soundatti block. In Belagavi city there are 361 primary and secondary schools out of which 243 are primary schools, 93 are secondary schools, 25 are both primary and secondary schools. Among 361 schools, 322 are co-educational schools, 29 are girls only schools and 10 are boys only schools. [18]

Study design: A Cross - Sectional study.

Study population: School children aged 11-16 years from the selected four Co - educational schools of Belagavi city.

Study period: 1st January to 31st December 2021.

Sample size:

Sample size was calculated using formula $n = \frac{4pq}{d^2}$

where

P = 33.6 [2] (prevalence of positive attitude)

q = 100 – p = 100 – 33.6 = 66.4

d = relative error ie, 10% of 33.6% = 3.36%

Therefore $n = 4pq / d^2$

$= 4 \times (33.6 \times 66.4) / (3.36 \times 3.36)$

$= 789 \cong 800$

Inclusion Criteria:

1. School children aged 11 to 16 years, from the selected schools.

Exclusion criteria:

1. Children with severe medical health problems

Sampling Method:

As per the list obtained from Deputy Director of Public Instruction a total of 322 co-educational schools are there in Belagavi city, out of which four schools were selected randomly one school from each zone of Belagavi city namely the north, south, east and west. From total strength of each school population proportionate sample was used to select number of students per school. Using Attendance register sampling frame was prepared. Desired number of students were selected per school using computer generated random numbers (simple random sampling).

Name of the school	Total strength	Population proportionate sample
Seventh Day English High School Azam Nagar, Belagavi (North)	**376**	**154**
Little Scholars Academy High School Kanbargi, Belgaum (West)	**608**	**248**
Shaikh Central School Nehru Nagar (East)	**532**	**218**
Cantonment Board English High School, Camp, Belagavi (South)	**439**	**180**
Total	**1955**	**800**

Among the school selected, letter was sent with detail explanation regarding the need of the study, after approval, the principal of selected school was requested to intimate the students and their parents about our study and seek permission. Data was collected after obtaining informed written consent from the parents and assent from the students of the selected schools.

Ethical Clearance:

Ethical clearance was obtained from Institutional Ethical Committee, J.N. Medical College, KAHER, Belagavi. (**Letter no.- MDC/DOME/76 dated. 25/01/2021)**

Data collection:

Data was collected by personal interview from all the study participants using a pre designed and pre tested questionnaire. The questionnaire included

1. The socio-demographic factors
2. Knowledge, attitude and practice of study participant regarding oral health and dental treatment

The children would respond to each elements of the questionnaire by choosing one or sometimes combination of the two or more response from the options provided in the list. Researcher was present all the time to clarify their doubts and concerns about any aspects regarding the study during the course of questionnaire filling.

Definition of Study variables:

1.**Age:** Age was recorded to the nearest completed years.

2.Type of family:

I. Nuclear: The family consisting of married couple along with their dependent children.
II. Joint: It consists of number of married couples and their children who live in the same household
III. Broken family: A broken family is one where the parents have separated, or where death has occurred of one or both the parents.

3. Educational Qualification of Parent:

I. Illiterate: those who cannot read or write with understanding in any language.

II. Basic education: those who had studied up till 10^{th} standard

III. Pre-University College (PUC): those who had completed education up to PUC.

IV. Diploma: those who had completed any diploma course

V. Degree: those who had completed any graduation degree course

VI. Post graduate: those who had completed any post-graduation course.

4. Occupation of Parent:

The source of their income, as self-reported by the beneficiaries, who would earn his or her living by means of it.

I. Farmer: owns his land or on a contract basis or who works at any place including agricultural fields on a daily wage basis.

II. Labourer- who works in any place on a daily wage basis

III. Self-employed: a person engaged in commercial or industrial business either an owner or executive

IV. Government employee: who is a permanent or contract worker in any government agency.

V. Private employee: who is a permanent or contract worker in any private company or factory or Non - governmental organizations (NGOs).

VI. Unemployed: who currently is not working or not receiving monitory benefits of any kind

VII. Home maker: who looks after the home, children and currently not working in any kind

5. Socioeconomic class:

Modified B. G. Prasad's classification was used for this. This scale was evolved in 1961. It was introduced considering the base of Consumer Price Index (CPI) for 1960 as 100, modified in 1982 and 2001 by introducing linking factors to convert CPI (1982). All India Consumer Price index (for Industrial workers) average for 2021 (on Base 2001=100) = 119.6. Multiplication factor = Current index value (119.6) / Base index value in 2001 (100) = 1.196. Therefore, new income value = multiplication factor × old income value = 4.63 × 4.93. Here 4.63 and 4.93 are the linking factors put forwarded by the Labour Bureau of India So, after substituting the values, the new scale is,

Socioeconomic class	B.G. Prasad's classification for 1961 (monthly income in rupees)	Revised B.G. Prasad's classification for 2021 (monthly income in rupees)
I	100 and above	7863 and above
II	50 to 99	3931-7862
III	30 to 49	2359-3930
IV	15 to 29	1179-2358
V	Below 15	1179and Below

6. Definition of Knowledge question to assess oral hygiene among school children

Knowledge question	**Definition/Correct answer**
Number of permanent teeth in the oral cavity of a child	28
Number of permanent teeth in the oral cavity of an adult	32
Four different types of teeth present in the adult oral cavity	Incisor, Canine, Pre-molar and Molar
Time and duration of brushing teeth	Twice a day, Morning and Night before going to bed for 2 minutes
Duration for changing Tooth brush	Every three months
Things used for cleaning teeth	Tooth brush, Mouth wash, Dental floss
Material to be used for cleaning teeth	Tooth paste, Tooth powder
Plaque means and will lead to	Plaque means debris on the teeth and will lead to dental caries
Gum bleeding means	Inflammed gum
Vitamin important for oral health	Vitamin C

7. Definition of Practice question to assess oral hygiene among school children

Practice question	**Definition/Correct answer**
Duration for regular dental visits	Once in 6 months
Food items to be consumed for maintaining good oral health	Consumption of fresh fruits several times a day, once in a day or at least several times a week
Food items to be completely avoided which cause poor oral health	Consumption of bakery products, Aerated drinks/other soft drinks, Jam/honey, chewing gum containing sugar, Sweets/candy, Milk with sugar, Tea and coffee with sugar

Data analysis:

Collected survey sheets were bundled and numbered according to respective school. Collected data was entered into excel sheet. Data was analyzed using Statistical Package for Social Sciences (SPSS) software trial version 24.0. The quantitative data was analyzed using mean, median and standard deviation. The qualitative data was summarized as percentage and proportion. To study the association between variables chi square test was applied.

Score:

Knowledge regarding oral hygiene: For every correct answer one mark was given and every wrong, don't know and unanswered questions were considered as zero. Knowledge score was divided according to marks scored by each participant.

- **Good knowledge:** Above (Mean + 2SD)

  = Above (12.67+2.67)

  = > 15.34

- **Average knowledge:** (Mean + 2 SD) to (Mean – 2 SD)

  = mean 12.67 ± 2SD 2.67

  = 15.34 to 10.00

- **Poor knowledge:** Below (Mean - 2SD)

  = < 10.00

Attitude towards oral hygiene: For every correct answer one mark was given and every wrong and don't know answers were considered as zero. Attitude score was divided according to marks scored by each participant.

Positive attitude: Above (Mean + 2SD)

= Above (5.21+1.40)

= > 6.61

Negative attitude: ≤ 6.61

Practice regarding oral hygiene: For every correct answer one mark was given and wrong, don't know and unanswered questions were considered as zero. Practice score was divided according to marks scored by each participant.

Good practice: Above (Mean + 2SD)

= Above (8.31+1.51)

= > 9.82

Neutral practice: (Mean + 2SD) to (Mean – 2SD)

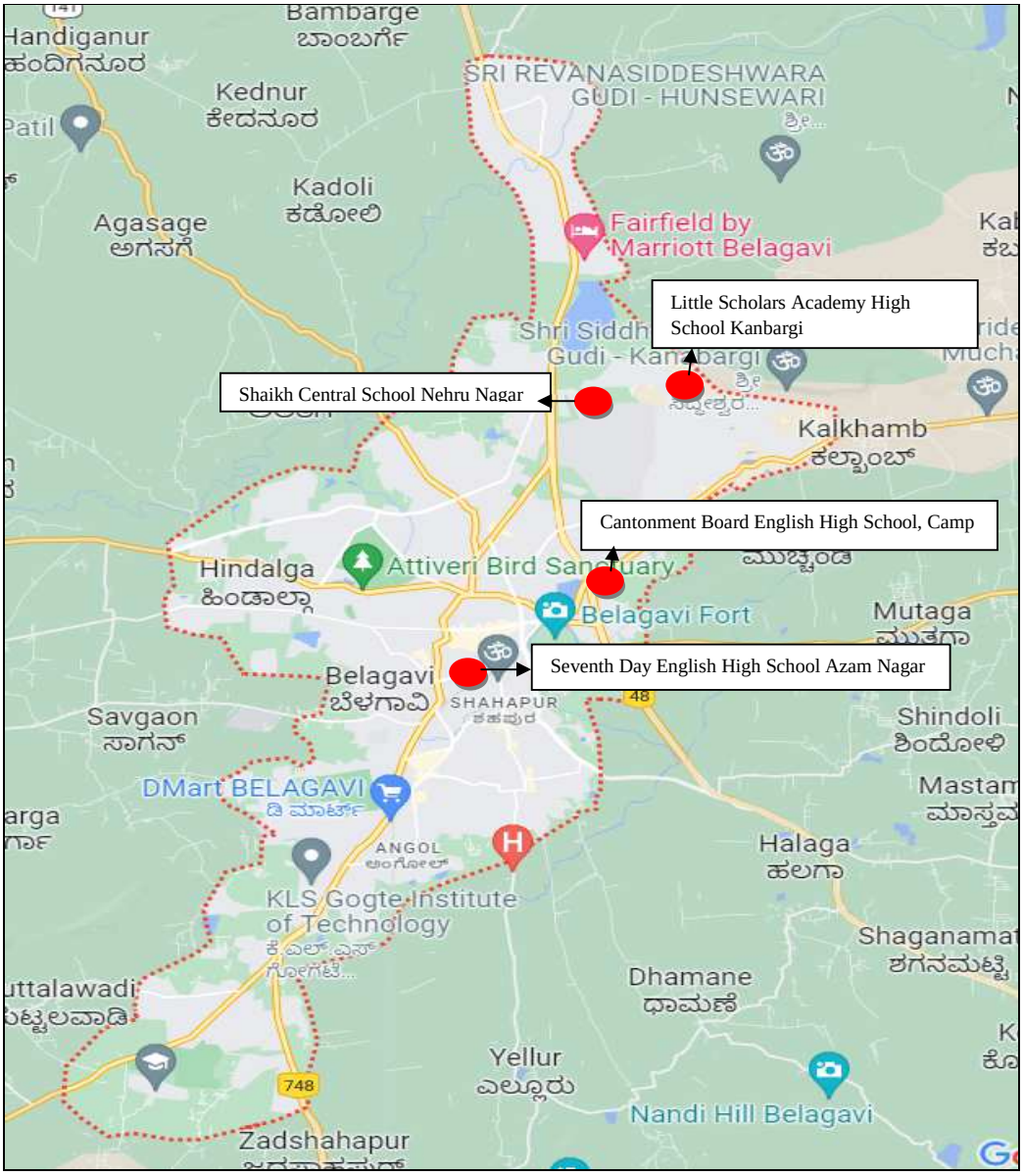
= 9.82 to 6.8

Poor practice: Below (Mean – 2SD)

= Below (8.31 – 1.51)

= < 6.8

MAP OF BELAGAVI CITY



V. RESULTS

The present cross-sectional study was conducted among 800 school children aged 11-16 years from the selected four co-educational schools of Belagavi city.

The data obtained was tabulated and analyzed under the following headings:

I. **Socio-demographic profile of study participant**

II. **Knowledge of study participant regarding oral health**

III. **Attitude of study participant towards oral health**

IV. **Practice of study participant regarding oral health**

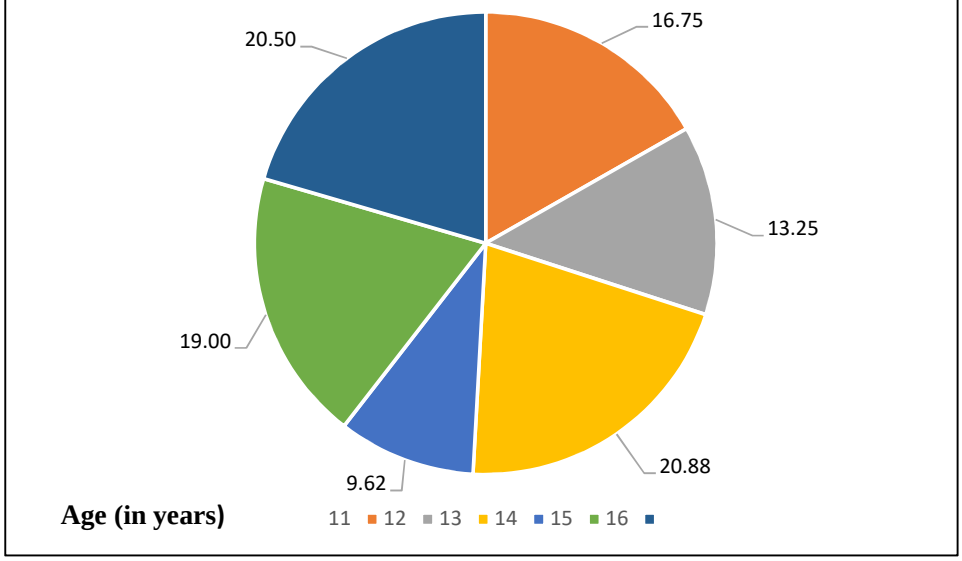
V. **Association between sociodemographic profile of study participant and knowledge, attitude and practice of oral health.**

I - Socio demographic profile of study participant

Table 1: Age distribution of study participant

Age (in years)	Number	Percentage
11	134	16.75
12	106	13.25
13	167	20.88
14	77	9.62
15	152	19.00
16	164	20.50
Total	**800**	**100**

Graph 1 (Table 1): Age distribution of study participant



In the present study, out of 800 study subject, 167 (20.88%) were aged 13 years, 164 (20.50%) were aged 16 years, 152 (19.00%) were aged 15 years, 134 (16.75%) were 11 years old, 106 (13.25%) and 77 (9.62%) were 12 years and 14 years old respectively. The mean ± SD age of the participant was 13.5 ± 1.87 years. The median age was 13.5 years and range was 11 to 16 years. On further analysis, it was noted that, 200 (25.00%) students were studying in 7^{th} standard, 179 (22.37%) in 10^{th} standard, 145 (18.13%) in 9^{th} standard, 142 (17.75%) in 6^{th} standard and 134 (16.75%) in 8^{th} standard.

Distribution of study participant according to sex: In the current study, out of 800 study participant, 410 (51.25%) were male and 390 (48.75%) were female students.

Table 2: Distribution of study participant according to religion

Religion	Number	Percentage
Hindu	600	75.00
Muslim	174	21.75
Christian	20	2.50
Jain	6	0.75
Total	800	100

Out of 800 study participant, 600 (75.00%) were Hindu by religion, 174 (21.75%) were Muslim, 20 (2.50%) and 6 (0.75%) belonged to Christian and Jain religion respectively.

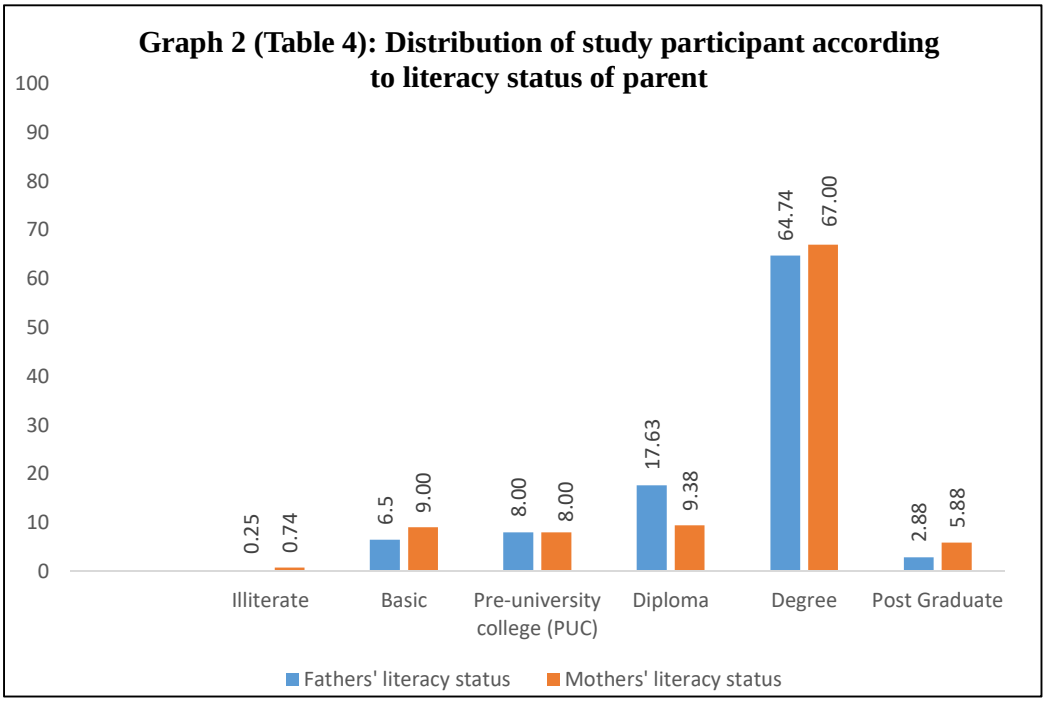
Table 3: Distribution of study participant according to type of family

Type of Family	Number	Percentage
Nuclear	600	75.00
Joint	199	24.88
Broken	1	0.12
Total	**800**	**100**

In our study, 600 (75.00%) of the study participant were staying in joint family whereas 199 (24.88%) were staying in nuclear family and 1 (0.12%) belonged to broken family.

Table 4: Distribution of study participant according to literacy status of parent

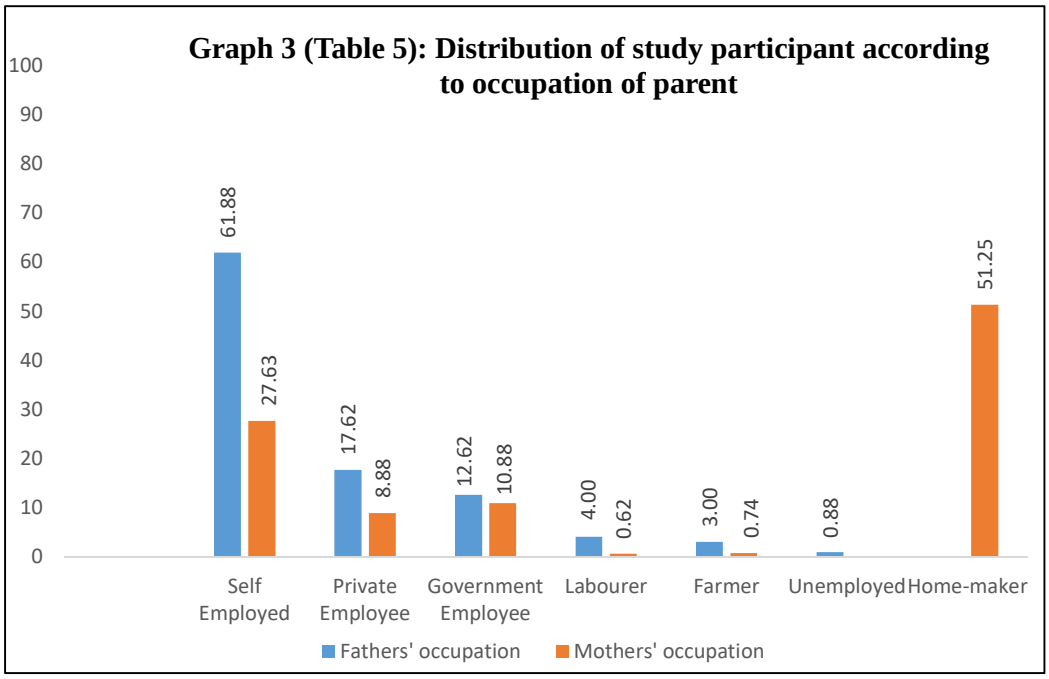
Literacy status	Fathers' literacy status		Mothers' literacy status	
	Number	Percentage	Number	Percentage
Illiterate	2	0.25	6	0.74
Basic	52	6.50	72	9.00
Pre-university college (PUC)	64	8.00	64	8.00
Diploma	141	17.63	75	9.38
Degree	518	64.74	536	67.00
Post Graduate	23	2.88	47	5.88
Total	**800**	**100**	**800**	**100**



In the study regarding literacy status of fathers' of 800 study participant, majority of them 798 (99.75%) were literates. Among them 518 (64.74%) were degree holder, 141 (17.63%) were diploma holder, 64 (8.00%) had completed PUC, 52 (6.50%) had done schooling uptill 10^{th} standard and 23 (2.88%) were post graduate. Regarding literacy status of mothers' of study participant, most of them 794 (99.26%) were literates. Among them 536 (67.00%) were degree holder, 75 (9.38 %) were diploma holder, 72 (9.00%) had schooling uptill 10^{th} standard, 64 (8.00%) completed PUC and 47 (5.88%) were post graduate.

Table 5: Distribution of study participant according to occupation of parent

Occupation	Fathers' occupation		Mothers' occupation	
	Number	Percentage	Number	Percentage
Self Employed	495	61.88	221	27.63
Private Employee	141	17.62	71	8.88
Government Employee	101	12.62	87	10.88
Labourer	32	4.00	5	0.62
Farmer	24	3.00	6	0.74
Unemployed	7	0.88	-	-
Home-maker	-	-	410	51.25
Total	**800**	**100**	**800**	**100**

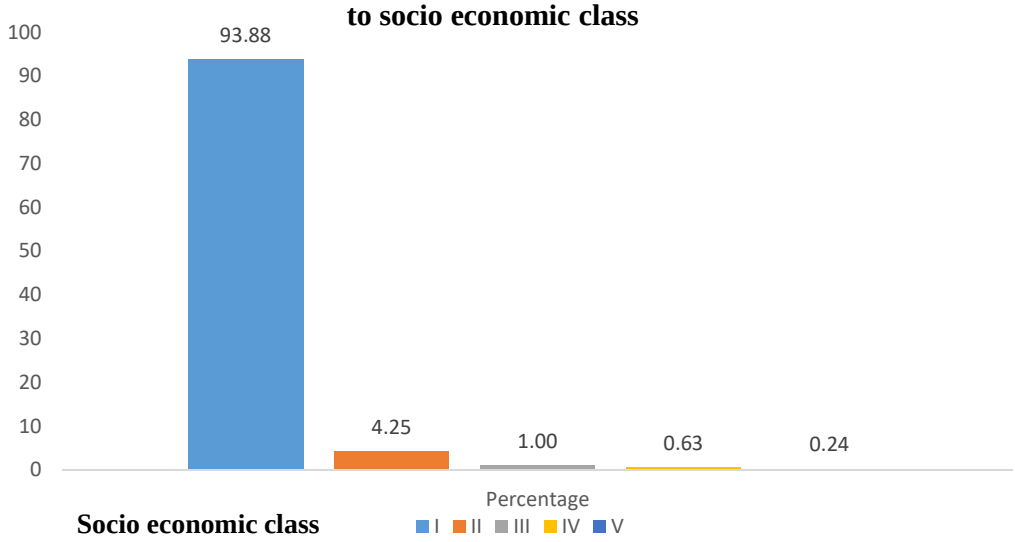


In the present study regarding occupation of fathers' of study participant, 495 (61.88%) were self-employed, 141 (17.62%) were employed in private sector, 101 (12.62%) were government employee, 32 (4.00%) were labourer, 24 (3.00%) were farmer and 7 (0.88%) were unemployed. In relation to occupation of mothers' of study participant, 410 (51.25%) were homemaker and 390 (48.75%) were working mothers. The common occupation noted in our study were: 221 (27.63%) self-employed, 87 (10.88%) government employee, 71 (8.88%) private employee, 5 (0.62%) were labourer and 6 (0.74%) were farmer.

Table 6: Distribution of study participant according to socio economic class

Socio-economic class	Number	Percentage
I	751	93.88
II	34	4.25
III	8	1.00
IV	5	0.63
V	2	0.24
Total	**800**	**100**

Graph 4 (Table 6): Distribution of study participant according to socio economic class



The present study shows that, majority 751 (93.88%) of the study participant belonged to socio-economic class I according to Modified B. G. Prasad's classification, 34 (4.25%) belonged to class II, 8 (1.00%) belonged to class III, 5 (0.63%) belonged to class IV and 2 (0.24%) belonged to class V.

II-Knowledge of study participant regarding oral health

Table 7: Distribution of study participant according to knowledge regarding oral health

Knowledge regarding oral health	Number	Percentage
Are teeth important part of body		
Yes	792	99.00
No	4	0.50
Don't know	4	0.50
Number of permanent teeth in child		
Correct	159	19.88
Incorrect	641	80.12
Number of permanent teeth in adult		
Correct	240	30.00
Incorrect	560	70.00
Four different types of teeth in an adult		
Correct	20	2.50
Incorrect	780	97.50
Total	**800**	**100**

Out of 800 children, majority 792 (99.00%) knew that teeth are an important part of our body. Whereas 4 (0.50%) children did not consider teeth as an important part of their body. Another 4 (0.50%) children were not sure about it. In the present study out of 800 study participant, 159 (19.88%) had correct knowledge regarding number of permanent teeth in child. The incorrect knowledge was noted in 641 (80.12%) of the school children. Among them, 413 (51.62%) responded that there are 26 permanent teeth in the oral cavity of a child whereas 218 (27.25%) and 10 (1.25%) responded that there are 32 and 34 permanent teeth in the oral cavity of a child respectively. With regards to number of permanent teeth in an adult, 240 (30.00%) had correct knowledge. The incorrect knowledge was noted in 560 (70.00%) of children. Among them, 333 (41.63%) responded that there are 28, whereas 121 (15.13%) and 106 (13.24%) responded that there are 26 and 34 permanent teeth in the oral cavity of an adult respectively. Types of teeth is a part of science curriculum in the school, but only 20 (2.50%) had the correct knowledge about four different type of teeth in the adult oral cavity. The incorrect knowledge was noted in 780 (97.50%) school children. Among them 703 (87.88%) of study participant don't know about any of the four different type of teeth in the adult whereas 37 (4.62%) knew one type, 21 (2.63%) knew three and 19 (2.37%) knew two out of the four different types of teeth in an adult oral cavity.

Table 8: Distribution of study participant according to knowledge regarding oral health

Knowledge regarding oral health	Number	Percentage
Brushing of teeth regularly will prevent oral health problems		
Yes	364	45.50
No	220	27.50
Don't know	216	27.00
Irregular brushing of teeth causes tooth ache		
Yes	740	92.50
No	24	3.00
Don't know	36	4.50
Improper cleaning of tongue results in bad breath		
Yes	706	88.25
No	22	2.75
Don't know	72	9.00
Rinse mouth with water after every meal		
Yes	604	75.50
No	23	2.87
Don't know	173	21.63
Total	**800**	**100**

In the present study out of 800 study subject, 364 (45.50%) knew that brushing of teeth regularly will prevent dental health problems. Whereas 220 (27.50%) responded that brushing of teeth regularly will not prevent development of dental health problems and 216 (27.00%) didn't have any knowledge about it. Out of 800 school children, 740 (92.50%) had correct knowledge regarding irregular brushing of teeth leads to toothache. Only 24 (3.00%) responded that irregular brushing of teeth will not cause tooth ache and 36 (4.50%) don't know much about it. Regarding knowledge about improper cleaning of tongue causing bad breath, 706 (88.25%) had correct knowledge. The incorrect knowledge was noted in 22 (2.75%) and 72 (9.00%) don't know that improper cleaning of tongue causes bad breath. With regards to knowledge regarding rinsing of mouth with water after every meal, 604 (75.50%) school children had correct knowledge, 23 (2.87%) incorrect knowledge and 173 (21.63%) don't know that they should rinse mouth with water after every meal.

Table 9: Distribution of study participant according to knowledge regarding oral health

Knowledge regarding oral health	Number	Percentage
Brush teeth twice daily		
Yes	784	98.00
No	7	0.88
Don't know	9	1.12
How long one should brush teeth		
Correct	287	35.88
Incorrect	513	64.12
Brush teeth in front of their parent		
Yes	406	50.75
No	288	36.00
Don't know	106	13.25
How often one should change toothbrush		
Correct	72	9.00
Incorrect	728	91.00
Total	**800**	**100**

In our study 784 (98.00%) among 800 study participant had correct knowledge regarding brushing of teeth twice daily. The incorrect knowledge was noted in only 7 (0.88%) and 9 (1.12%) don't know about it. Out of our 800-study subject, with regards to knowledge about duration of brushing of teeth, 287 (35.88%) had correct knowledge i.e they should brush teeth for two complete minutes. The incorrect knowledge noted in our study were: 455 (56.87%) responded that they should brush teeth in less than one minute and 58 (7.25%) responded that they should brush teeth for one minute or more than two minutes. About knowledge regarding brushing teeth in front of parent, 406 (50.75%) had correct knowledge that they should brush teeth in front of their parent. About 288 (36.00%) responded that they should not brush teeth in front of their parent and 106 (13.25%) don't know whether that they should brush teeth in front of their parent or not. Regarding knowledge about duration of changing of toothbrush, 72 (9.00%) had correct knowledge i.e, that they should change toothbrush every three months. The incorrect responses noted were: 481 (60.12%) told that they should change toothbrush either on monthly basis or every six month and 247 (30.88%) told that they should change toothbrush every two months.

Table 10: Distribution of study participant according to knowledge of material used for cleaning teeth

Material used for cleaning teeth	Number	Percentage
Correct	787	98.40
Incorrect	13	1.60
Total	800	100
If correct, (n=787)		
Toothbrush, mouthwash and floss	10	1.27
Toothbrush / mouthwash or floss	179	22.74
Toothbrush	598	75.99
If incorrect, (n=13)		
Finger, Safety pin and Toothpick	1	1.28
Finger/Safety pin or Toothpick	10	12.82
Finger	67	85.90
Total	78*	100

*** Multiple responses**

Out of 800 study participant, 787 (98.40%) of children had correct knowledge that they should use toothbrush or mouthwash or dental floss all three for cleaning teeth. Among 787 students who responded correctly, 10 (1.27%) thought that they should use toothbrush/mouthwash and dental floss for cleaning teeth. Whereas 179 (22.74%) responded that should use toothbrush and mouthwash or dental floss for cleaning teeth. Majority 598 (75.99%) responded that only toothbrush should be used for cleaning teeth. Among 13 students who had incorrect knowledge, 1 (1.28%) child responded that they can use finger, safety pin and toothpick for cleaning teeth. Whereas 10 (12.82%) responded that they can use finger/safety pin or toothpick all three for cleaning teeth. Majority 67 (85.90%) thought that they can use finger for cleaning teeth.

Table 11: Distribution of the study participant according to knowledge of substance used for cleaning teeth

Substance used for cleaning teeth	Number	Percentage
Correct	782	97.70
Incorrect	18	2.30
Total	**800**	**100**
If correct, (n=782)		
Toothpaste or toothpowder	139	17.77
Toothpaste	643	82.23
If incorrect, (n=18)		
Salt/Charcoal or Ash	2	2.66
Salt	73	97.34
Total	**75***	**100**

***Multiple responses**

Out of 800 study participant, 782 (97.70%) of children had correct knowledge that they should use toothpaste or toothpowder for cleaning teeth. Among 782 students who responded correctly, 643 (82.23%) responded that they should use toothpaste and 139 (17.77%) students thought that they should use toothpaste or toothpowder for cleaning teeth. Among 18 students who had incorrect knowledge, 2 (2.66%) children responded that they can use salt/charcoal or ash for cleaning teeth. Whereas 73 (97.34%) responded that they can use salt for cleaning teeth.

Table 12: Distribution of study participant according to knowledge regarding oral health

Knowledge regarding oral health	Number	Percentage
What does plaque mean		
Hard & soft debris in teeth	392	49.00
Staining of teeth	102	12.75
Don't know	306	38.25
What does dental plaque lead to		
Dental caries	320	40.00
Inflammation	101	12.63
Staining of teeth	101	12.62
Don't know	278	34.75
What does gum bleeding mean		
Healthy Gum	126	15.74
Gum Recession	59	7.38
Inflamed Gum	31	3.88
Don't Know	584	73.00
Total	**800**	**100**

In the present study, 392 (49.00%) study participant had correct knowledge that oral plaque are hard and soft debris in the teeth, 102 (12.75%) thought that plaque means staining of teeth and 306 (38.25%) don't know anything about dental plaque. On further analysis of dental plaque knowledge leading to, 320 (40.00%) study participant knew that it leads to dental caries. Whereas 101 (12.63%) school children thought that dental plaque will lead to inflammation, another 101 (12.62%) thought that dental plaque will lead to staining of teeth and 278 (34.75%) don't know have any knowledge regarding dental plaque leading to any dental health problems. In the present study, only 31 (3.88%) had correct knowledge that gum bleeding means inflamed gum and 769 (96.12%) study participant did not have correct knowledge. The incorrect responses noted were : 126 (15.74%) gum bleeding is healthy gum, 59 (7.38%) gum recession and 584 (73.00%) no knowledge at all.

Table 13: Distribution of study participant according to knowledge regarding oral health

Knowledge regarding oral health	Number	Percentage
Sweet/bakery product affect teeth adversely		
Yes	711	88.88
No	28	3.50
Don't know	61	7.62
Fizzy drink affect the teeth adversely		
Yes	655	81.88
No	42	5.24
Don't know	103	12.88
Using fluoride containing toothpaste strengthen teeth		
Yes	441	55.12
No	64	8.00
Don't know	295	36.88
Vitamin important for oral health		
A	249	31.13
C	306	38.25
D	100	12.50
E	145	18.12
Total	**800**	**100**

In the present study, out of 800 study participant, 711 (88.88%) knew about adverse effect of sweet and bakery products on oral health. Only 28 (3.50%) responded that sweet or bakery products would not affect teeth adversely whereas 61 (7.62%) don't know. Regarding knowledge about the adverse effect of fizzy drink on teeth, 655 (81.88%) had correct knowledge, 42 (5.24%) responded that fizzy drink would not affect teeth adversely and 103 (12.88%) don't know about it. With respect to knowledge regarding using fluoride containing toothpaste for strengthening of teeth, 441 (55.12%) had correct knowledge that fluoride containing toothpaste will help in strengthening of teeth. Only 64 (8.00%) thought that fluoride containing toothpaste will not strengthen the teeth and 295 (36.88%) don't know about it. In our study, 306 (38.25%) of study participant knew about the vitamin which is important for oral health i.e, Vitamin C. The incorrect knowledge noted were: 249 (31.13%) responded as Vitamin A, 145 (18.12%) as Vitamin E and 100 (12.50%) as Vitamin D.

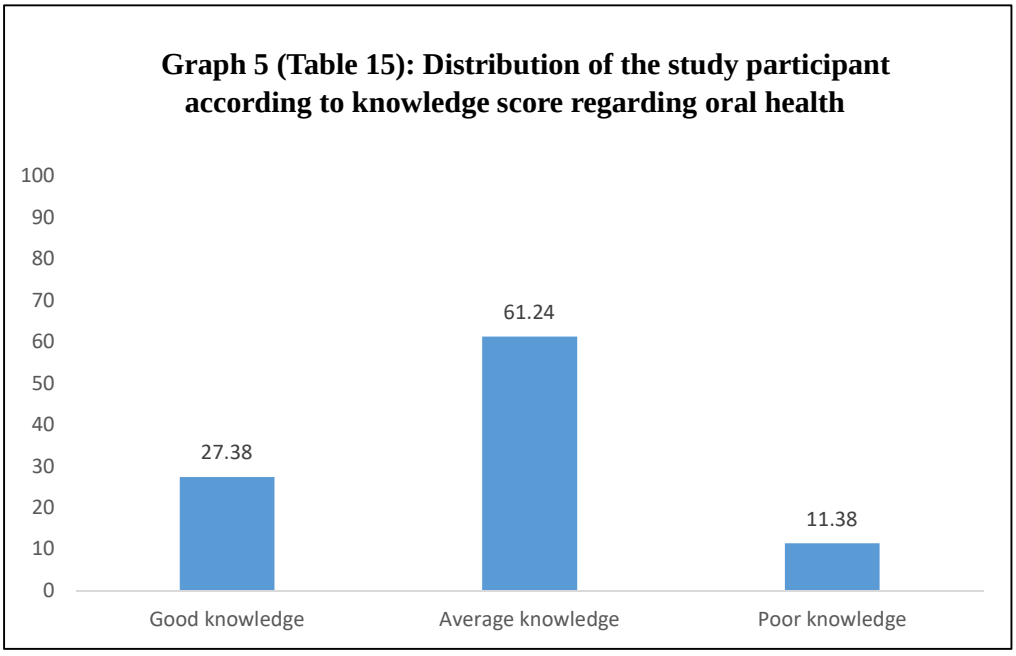
Table 14: Distribution of study participant according to knowledge regarding oral health

Knowledge regarding oral health	Number	Percentage
Regular visit to the dentist are necessary		
Yes	474	59.25
No	202	25.25
Don't know	124	15.50
Frequency of dental visits		
when one has dental problem	666	83.25
every 6 months	71	8.88
once a year	28	3.50
occasionally	35	4.37
Total	**800**	**100**

In the present study, out of 800 study participant, 474 (59.25%) had correct knowledge regarding the necessity of regular visit to the dentist. Whereas 202 (25.25%) responded that regular visit to the dentist is not necessary and 124 (15.50%) don't have any idea. With regards to knowledge regarding how often one should visit a dentist, 71 (8.88%) knew that it should be done every 6 months, 666 (83.25%) visit dentist only when they have dental problem, 35 (4.37%) occasionally and 28 (3.50%) responded that they should visit dentist once a year.

Table 15: Distribution of the study participant according to knowledge score regarding oral health

Knowledge score regarding oral health	Number	Percentage
Good	219	27.38
Average	490	61.24
Poor	91	11.38
Total	**800**	**100**



The present study shows that among the school children, the mean knowledge score was 12.67 with standard deviation of 2.67, median was 11.5 and the range was 6 to 17. Out of 800 children, 219 (27.38%) had good knowledge, 490 (61.24%) had average knowledge and 91 (11.38%) had poor knowledge regarding oral health.

III- Attitude of study participant towards oral health

Table 16: Distribution of the study participant according to their attitude towards oral health

Attitude towards oral health	Number	Percentage
Does tooth decay affect the overall appearance		
Yes	665	83.13
No	135	16.87
Poor oral hygiene prevents smiling with friends		
Yes	589	73.63
No	114	14.25
Don't know	97	12.12
Avoid talking or sitting next to who have bad breath		
Yes	605	75.60
No	195	24.40
Total	**800**	**100**

In the present study, among 800 students studied, 665 (83.13%) felt that tooth decay will affect the overall appearance whereas 135 (16.87%) did not feel so. Among the school children, 589 (73.63%) felt that poor dental hygiene prevents them from smiling with friends whereas 114 (14.20%) did not feel so and remaining 97 (12.12%) don't have any opinion about it. With regards to bad breath, 605 (75.60%) of study participant felt that they will avoid talking or sitting next to whom who have bad breath whereas 195 (24.40%) did not feel so.

Table 17: Distribution of the study participant according to their attitude towards oral health

Attitude towards oral health	Number	Percentage
Make fun of children who have dental problem		
Yes	271	33.90
No	529	66.10
Oral health problems force you to miss school		
Yes	620	77.50
No	113	14.13
Don't know	67	8.37
Maintaining healthy teeth is an individual responsibility		
Yes	738	92.25
No	29	3.62
Don't know	33	4.13
Total	**800**	**100**

In the present study, 529 (66.10%) of study participant felt that they will not make fun of children who have dental health problem whereas 271 (33.90%) did not feel so. Out of 800 study subject, 620 (77.50%) felt that oral health problem will force them to miss school whereas 113 (14.13%) did not feel so. Remaining 67 (8.37%) don't know whether oral health problem will force them to miss school or not. With regards to attitude towards maintaining healthy teeth is an individual responsibility**,** 738 (92.25%) felt that it was their own responsibility whereas 29 (3.62%) did not feel so and 33 (4.13%) don't know whether maintaining healthy teeth is an individual responsibility or not.

Table 18: Distribution of the study participant according to their attitude towards oral health

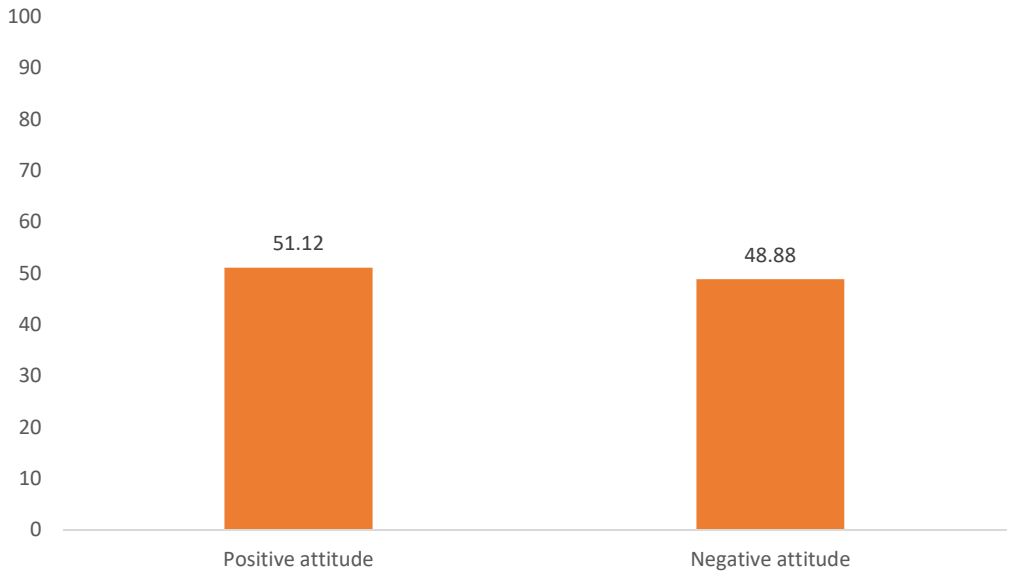
Attitude towards oral health	Number	Percentage
Maintaining good oral hygiene prevents tooth decay		
Yes	680	85.00
No	120	15.00
Dentist helps to maintain oral health		
Yes	605	75.63
No	36	4.50
Don't know	159	19.87
Total	**800**	**100**

The present study shows that 680 (85.00%) of study participant felt that maintaining good oral hygiene prevents them from development of tooth decay whereas 120 (15.00%) did not feel so. Out of 800 students, 605 (75.63%) of study participant felt that dentist will help them in maintenance of oral health, 36 (4.50%) did not feel so and 159 (19.87%) don't know whether dentist will help them to maintain oral health or not.

Table 19: Distribution of the study participant according to the attitude score towards oral health

Attitude score towards oral health	Number	Percentage
Positive	409	51.12
Negative	391	48.88
Total	**800**	**100**

Graph 6 (Table 19): Distribution of the study participant according to the attitude score towards oral health



The present study shows that among 800 school children, the mean attitude score was 5.21 with standard deviation of 1.40, median was 5 and range was 2 to 8. Out of 800 children, 409 (51.12%) had positive attitude, whereas 391 (48.88%) had negative attitude score towards oral health.

IV. Practice of study participant regarding oral health

Table 20: Distribution of the study participant according to practice regarding oral health

Practice regarding oral health	Number	Percentage
Regular Brushing of teeth		
Yes	773	96.70
No	27	3.30
Frequency of brushing of teeth (in days)		
Less than once	34	4.24
Once	356	44.50
Twice	405	50.63
More than twice	5	0.63
Time of brushing of teeth		
Morning	384	48.00
Morning & Night	410	45.30
Night	6	6.70
Duration of brushing of teeth (in minutes)		
<1	122	15.24
1	292	36.50
2	361	45.13
>2	25	3.13
Total	**800**	**100**

In the present study, out of 800 study participant, 773 (96.70%) of them brushed their teeth regularly whereas 27 (3.30%) did not brush their teeth regularly. With regards to frequency of brushing of teeth, 405 (50.63%) of study participant brushed their teeth twice per day, 356 (44.50%) brushed their teeth once per day, 34 (4.24%) brushed their teeth less than daily once and 5 (0.63%) brushed their teeth more than twice per day. In our study, 384 (48.00%) of study participant brushed their teeth in the morning whereas 410 (45.30%) brushed teeth both in the morning and night and 6 (6.70%) students brushed their teeth only in the night. With regards to duration of brushing of teeth, 361 (45.13%) of study participant brushed their teeth for complete two minutes, 292 (36.50%) brushed their teeth for about one minute, 122 (15.24%) brushed their teeth less than one minute and 25 (3.13%) brushed their teeth for more than two minutes.

Table 21: Distribution of the study participant according to practice regarding oral health

Practice regarding oral health	Number	Percentage
Brushed teeth in front of parent		
Yes	607	75.90
No	193	24.10
Duration of changing of toothbrush (in months)		
1	489	61.12
2	264	33.00
3	39	4.88
6	8	1.00
Material used for cleaning teeth		
Tooth brush	776	97.00
Tooth brush and Mouthwash	21	2.63
Tooth brush and Toothpick	2	0.25
Finger	1	0.12
Substance used for cleaning teeth		
Toothpaste	787	98.38
Toothpowder	12	1.50
Salt	1	0.12
Total	**800**	**100**

The present study shows that, 607 (75.90%) school children brushed their teeth in front of one of the parent whereas 193 (24.10%) brushed their teeth independently. Out of 800 students studied, 489 (61.12%) changed their toothbrush every month, 264 (33.00%) changed their toothbrush every two month, 39 (4.88%) changed their toothbrush every 3 month and 8 (1.00%) changed their toothbrush every 6 months. In our study,776 (97.00%) of study participant used toothbrush for cleaning teeth and 21 (2.63%) used toothbrush and mouthwash for cleaning teeth. Only 2 (0.25%) students used toothbrush and toothpick for cleaning teeth and only 1 (0.12%) student used finger. With regard to substance being used for cleaning teeth, 787 (98.38%) used toothpaste, 12 (1.50%) used toothpowder and only 1 (0.12%) student used salt for cleaning teeth.

Table 22: Distribution of the study participant according to practice regarding oral health

Practice regarding oral health	Number	Percentage
Use tooth paste containing fluoride		
Yes	448	56.00
No	352	44.00
Rinse mouth with water after meal		
Yes	787	98.40
No	13	1.60
Clean tongue while brushing		
Yes	635	79.40
No	165	20.60
Total	**800**	**100**

The current study shows that, 448 (56.00%) used tooth paste containing fluoride whereas 352 (44.00%) did not use toothpaste containing fluoride. Out of 800 study participant, 787 (98.40%) rinsed mouth with water after every meal and 13 (1.60%) did not rinse their mouth with water after every meal. With regards to tongue cleaning practice while brushing, 635 (79.40%) cleaned their tongue with brush and 165 (20.60%) did not clean their tongue while brushing.

Table 23: Distribution of the study participant according to practice regarding oral health

Practice regarding oral health	Number	Percentage
Recent dental visit		
Yes	19	2.40
No	781	97.60
Total	**800**	**100**
If yes, duration of dental visit (n=19)		
< 3 months	8	42.10
3-6 month	7	36.90
6 months to 1 year	1	5.30
>1 year	3	15.70
Reason for dental visit		
Toothache	15	78.95
Dental Caries	4	21.05
Intervention done during dental visit		
Symptomatic treatment	16	84.20
Root canal Therapy	3	15.80
Total	**19**	**100**

The current study showed that, 781 (97.60%) school children did not visit a dentist in the recent past and 19 (2.40%) had a visit. Among 19 students, 8 (42.10%) had visited the dentist within 3 months, 7 (36.90%) within 3-6 months, 3 (15.70%) more than one-year and only 1 (5.30%) student had visited a dentist between 6 months to 1 year duration. Out of 19 study participant who visited dentist recently, 15 (78.95%) visited for toothache whereas 4 (21.05%) visited for dental caries. Among them, 16 (84.20%) received symptomatic treatment whereas 3 (15.80%) had undergone Root canal therapy.

Table 24: Distribution of the study participant according to practice of consumption of food items

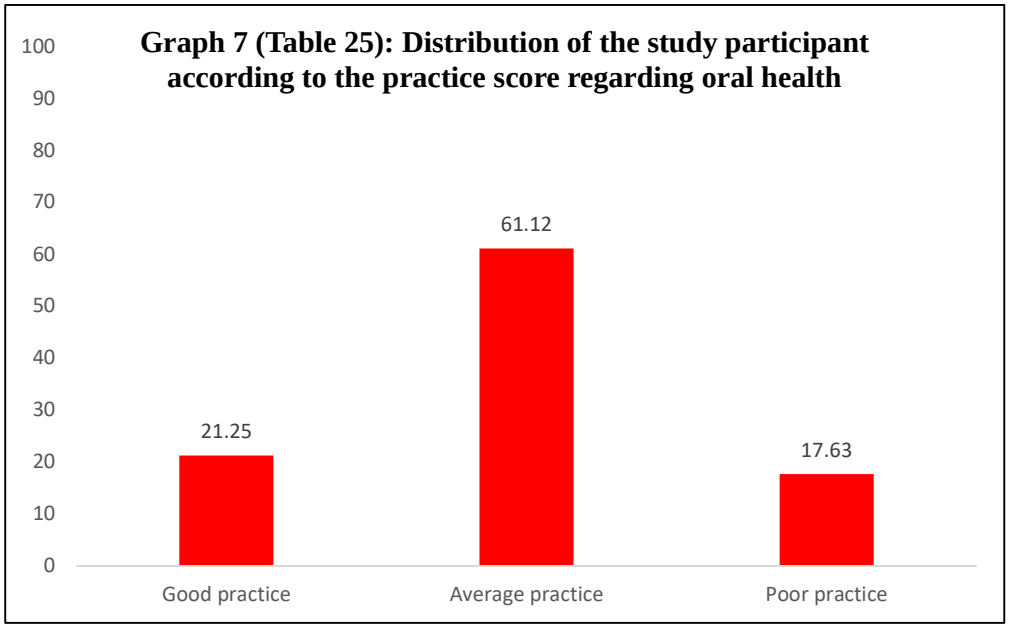
Food items	Several times a day **Number (%)**	Every day **Number (%)**	Several times a week **Number (%)**	Once a week **Number (%)**	Several times a month **Number (%)**	Never **Number (%)**	**Total (%)**
Fresh fruits	3 (0.38)	80 (10.00)	669 (83.62)	45 (5.62)	3 (0.38)	-	800 (100)
Bakery products	3 (0.37)	61 (7.63)	560 (70.00)	169 (21.13)	7 (0.87)	-	800 (100)
Aerated drinks/other soft drinks	-	21 (2.60)	204 (25.53)	497 (62.12)	58 (7.25)	20 (2.50)	800 (100)
Jam/honey	1 (0.12)	32 (4.00)	215 (26.88)	441 (55.13)	87 (10.87)	24 (3.00)	800 (100)
Chewing gum containing sugar	2 (0.24)	31 (3.87)	244 (30.50)	343 (42.88)	147 (18.38)	33 (4.13)	800 (100)
Sweets/candy	1 (0.12)	36 (4.50)	297 (37.13)	295 (36.88)	148 (18.50)	23 (2.87)	800 (100)
Milk with sugar	9 (1.12)	61 (7.62)	281 (35.13)	324 (40.50)	116 (14.50)	9 (1.13)	800 (100)
Tea with sugar	8 (1.00)	76 (9.50)	300 (37.50)	308 (38.50)	94 (11.75)	14 (1.75)	800 (100)
Coffee with sugar	7 (0.88)	77 (9.62)	321 (40.12)	275 (34.38)	96 (12.00)	24 (3.00)	800 (100)

Out of 800 study participant, 669 (83.62%) ate fruits several times a week, 80 (10.00%) ate every day, 45 (5.62%) ate fruits once a week, 3 (0.38%) each ate fruits several times a month and several times a day. Also, 560 (70.00%) ate bakery product several times a week, 169 (21.13%) ate bakery product once a week, 61 (7.63%) ate bakery product every day, 7 (0.87%) ate bakery product several times a month and 3 (0.37%) ate bakery product several times a day. In this study, 497 (62.12%) had aerated / soft drinks once a week, 204 (25.53%) had several times a week, 58 (7.25%) had several times a month, 21 (2.60%) had every day and 20 (2.50%) never had

aerated / soft drinks. Nearly 441 (55.13%) ate jam / honey once a week, 215 (26.88%) ate several times a week, 87 (10.87%) ate jam / honey several times a month, 32 (4.00%) ate every day, 1 (0.12%) ate several times a day and 24 (3.00%) never ate jam / honey. Current study showed that, 343 (42.88%) ate chewing gum containing sugar once a week, 244 (30.50%) ate several times a week, 147 (18.38%) ate several times a month, 31 (3.87%) ate chewing gum containing sugar every day, 2 (0.24%) ate several times a day and 33 (4.13%) never ate chewing gum containing sugar. Consumption of food item, 297 (37.13%) ate sweets / candy several times a week, 295 (36.88%) ate once a week, 148 (18.50%) ate several times a month, 36 (4.50%) ate every day, 1 (0.12%) ate sweets / candy several times a day and 23 (2.87%) never ate sweets / candy. In the present study, 324 (40.50%) had milk with sugar once a week, 281 (35.13%) had several times a week, 116 (14.50%) had several times a month, 61 (7.62%) had every day and 9 (1.13%) each had several times a day and never drank milk with sugar. With regards to consumption of tea with sugar, 308 (38.50%) had tea with sugar once a week, 300 (37.50%) had several times a week, 94 (11.75%) had several times a month,76 (9.50%) had every day, 8 (1.00%) had several times a day and 14 (1.75%) never drank tea with sugar. Whereas, 321 (40.12%) had coffee with sugar several times a week, 275 (34.38%) had once a week, 96 (12.00%) had several times a month, 77 (9.62%) had every day, 7 (0.88%) had several times a day and 24 (3.00%) never drank coffee with sugar.

Table 25: Distribution of the study participant according to the practice score regarding oral health

Practice score regarding oral health	Number	Percentage
Good	170	21.25
Average	489	61.12
Poor	141	17.63
Total	**800**	**100**



The present study shows that among 800 study participant, the mean practice score was 8.31 with standard deviation of 1.51, median was 8.5 and the range was 5 to 12. Out of 800 study subject, 170 (21.25%) had good practice, 489 (61.12%) had average practice and 141 (17.63%) had poor practice score regarding oral health.

V. Association between sociodemographic profile of study participant and knowledge, attitude and practice of oral health.

Table 26: Association between knowledge score regarding oral health and age of the study participant

Age (in years)	Good knowledge	Average knowledge	Poor knowledge	Total
11	42 (31.35)	79 (58.95)	13 (9.70)	134 (100)
12	21 (19.82)	70 (66.03)	15 (14.15)	106 (100)
13	44 (26.35)	102 (61.08)	21 (12.57)	167 (100)
14	28 (36.37)	39 (50.65)	10 (12.98)	77 (100)
15	32 (21.06)	105 (69.08)	15 (9.86)	152 (100)
16	52 (31.71)	95 (57.93)	17 (10.36)	164 (100)
χ^2=14.29		**df=10**	**p= 0.16**	

In our study, out of 800 children studied, good knowledge regarding oral health was slightly higher 28 (36.37%) in the age group of 14 years and almost similar 31.71% and 31.35% in the age group of 16 and 11 years respectively. The average knowledge score regarding oral health was seen higher in 15 years old students 105 (69.08%) and the least in 39 (50.65%) 14-year-old students. About 9.70% and 9.86% students aged 11 and 15 years had the least poor knowledge score and 13-year-old 14.15% had higher score. Although good knowledge regarding oral health was slightly higher in the age group of 14 years but this association was not found to be statistically significant (p = 0.16).

Table 27: Association between knowledge score regarding oral health and standard of the study participant

Standard	Good knowledge	Average knowledge	Poor knowledge	Total
6th	45 (31.70)	83 (58.45)	14 (9.85)	142 (100)
7th	47 (23.50)	129 (64.50)	24 (12.00)	200 (100)
8th	41 (30.60)	72 (53.73)	21 (15.67)	134 (100)
9th	33 (22.75)	100 (68.97)	12 (8.28)	145 (100)
10th	53 (29.61)	106 (59.22)	20 (11.17)	179 (100)
χ^2= 11.08		**df = 8**	**p= 0.19**	

In our study, out of 800 study subject, good knowledge regarding oral health was slightly higher (31.70%) among 6th standard students and least among 9th standard students 33 (22.75%). The average knowledge score regarding oral health was higher in 9th standard students (68.97%) and less among 8th standard students 72 (53.73%). The least 12 (8.28%) poor knowledge score was seen in children who studied in 9th standard when compared to other age group. Although good knowledge regarding oral health was slightly higher among 6th standard students, this association was not found to be statistically significant (p = 0.19).

Table 28: Association between knowledge score regarding oral health and sex of the study participant

Sex	Good knowledge	Average knowledge	Poor knowledge	Total
Male	100 (24.39)	262 (63.91)	48 (11.70)	410 (100)
Female	119 (30.51)	228 (58.47)	43 (11.02)	390 (100)
χ^2= 3.78		**df = 2**	**p= 0.15**	

Out of 800 study subject, good knowledge regarding oral health was slightly higher 119 (30.51%) among female students when compared to male students whereas average knowledge score regarding oral health was more among male students 262 (63.91%). The poor knowledge score regarding oral health was almost similar (11.70% and 11.02%) among male and female study participant. Although good knowledge regarding oral health was higher among female, this association was not found to be statistically significant (p = 0.15).

Table 29: Association between knowledge score regarding oral health and religion of the study participant

Religion	Good knowledge	Average knowledge	Poor knowledge	Total
Hindus	167 (27.83)	369 (61.50)	64 (10.67)	600 (100)
Non-hindus	52 (26.00)	121 (60.50)	27 (13.50)	200 (100)
χ^2= 1.26 df = 2 p= 0.53				

Out of 800 study subject, knowledge score regarding oral health was almost similar except poor knowledge score was slightly higher 27 (13.50%) among study participant who belonged to other religion (Muslim, Christain and Jain). Even though students who belonged to Hindu religion had good knowledge (27.83%) regarding oral health, this association was not found to be statistically significant (p = 0.53).

Table 30: Association between knowledge score regarding oral health and literacy status of father

Literacy status of father	Good knowledge	Average knowledge	Poor knowledge	Total
Degree and Post Graduate	153 (28.28)	333 (61.56)	55 (10.16)	541 (100)
Others	66 (25.49)	157 (60.62)	36 (13.89)	259 (100)
χ^2= 3.08 df = 2 p= 0.21				

Out of 800 study subject, good knowledge regarding oral health was slightly higher (28.28%) in children whose father's had completed degree and postgraduation when compared to others (Illiterate, Basic, Pre-university college and Diploma). Average knowledge regarding oral health was almost similar in both (61.56% and 60.62%) the groups. Poor knowledge regarding oral health was least (10.16%) among study participant whose fathers' had completed degree and postgraduation. This association was not found to be statistically significant (p = 0.21).

Table 31: Association between knowledge score regarding oral health and literacy status of mother

Literacy status of mother	Good knowledge	Average knowledge	Poor knowledge	Total
Degree and Post Graduate	154 (26.42)	361 (61.92)	68 (11.66)	583 (100)
Others	65 (29.96)	129 (59.45)	23 (10.59)	217 (100)
χ^2= 0.70 df = 2 p= 0.70				

Out of 800 study subject, good knowledge regarding oral health was higher (29.96%) in children whose mothers' had education lesser than degree when compared to study subject mothers' who completed degree and postgraduation. Average knowledge regarding oral health was slightly higher (61.92%) among children with degree and postgraduate educated mother. The poor knowledge regarding oral health was almost similar in both the groups (11.66% and 10.59%). This association was not found to be statistically significant (p = 0.70).

Table 32: Association between knowledge score regarding oral health and socio-economic class of the study participant

Socio-economic class	Good knowledge	Average knowledge	Poor knowledge	Total
I	207 (27.57)	456 (60.72)	88 (11.71)	751 (100)
II, III, IV and V	12 (24.49)	34 (69.39)	3 (6.12)	49 (100)
χ^2= 1.98		**df=2**	**p= 0.36**	

In our study, 207 (27.57%) students who belonged to socio-economic class I had better knowledge score when compared to other 12 (24.49%) students who belonged to socio-economic class II, III, IV and V. Average knowledge score regarding oral health was seen more among students who belonged to socio-economic class II, III, IV and V 34 (69.39%). Although students belonging to socioeconomic class I had higher good knowledge score, it was noted that poor knowledge score (11.71%) was also higher among them. This association between them was not found to be statistically significant (p=0.36)

Table 33: Association between attitude score towards oral health and age of the study participant

Age (in years)	Positive attitude	Negative attitude	Total
11	68 (50.75)	66 (49.25)	134 (100)
12	58 (54.72)	48 (45.28)	106 (100)
13	80 (47.91)	87 (52.09)	167 (100)
14	49 (63.64)	28 (36.36)	77 (100)
15	79 (51.97)	73 (48.03)	152 (100)
16	75 (45.73)	89 (54.27)	164 (100)
χ^2= 8.02	**df=5**	**p= 0.15**	

In our study, out of 800 children studied, positive attitude towards oral health was higher 49 (63.64%) among children aged 14 years, followed by (54.72%, 51.97% and 50.75%) students aged 12, 15 and 11 years old respectively. With regards to negative attitude towards oral health highest (54.27%) was noted among 16-year-old students and least (36.36%) was in 14-year-old. Although positive attitude towards oral health was higher in 14-year-old, this association was not found to be statistically significant (p = 0.15).

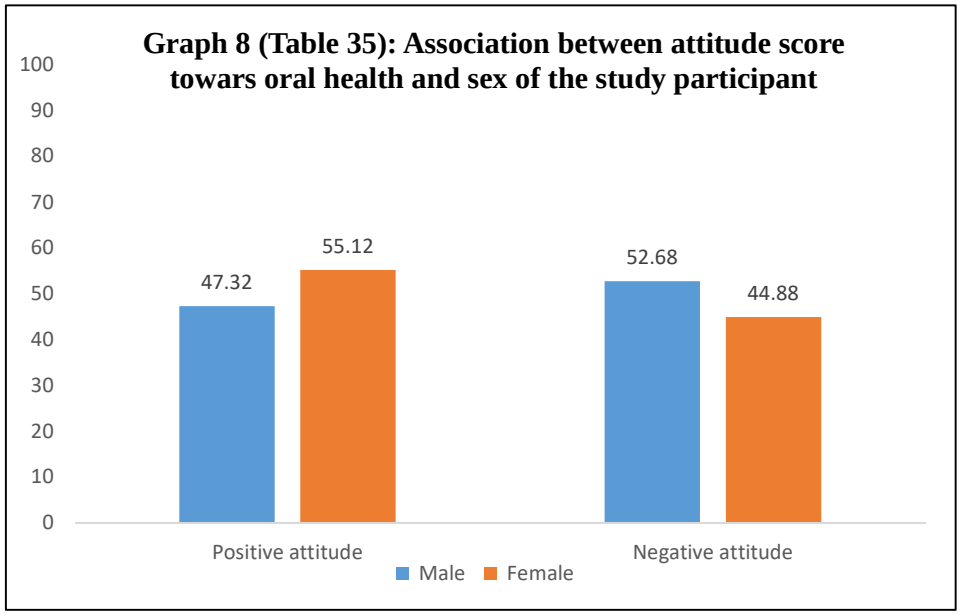
Table 34: Association between attitude score towards oral health and standard of the study participant

Standard	Positive attitude	Negative attitude	Total
6^{th}	67 (47.18)	75 (52.82)	142 (100)
7^{th}	105 (52.50)	95 (47.50)	200 (100)
8^{th}	76 (56.71)	58 (43.29)	134 (100)
9^{th}	81 (55.86)	64 (44.14)	145 (100)
10^{th}	80 (44.69)	99 (55.31)	179 (100)
χ^2= 6.97 df = 4 p= 0.13			

In our study out of 800 study subject, positive attitude towards oral health was highest (56.71%) among 8^{th} standard students followed by (55.86% and 52.50%) in 9^{th} and 7^{th} standard students respectively. Negative attitude score towards oral health was seen most (55.31%) in children who studied in 10^{th} standard and least (43.29% and 44.14%) among 8^{th} and 9^{th} standard students respectively. Although positive attitude towards oral health was higher among 8^{th} standard students when compared to others, this association was not found to be statistically significant (p = 0.13).

Table 35: Association between attitude score towards oral health and sex of the study participant

Sex	Positive attitude	Negative attitude	Total
Male	194 (47.32)	216 (52.68)	410 (100)
Female	215 (55.12)	175 (44.88)	390 (100)
χ^2= 4.88	**df = 1**		**p= 0.02**



Out of 800 study subject, positive attitude towards oral health was higher (55.12%) among female students when compared to male students (47.31%). This difference in the attitude score between male and female student was found to be statistically significant (p = 0.02).

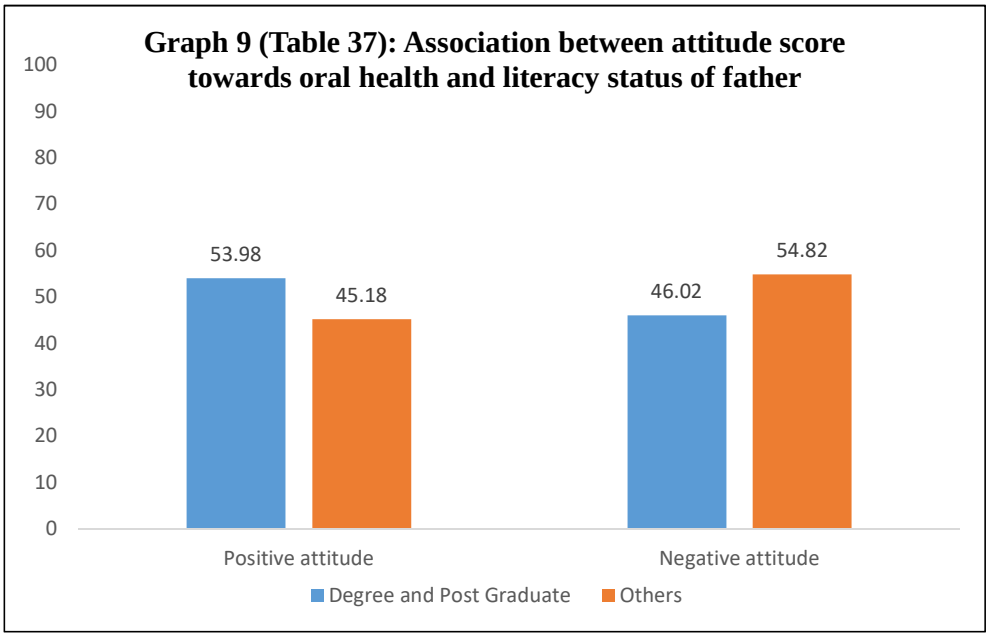
Table 36: Association between attitude score towards oral health and religion of the study participant

Religion	Positive attitude	Negative attitude	Total
Hindus	301 (50.16)	299 (49.84)	600 (100)
Non-Hindus	108 (54.00)	92 (46.00)	200 (100)
χ^2= 0.88 df = 1 p= 0.34			

Out of 800 study subject, positive attitude towards oral health was higher (54.00%) among study participant belonging to other religion (Muslim, Christian and Jain) when compared to Hindus. Although positive attitude towards oral health was higher among study participant of other religion, but this association was not found to be statistically significant (p = 0.34).

Table 37: Association between attitude score towards oral health and literacy status of father

Literacy status of father	Positive attitude	Negative attitude	Total
Degree and Post Graduate	292 (53.98)	249 (46.02)	541 (100)
Others	117 (45.18)	142 (54.82)	259 (100)
χ^2= 5.42	**df = 1**	**p= 0.01**	



Out of 800 study subject, positive attitude towards oral health was higher (53.98%) among children whose fathers' had completed degree and postgraduate when compared to others (Illiterate, Basic, Pre-university college and Diploma). As the literacy status in father's increased the positive attitude towards oral health also increased in school children and this association was found to be statistically significant (p = 0.01).

Table 38: Association between attitude score regarding oral health and literacy status of mother

Literacy status of mother	Positive attitude	Negative attitude	Total
Degree and Post Graduate	308 (52.84)	275 (47.16)	583 (100)
Others	101 (46.55)	116 (53.45)	217 (100)
χ^2= 2.50 df = 1		**p= 0.11**	

Out of 800 study subject, positive attitude regarding oral health was higher (52.84%) among children whose mothers' had completed degree and postgraduation when compared to others (Illiterate, Basic, Pre-university college and Diploma). As the literacy status in mother's increased the positive attitude towards oral health also increased in school children, but this association was not found to be statistically significant (p = 0.11).

Table 39: Association between attitude score towards oral health and socio-economic class of the study participant

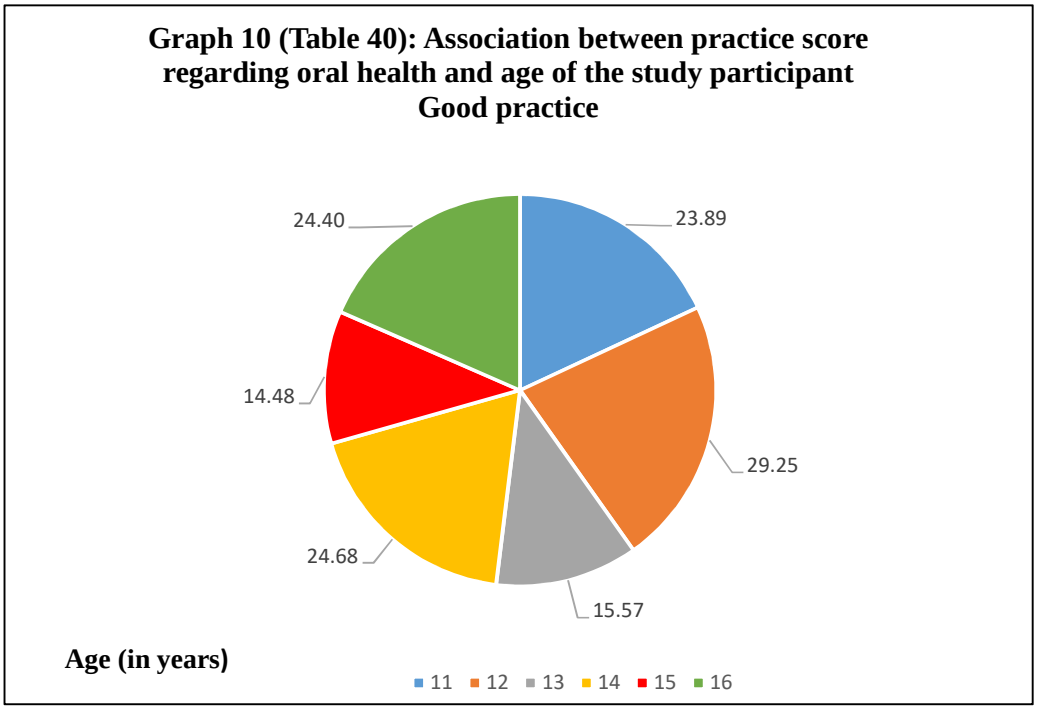
Socio-economic class	Positive attitude	Negative attitude	Total
I	388 (51.67)	363 (48.33)	751 (100)
II, III, IV and V	21 (42.86)	28 (57.14)	49 (100)
χ^2= 1.42	**df=1**	**p= 0.23**	

In our study, out of 751students who belonged to socio-economic class I, 388 (51.67%) students had positive attitude score towards oral health whereas out of 49 students who belonged to socio-economic class II, III, IV and V, 28 (57.14%) had negative attitude towards oral health. The association between them was not found to be statistically significant (p=0.23)

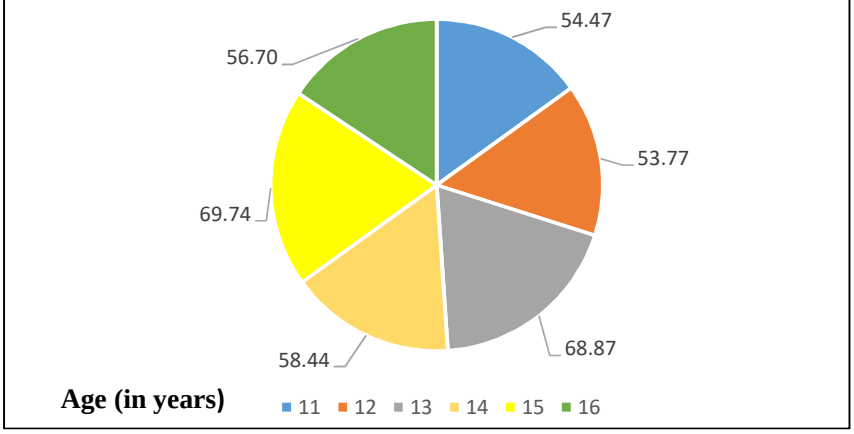
Table 40: Association between practice score regarding oral health and age of the study participant

Age (in years)	Good practice	Average practice	Poor practice	Total
11	32 (23.89)	73 (54.47)	29 (21.64)	134 (100)
12	31 (29.25)	57 (53.77)	18 (16.98)	106 (100)
13	26 (15.57)	115 (68.87)	26 (15.56)	167 (100)
14	19 (24.68)	45 (58.44)	13 (16.88)	77 (100)
15	22 (14.48)	106 (69.74)	24 (15.78)	152 (100)
16	40 (24.40)	93 (56.70)	31 (18.90)	164 (100)
χ^2=18.75		**df=10**	**p= 0.04**	

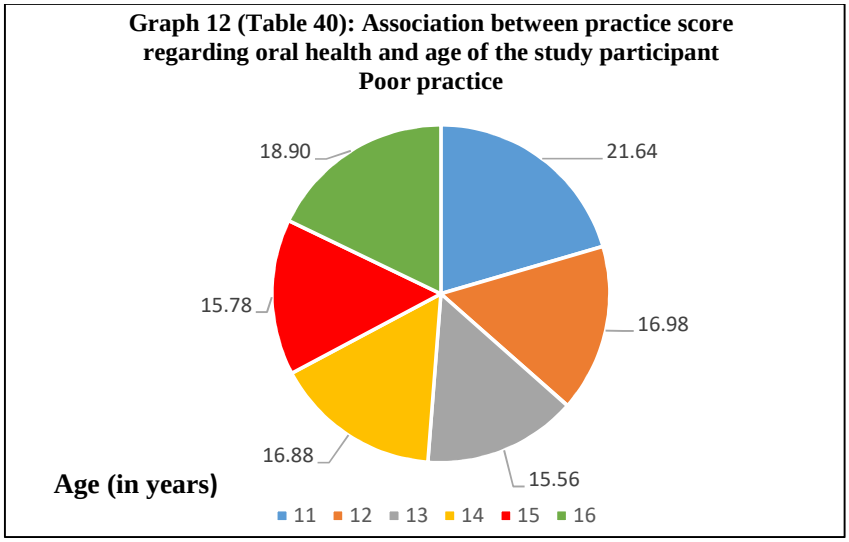
Graph 10 (Table 40): Association between practice score regarding oral health and age of the study participant



Graph 11 (Table 40): Association between practice score regarding oral health and age of the study participant
Average Practice



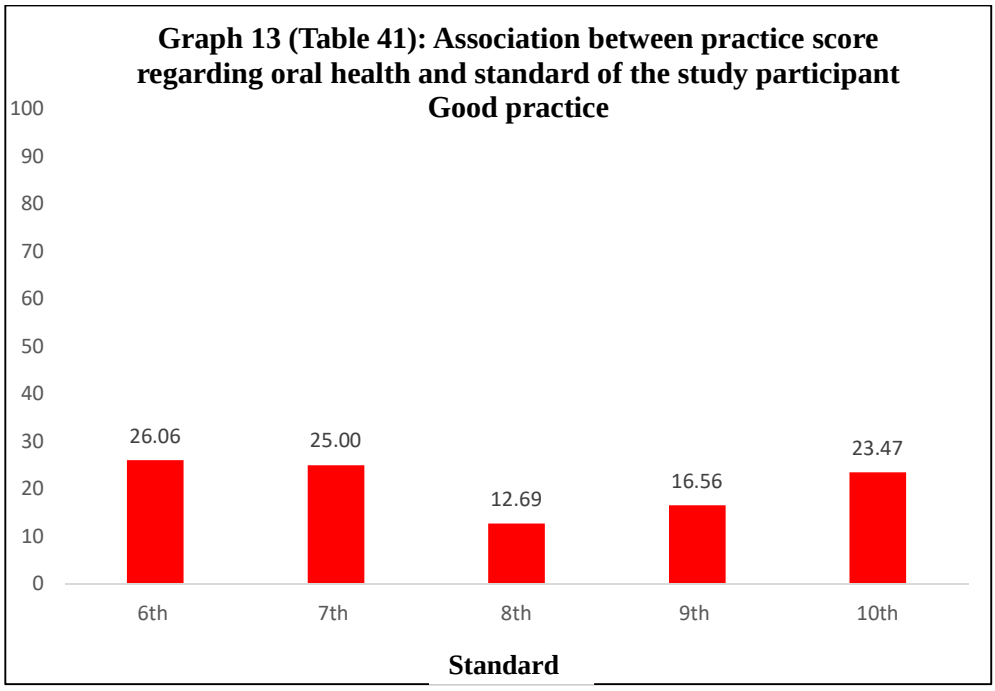
Graph 12 (Table 40): Association between practice score regarding oral health and age of the study participant
Poor practice



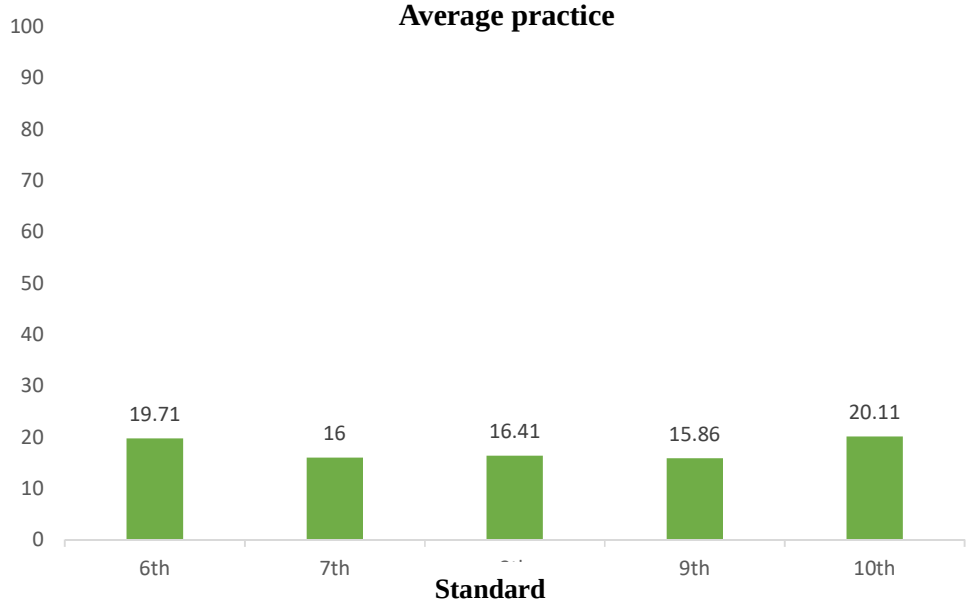
In our study out of 800 children, good practice score regarding oral health was highest (29.25%) in children aged 12 years followed by (24.68%, 24.40% and 23.89%) in 14, 16 and 11-year-old children. Average practice score regarding oral health was noted most in 15 years (69.74%) students followed by (68.87%) in 13-year-old students. The most (21.64%) poor practice score in oral health was seen in children aged 11 years when compared to other age group. This association between practice score of oral health and age group was found to be statistically significant (p = 0.04).

Table 41: Association between practice score regarding oral health and standard of the study participant

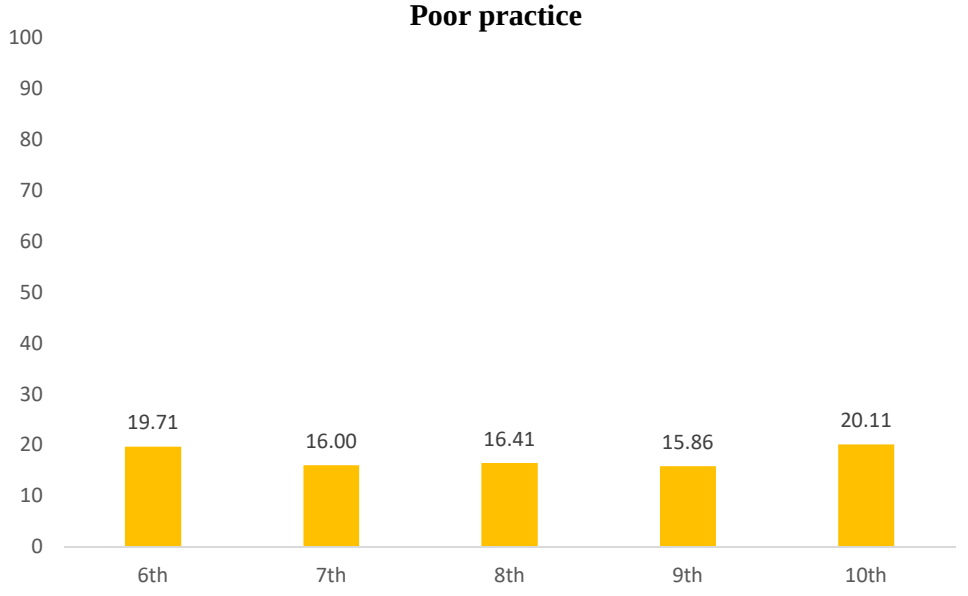
Standard	Good practice	Average practice	Poor practice	Total
6th	37 (26.06)	77 (54.23)	28 (19.71)	142 (100)
7th	50 (25.00)	118 (59.00)	32 (16.00)	200 (100)
8th	17 (12.69)	95 (70.90)	22 (16.41)	134 (100)
9th	24 (16.56)	98 (67.58)	23 (15.86)	145 (100)
10th	42 (23.47)	101 (56.42)	36 (20.11)	179 (100)
χ^2= 16.04		**df = 8**		**p= 0.04**



Graph 14 (Table 41): Association between practice score regarding oral health and standard of the study participant Average practice



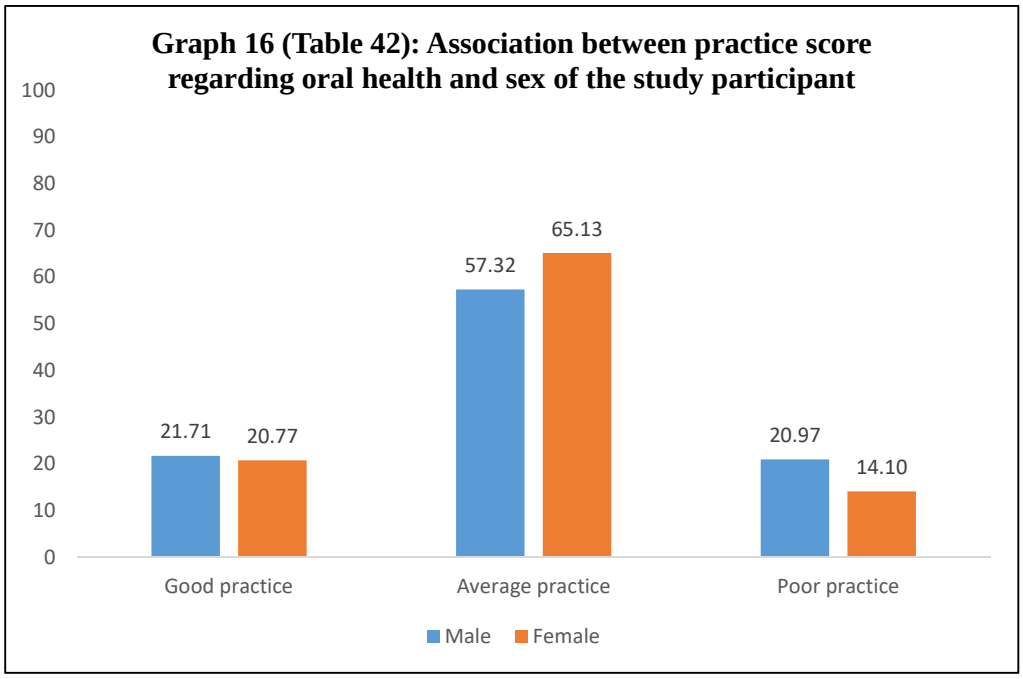
Graph 15 (Table 41): Association between practice score regarding oral health and standard of the study participant Poor practice



Out of 800 study subject, good practice score regarding oral health was slightly higher (26.06%) in 6^{th} standard students followed by 25.00% and 23.47% among 7^{th} and 10^{th} standard students. The average practice score 70.90% and 67.58% were noted in 8^{th} and 9^{th} standard students respectively. Poor practice score 20.11% and 19.71% in oral health were noted among 10^{th} and 6^{th} standard students respectively. This association between them was found to be statistically significant ($p = 0.04$).

Table 42: Association between practice score regarding oral health and sex of the study participant

Sex	Good practice	Average practice	Poor practice	Total
Male	89 (21.71)	235 (57.32)	86 (20.97)	410 (100)
Female	81 (20.77)	254 (65.13)	55 (14.10)	390 (100)
χ^2= 7.43		**df = 2**	**p= 0.02**	



Out of 800 study subject, good practice score regarding oral health was slightly higher (21.71%) among male, average practice score was marginally higher (65.13%) among female students whereas poor practice score was higher (20.97%) in male students when compared to female students. This association between them was found to be statistically significant (p = 0.02).

Table 43: Association between practice score regarding oral health and religion of the study participant

Religion	Good practice	Average practice	Poor practice	Total
Hindus	129 (21.51)	365 (60.83)	106 (17.66)	600 (100)
Non-Hindus	41 (20.50)	124 (62.00)	35 (17.50)	200 (100)
χ^2= 0.10		**df = 2**	**p= 0.94**	

Out of 800 study subject, good practice regarding oral health was slightly higher (21.51%) among children who belonged to Hindu religion when compared to the study participant of other religion (Muslim, Christian and Jain). Whereas average practice was slightly higher (62.00%) in non-Hindu children. The poor practice score regarding oral health (17.66% and 17.50%) was seen almost similar in both the groups and this association was not found to be statistically significant (p = 0.94).

Table 44: Association between practice score regarding oral health and literacy status of father

Literacy status of father	Good practice	Average practice	Poor practice	Total
Degree and Post Graduate	120 (22.19)	324 (59.89)	97 (17.92)	541 (100)
Others	50 (19.31)	165 (63.71)	44 (16.98)	259 (100)
χ^2= 1.18		**df = 2**	**p= 0.55**	

Out of 800 study subject, good and poor practice score regarding oral health was slightly higher (22.19% and 17.92%) among children fathers' who had completed degree and postgraduation respectively. Average practice score regarding oral health was seen more among (63.71%) children whose fathers' had education lesser than degree but this association was not found to be statistically significant (p = 0.55).

Table 45: Association between practice score regarding oral health and literacy status of mother

Literacy status of mother	Good practice	Average practice	Poor practice	Total
Degree and Post Graduate	129 (22.13)	352 (60.38)	102 (17.49)	583 (100)
Others	41 (18.90)	137 (63.13)	39 (17.97)	217 (100)
χ^2= 0.99		**df = 2**	**p= 0.60**	

Out of 800 study subject, good practice regarding oral health was higher (22.13%) among children whose mothers' had completed degree and postgraduation. The average practice regarding oral health was seen higher (63.13%) among children whose mothers' had education lesser than degree. Poor practice (17.97% and 17.49%) was noted similar among both the groups. Although good practice regrading oral health increased with mother's literacy status, but no significant statistical association was noted (p = 0.60).

Table 46: Association between practice score regarding oral health and socio-economic class of the study participant

Socio-economic class	Good practice	Average practice	Poor practice	Total
I	158 (21.04)	459 (61.12)	134 (17.84)	751 (100)
II, III, IV and V	12 (24.50)	30 (61.22)	7 (14.28)	49 (100)
χ^2= 0.58		**df=2**	**p= 0.74**	

In our study, 12 (24.50%) students who belonged to socio-economic class II, III, IV and V had better practice score when compared to students who belonged to socio-economic class I. Average practice score regarding oral health was seen similarly (61.22% and 61.12%) in both the groups. Poor practice was noted highest among students (17.84%) who belonged to socio-economic class I . This association between socio economic status and practice of oral health was not found to be statistically significant (p=0.74).

VI. DISCUSSION

The present cross-sectional study was conducted among 800 school children aged 11-16 years from the selected four co-educational schools of Belagavi city during the period of 1st January to 31st December 2021.

I: Socio-demographic profile of study participant

Table 1 to 6 : Sociodemographic profile

In the present study,167 (20.88%) were aged 13 years, 164 (20.50%) were aged 16 years, 152 (19.00%) were aged 15 years, 134 (16.75%) were 11 years old, 106 (13.25%) and 77 (9.62%) were 12 years and 14 years old respectively. A cross-sectional study, among school children in Chennai reported that, 57.70% belonged to 10-12 year age group and 42.30% belonged to the age group of 13-15 year old. [9] Another cross-sectional study conducted in Derna city, Libya reported that, 37.00% belonged to 9-11 year age group, 32.80% belonged to 11-13 year age group and 30.20% belonged to 13-15 year age group. [14] This difference in the age distribution could be due to different age group being selected for the study.

In the current study, out of 800 study participant, 51.25% were male and 48.75% were female students. Whereas in the Chennai study, 51.10% of the study participant were male and 48.90% were female. In the field practice area of Sullia Taluk, a descriptive cross-sectional study was conducted, among them 53.00% were male and 47.00% were female. [22] In the Libya study, 62.30% were female and 37.70% were male. [14] Studies conducted in India had similar finding in relation to sex distribution whereas female study participants were more in the African study.

Out of 800 study participant, 75.00% were Hindu by religion, 21.75% were Muslim, 2.50% and 0.75% belonged to Christian and Jain religion respectively. Regarding type of family, 75.00% of the study participant were staying in nuclear family whereas 24.88% were staying in joint family and 0.12% belonged to broken family. As per National Family Health Survey (NFHS) 5 data overall India, 81.90% are Hindu by religion,12.40% are Muslim, 2.80% are Christian, 0.30% are Jain and 2.60% belonged to other religion. According to NFHS 5 data India, 58.20% are staying in nuclear family whereas 41.80% are staying in non-nuclear family. This slight difference in data can be explained due to regional variation in socio demographic factors. [12]

In the study regarding literacy status of fathers' of 800 study participant, majority of them 99.75% were literates and out of them, 64.74% were degree holder. Regarding literacy status of mothers' of study participant, most of them 99.26% were literates and out of them 67.00% were also degree holder. In a study conducted in Puducherry, 28.98% and 38.80% fathers' and mothers' of study participants respectively were educated till primary school level.[41] In the study conducted in Mysore city, 40.00% of parents of study participants were educated till secondary school level, 5.00% were graduates, 15.00% were PUC certificate holder, 25.00% were educated till primary school and 15.00% were illiterates.[42] In our study literacy status of parents' of study participant were higher compared to Puducherry and Mysore study which might be due to household standards and living conditions of the study area.

In the present study regarding occupation of parents' of study participant, 61.88% fathers' of study participant were self-employed and in relation to occupation of mothers' of study participant, 51.25% were homemaker and 48.75% were working mothers. In the study conducted in Mysore city, 56.00% of their parents were doing business [42] and in the Puducherry study, 74.29% parents were unskilled workers. [41]

The present study shows that majority 93.88% of the study participant, belonged to socio-economic class I according to Modified B. G. Prasad's classification. In the Puducherry study, 66.36% study participant belonged to socio-economic class VI and 16.36% belonged to socio-economic class VII according to Kuppuswamy scale classification. [41] Our study participants socio-economic class was much higher compared to above study because it was conducted in a city area and among private schools.

II: Knowledge of study participant regarding oral health

Table 7: Distribution of study participant according to knowledge regarding oral health

Out of 800 children, majority 99.00% had correct knowledge that teeth are an important part of our body. In the present study, 19.88% and 30.00% had correct knowledge regarding number of permanent teeth in child and an adult respectively. Only 2.50% had the correct knowledge about four different type of teeth in the adult oral cavity. A study conducted in Chennai among school students, 80.20% had correct knowledge that teeth are an important part of our body. In this study it was also noted that, 63.00% had correct knowledge regarding number of permanent teeth in child.[1] In another cross-sectional descriptive study conducted among school children attending

outpatient clinic in Chennai, 76.75% had correct knowledge that teeth are an important part of our body, 72.00% had correct knowledge that there are 32 permanent teeth and 22.00% responded that there are 28 permanent teeth in the oral cavity of a child.[26] In a study conducted among school children in Bangalore city,74.00% had correct knowledge that there are 32 permanent teeth in the oral cavity of an adult and 42.25% knew that there are 28 permanent teeth in the oral cavity of a child.[43] Knowledge regarding oral health, teeth being an important part of the body was slightly higher in our study. Whereas number of permanent teeth in child and an adult was relatively less when compared to other studies. Chennai and Bangalore being a metro city, the study participants had better knowledge due to more informative resources compared to our study participants.

Table 8: Distribution of study participant according to knowledge regarding oral health

In the present study out of 800 study subject, 45.50% knew that brushing teeth regularly will prevent dental health problems, 92.50% had correct knowledge regarding irregular brushing of teeth leads to toothache, 88.25% had knowledge that improper cleaning of tongue causes bad breath and 75.50% had knowledge regarding rinsing of mouth with water after every meal. In a study conducted among school students in an urban field practice area of Kancheepuram district, Tamil Nadu, 86.00% had correct knowledge that brushing teeth regularly will prevent dental health problems and 85.20% had correct knowledge that irregular brushing of teeth leads to toothache. Regarding knowledge about improper cleaning of tongue causing bad breath, 72.00% had correct knowledge and 71.60% had knowledge regarding rinsing of mouth with water after every meal. [29] Another study conducted in Erode, Tamil

Nadu, 48.80% had correct knowledge that brushing teeth regularly will prevent dental health problems and 47.00% school children had correct knowledge that they should rinse mouth with water after every meal. [32] A study conducted among school children of Bangalore city reported that, 94.75% had correct knowledge that regular brushing of teeth will prevent oral health problems and 74.75% had correct knowledge that they should rinse mouth with water after every meal.[43] To infer knowledge regarding irregular brushing of teeth causing toothache, improper cleaning of tongue resulting in bad breath and rinsing mouth with water after every meal was similar in all the studies except that our study participant had poor knowledge regarding brushing teeth regularly will prevent dental health problems.

Table 9: Distribution of study participant according to knowledge regarding oral health

In our study 98.00% among 800 study participant had correct knowledge regarding brushing of teeth twice daily, 35.88% had correct knowledge about duration of brushing of teeth i.e for two complete minutes, 50.75% had correct knowledge that they should brush teeth in front of their parent and only 9.00% had correct knowledge i.e, they should change toothbrush every three month. A study conducted in Chennai among school children, 58.30% had correct knowledge regarding brushing of teeth twice daily, 41.90% had correct knowledge i.e they should brush teeth for two complete minutes and 14.70% had correct knowledge that they should brush teeth in front of their parent.[1] In a study conducted among primary school children, Himachal Pradesh, 61.00% had correct knowledge regarding brushing of teeth twice daily.[44] Another study conducted among school children, in a private school in Villivakkam Chennai, 58.60% had correct knowledge regarding brushing of teeth twice daily.[28]

Overall, the knowledge regarding these components of oral health was slightly better in our study subject.

Table 10 and 11: Distribution of study participant according to knowledge of material and substance used for cleaning teeth

Out of 800 study participant 98.40% of children had correct knowledge that they should use toothbrush or mouthwash or dental floss for cleaning teeth and 97.70% of children had correct knowledge that they should use toothpaste or toothpowder for cleaning teeth. In the study conducted in Manipur, North Eastern India among school children, 99.90% responded that they should use tooth brush for cleaning teeth. [40]

Table 12: Distribution of study participant according to knowledge regarding oral health

In the present study, 49.00% study participant had correct knowledge that dental plaque are hard and soft debris in the teeth. On further analysis of dental plaque knowledge leading to, 40.00% study participant knew that it leads to dental caries. Only 3.88% had correct knowledge that gum bleeding means inflamed gum. In Chennai study, 27.20% study participant knew that oral plaque will leads to tooth decay and 35.60% had correct knowledge that gum bleeding means inflamed gum.[1] In Himachal Pradesh study, only 3.70% knew about dental plaque means hard and soft debris in teeth.[44] Overall the knowledge regarding dental plaque was poor in all the studies. So, when dental health education programmes are planned for school children this area needs to be emphasized.

Table 13: Distribution of study participant according to knowledge regarding oral health

In the present study, 88.88% knew about adverse effect of sweet and bakery products and 81.88% knew the adverse effect of fizzy drink on teeth. With respect to knowledge regarding using fluoride containing toothpaste for strengthening of teeth, 55.12% had correct knowledge and 38.25% of study participant knew that Vitamin C is important for oral health. In Chennai study, 81.80% knew about adverse effect of sweet and bakery products, 77.70% had correct knowledge about the adverse effect of fizzy drink on teeth, 55.60% had correct knowledge regarding using fluoride containing toothpaste for strengthening of teeth and 40.20% knew about the vitamin important for oral health.[1] Another study conducted among school children in Villivakkam, Chennai, 78.10% knew about adverse effect of fizzy drink on teeth. [28] In a study conducted among primary school children, Himachal Pradesh, 90.00% knew about adverse effect of sweet and bakery products on teeth. With respect to knowledge regarding using fluoride containing toothpaste for strengthening of teeth, 11.30% of study participants had correct knowledge and 67.30% knew about adverse effect of fizzy drink on teeth.[44] Knowledge regarding factors which affect teeth adversely was good but factors strengthening the teeth was average in school children.

Table 14: Distribution of study participant according to knowledge regarding oral health

In the present study, 59.25% had correct knowledge regarding the necessity of regular visit to the dentist and only 8.88% knew that it should be done every six months. A survey conducted in Chennai among school students, with regards to knowledge regarding how often one should visit a dentist, 19.10% knew that it should

be done every 6 months.[1] Another study conducted among school children in Villivakkam Chennai, 14.80% had correct knowledge regarding the necessity of regular visit to the dentist and among them 23.43% knew that it should be done every 6 months. [28]

Table 15: Distribution of the study participant according to knowledge score regarding oral health

The present study shows that, the mean knowledge score was 12.67 with standard deviation of 2.67. Out of 800 children, 27.38% had good knowledge, 61.24% had average knowledge and 11.38% had poor knowledge regarding oral health. In a study conducted in Kancheepuram district, Tamil Nadu, 65.60% of children had good knowledge, 33.20% had moderate knowledge and 1.20% had poor knowledge regarding oral health.[29] In Manipur study 90.90% had good knowledge whereas 9.10% had poor knowledge regarding oral health.[40] In our study more than 60.00% of subjects had average knowledge on oral health when compared to other studies. The reason could be that we had an extensive questionnaire trying to cover all the aspects regarding knowledge on oral health.

III: Attitude of study participant towards oral health

Table 16: Distribution of the study participant according to their attitude towards oral health

In the present study, 83.13% felt that tooth decay will affect the overall appearance, 73.63% felt that poor dental hygiene prevents them from smiling with friends and 75.60% felt that they will avoid talking or sitting next to whom who have bad breath. In Kancheepuram district, Tamil Nadu study, 80.80% felt that tooth decay

will affect the overall appearance and 76.80% felt that poor dental hygiene prevents them from smiling with friends.[29] Another study conducted among school children in Davangere, 100% felt that tooth decay will affect the overall appearance and general health.[19] Among school children more than 2/3rd of them had negative attitude towards children who had poor oral hygiene.

Table 17: Distribution of the study participant according to their attitude towards oral health

In our study, 66.10% students felt that they will not make fun of children who have dental health problem and 77.50% felt that oral health problem will force them to miss school. With regards to attitude towards maintaining healthy teeth is an individual responsibility**,** 92.25% felt that it was their own responsibility. In Kancheepuram district, Tamil Nadu study, 47.20% felt that oral health problem will force them to miss school. With regards to attitude towards maintaining healthy teeth is an individual responsibility**,** 96.00% and 99.00% felt that it was their own responsibility in Tamil Nadu and Davangere study respectively. [29 &19]

Table 18: Distribution of the study participant according to their attitude towards oral health

In the present study, 85.00% felt that maintaining good dental hygiene prevents them from development of tooth decay and 75.63% felt that dentist will help them in maintenance of oral health. In Tamil Nadu and Davangere studies, 84.80% and 96.29% of study participant felt that maintaining good dental hygiene prevents them from development of tooth decay respectively. And also 86.80% and 100% of

study participant felt that dentist will help them in maintenance of oral health respectively. [29&19]

Table 19: Distribution of the study participant according to the attitude score towards oral health

The present study shows that, the mean attitude score was 5.21 with standard deviation of 1.40. Out of 800 children, 51.12% had positive attitude, whereas 48.88% had negative attitude towards oral health. In Kancheepuram district, Tamil Nadu study, 33.60% of children had good attitude, 59.60% had moderate attitude and 6.80% had poor attitude towards oral health. [29] In Manipur study, 79.80% had positive attitude whereas 20.20% had negative attitude towards oral health.[40]

IV: Practice of study participant regarding oral health

Table 20: Distribution of the study participant according to practice regarding oral health

In the present study, 96.70% of them brushed their teeth regularly, 50.63% of study participant brushed their teeth twice per day and 44.50% brushed their teeth once per day. In our study, 48.00% of study participant brushed their teeth in the morning whereas 45.30% brushed teeth both in the morning and night. With regards to duration of brushing of teeth, 45.13% of study participant brushed their teeth for complete two minutes, 36.50% brushed their teeth for about one minute, 15.24% brushed their teeth less than one minute and 3.13% brushed their teeth for more than two minutes. In a study conducted in Kancheepuram district, Tamil Nadu, 84.00% brushed their teeth regularly. With regards to frequency of brushing of teeth, 49.20% of study participant brushed their teeth twice per day and 50.80% brushed their teeth

once per day. [29] Another study conducted in Davangere, 30.43% brushed their teeth regularly and 69.00% brushed their teeth once daily. [19] The Chennai study, 34.95% brushed their teeth regularly whereas 61.17% brushed their teeth once daily, 3.88% brushed their teeth more than once daily. With regards to duration of brushing of teeth, 26.21% of study participant brushed their teeth for 1-2 minutes, 22.33% brushed their teeth for about 2-3 minutes, 31.07% brushed their teeth for about 3-4 minutes and 20.39% brushed their teeth for more than four minutes.[25] Another study conducted in Alapakkam Chennai, 58.30% of study participant brushed teeth twice per day, 36.10% brushed teeth once per day, 2.50% brushed teeth less than once daily and 3.00% brushed their teeth more than twice per day, the findings was almost similar to our study. With regards to duration of brushing of teeth, 41.90% of study participant brushed their teeth for complete two minutes, 45.30% brushed their teeth for more than two minutes, 9.00% brushed their teeth for about one minute and 3.90% brushed their teeth less than one minute. [1]

Table 21 : Distribution of the study participant according to practice regarding oral health

The present study shows that, 75.90% school children brushed their teeth in front of one of the parent and only 1.00% changed their toothbrush every 6 months. In our study, 97.00% and 98.38% of study participant used toothbrush and toothpaste for cleaning teeth respectively. A study conducted among school children in Davangere, 100% of students used toothbrush and tooth paste for cleaning teeth and 43.46% changed their toothbrush every 6 months. In this study, 78.00% brushed their teeth in front of parent.[19] The study conducted in Chandigarh, 96.80% used toothbrush and 98.80% used tooth paste for cleaning teeth. In this study 29.30% had changed their

toothbrush every 3 months, 32.80% changed every month and 9.60% changed once in 6 months. [45] Another study conducted among rural children of Kanchipuram District, 62.96% used toothbrush and 55.5% used tooth paste as a material for cleaning teeth. About 19.60% changed their toothbrush every 6 months.[30] Practice of using toothbrush and toothpaste for cleaning teeth was almost good but changing of toothbrush every 6 months was poor.

Table 22: Distribution of the study participant according to practice regarding oral health

The current study shows that, 56.00% used fluoride containing tooth paste, 98.40% rinsed mouth with water after every meal and 79.40% cleaned their tongue with brush while brushing. A study conducted among secondary school children in Chandigarh, 36.30% had used tooth paste containing fluoride and 63.70% did not. With regards to rinsing of mouth with water after every meal, 70.30% and only 3.43% rinsed mouth with water after every meal in Chandigarh and Davangere study respectively .[45 & 19] Another study conducted among rural children of Kanchipuram District, regarding rinsing mouth with water every meal, 38.27% never rinsed, 32.09% rinsed sometimes and 29.62% rinsed their mouth with water after every meal. [30]

Table 23: Distribution of the study participant according to practice regarding oral health

The current study showed that, 97.60% school children did not visit a dentist in the recent past and only 2.40% had a visit. Among 19 students, 42.10% had visited the dentist within 3 months, 36.90% within 3-6 months, 15.70% more than one-year

and 5.30% student had visited a dentist between 6 months to 1-year duration. The reason for dental visit was 78.95% for toothache and 21.05% for dental caries. Among them, 84.20% received symptomatic treatment whereas 15.80% had undergone Root canal therapy. In a study conducted in Chandigarh, 24.90% had visited a dentist within 6 month, 17.40% more than six months and 34.60% visited more than one-year . With regards to reason for last dental visit, 33.10% for toothache, 15.70% for routine dental check-up, 14.30% because of their parents' advice, 13.20% on their own self advice and 22.60% had no idea for what reason they had visited a dentist recently.[45] In another study conducted among school settings in rural south India, 39.00% had not visited a dentist in the last 12 months, 17.00% visited once in 12 months, 5.00% visited twice in the last 12 month in which the findings was much lower when compared to our study. Also 6.00% visited more than three times a year, 33.00% had no idea when they had visited a dentist recently. Among them 15.00% visited for toothache, 8% visited because of their parents' advice, 73.00 % had no idea for what reason they had visited a dentist recently.[46]

Table 24: Distribution of the study participant according to practice of consumption of food items

Out of 800 study participant, the good practice noted in our study was 83.62% ate fruits several times a week, 10.00% every day and 0.38% ate fruits several times a day. The poor practices noted were: 70.00% ate bakery product several times a week, 62.12% had aerated / soft drinks once a week, 55.13% ate jam / honey once a week, 42.88% ate chewing gum containing sugar once a week, 37.13% ate sweets / candy several times a week, 40.50% had milk with sugar once a week, 35.13% had several times a week, 38.50% had tea with sugar once a week and 40.12% had coffee with

sugar several times a week. In a study conducted in rural South India, 35.00% ate fresh fruits several times a day, 45% ate bakery products several times a day, 31.00% ate jam/honey several times a day, 50.00% ate chewing gum containing sugar several times a day and 33.00% ate sweets/candy several times a day. More than half of students had tea and milk with sugar several times a day 55.00% and 53.00% respectively. [46] Another study conducted among the school going children in Erode, Tamil Nadu, 55.30% ate fresh fruits once a week, 43.40% ate bakery products once a day, 58.30% had tea/coffee with sugar once a day, 41.60% ate sweets/chocolates once a week, 30.90% drank once a month and 44.80% never drank aerated/soft drink.[32] A study conducted among secondary school students of Azad Kashmir, Pakistan, 59.10% ate sweets/bakery products 1-2 times a day and 49.00% had soft/aerated drinks everyday. [47]

Table 25: Distribution of the study participant according to the practice score regarding oral health

The present study shows, the mean practice score was 8.31 with standard deviation of 1.51. Out of 800 study subject, 21.25% had good practice, 61.12% had average practice and 17.63% had poor practice score regarding oral health. In a study conducted in Kancheepuram district, Tamil Nadu, 10.80% of children had good practice, 58.40% had moderate practice and 30.80% had poor practice regarding oral health.[29] In Manipur study 70.40% had good practice whereas 29.60% had poor practice regarding oral health. [40]

V: Association between sociodemographic profile of study participant and knowledge, attitude and practice of oral health.

Table 26 to 32: Association between knowledge score regarding oral health and age, sex, standard, religion, literacy status and socioeconomic class of the study participant

In our study, out of 800 children studied, good knowledge regarding oral health was slightly higher in the age group of 14 years (36.37%), in 6th standard students (31.70%), among female students (30.51%), in students belonging to Hindu religion (27.83%), in children whose father's had completed degree and postgraduation (28.28%), in children whose mothers' had education lesser than degree (29.96%) and in students who belonged to socio-economic class I (27.57%). Similarly average knowledge regarding oral health was slightly higher in the age group of 15 years (69.08%), in 9th standard students (68.97%), among male students (63.91%), in students belonging to Hindu religion (61.50%), in children whose father's had completed degree and postgraduation (61.56%), in children whose mothers' had completed degree and postgraduation (61.92%) and in students who belonged to socio-economic class II, III, IV and V (69.39%). The association between knowledge regarding oral health and sociodemographic factors of the study participant were not found to be statistically significant ($p > 0.05$). In a study conducted among adolescents in Manipur, good knowledge regarding oral health was higher among female (74.82%), with mean ± SD of 5.5 ±1.0 $p < 0.0001$, age group of 18 years (47.16%) with mean ± SD of 5.9±1.3 ($p = < 0.0001$) and parents education, those who had completed university education (38.27%) with mean ± SD of 6.0 ± 1.2 with $p < 0.0001$ were found to be statistically significant. [40] A study conducted in Amritsar,

good knowledge regarding oral health was higher among female (17.90%), average knowledge was noted higher among female (59.00%) and poor knowledge was noted higher among male (53.10%) and this difference was statistically significant (p = 0.015). With regards to good knowledge regarding oral health among fathers' of study participant, it was higher among those who studied below matric (16.10%), average knowledge was noted higher among those who studied matric and above (75.00%) and poor knowledge was noted higher among illiterates (55.60%). This also was found to be statistically significant (p = 0.016). Whereas age group, standard of the study participant and mothers' literacy status were not found to be influencing the knowledge regarding oral health (p > 0.05).[38] Another study conducted in Chennai among school children, good knowledge regarding oral health was reported higher among female students similar to our study when compared to male (p = 0.340 and p = 0.15) and this association was not found to be statistically significant. Regarding good knowledge about oral health, it was higher among the age group of 10-11 years than 12-13 years (p = 0.649), but the association was not found to be statistically significant. [28] It was noted that sex of the study participant and parents' education were two important factors influencing the knowledge of children regarding oral health.

Table 33 to 39: Association between attitude score regarding oral health and age, sex, standard, religion, literacy status and socioeconomic class of the study participant

In our study, out of 800 children studied, positive attitude towards oral health was higher in the age group of 14 years (63.64%), in 8th standard students (56.71%), among female students (55.12%), in students belonging to non-Hindu religion

(54.00%), in children whose father's had completed degree and postgraduation (53.98%), in children whose mothers' had completed degree and postgraduation (52.84%) and in students who belonged to socio-economic class I (51.67%). The sex of the study participant (p = 0.02) and fathers' literacy status (p = 0.01) were statistically significantly associated with positive attitude towards oral health. A study conducted in 12-year-old school children of Sullia Taluk, positive attitude towards oral health was noted higher among female (52.50%) when compared to male (p = 0.001). [22] Another study conducted among primary schoolchildren in Derna City, Libya, positive attitude was reported higher among 11-13 year age group (41.90%) whereas negative attitude was reported higher among 9-11 year age group (39.40%) (p= 0.000). Regarding positive attitude about oral health, it was reported higher among female (59.60%), negative attitude was also reported higher among female (63.30%) (p = 0.236). The association between them was not found to be statistically significant. In this study, positive attitude regarding oral health was higher (49.80%) among fathers' who studied more than high school whereas more negative attitude was also reported higher (38.80%) among fathers' who studied more than high school (p=0.005) and was found to be statistically significant. Positive attitude regarding oral health was reported higher (43.60%) among mothers' who studied more than high school whereas negative attitude was also higher (44.60%) among mothers' who studied more than high school (p=0.683). The association between them was not found to be statistically significant.[14] It was noted that sex of the study participant and parents' education were two important factors influencing the positive attitude of children towards oral health.

Table 40 to 46: Association between practice score regarding oral health and age, sex, standard, religion, literacy status and socioeconomic class of the study participant

In our study, out of 800 children studied, good practice regarding oral health was higher in the age group of 12 years (29.25%), in 6th standard students (26.06%), among male students (21.71%), in students belonging to Hindu religion (21.51%), in children whose father's had completed degree and postgraduation (22.19%), in children whose mothers' had completed degree and postgraduation (22.13%) and in students who belonged to socio-economic class II, III, IV and V (24.50%). Similarly average practice regarding oral health was slightly higher in the age group of 15 years (69.74%), in 8th standard students (70.90%), among female students (65.13%), in students belonging to non-Hindu religion (62.00%), in children whose fathers' had lesser than degree education (63.71%), in children whose mothers' had lesser than degree education (63.13%) and in students who belonged to socio-economic class II, III, IV and V (61.22%). The good practice regarding oral health was significantly associated with younger age group ($p = 0.04$), lower standard ($p = 0.04$) and sex of the study participant ($p = 0.02$). A study conducted in Punjab, good practice regarding oral health among female was higher compared to male ($p = 0.378$) which was not found to be statistically significant.[38] In a study conducted among adolescents in Manipur, good practice regarding oral health among male was higher with mean ± SD of 4.4 ±1.5 ($p < 0.017$), which was found to be statistically significant similar to our study. Good practice regarding oral health was higher in the age group of 17 years with mean ± SD of 4.5±1.6 and this association was found to be statistically significant ($p = < 0.035$). With regards to parents' education, those who had completed university education had good practice regarding oral health with mean ±

SD of 4.4 ± 1.6 ($p < 0.0001$), which was found to be statistically significant. [40] Another study conducted in Chennai among school children, overall good practice regarding oral health was reported higher among female students when compared to male ($p = 0.291$) and higher among the age group of 10-11 years than 12-13 years ($p = 0.187$) these association were not found to be statistically significant. [28] It was noted that age and sex of the study participant were two important factors influencing the practice of children regarding oral health.

VII. CONCLUSION

More than 60% of the school children had average knowledge and practice score regarding oral health. Above 50% of study participant had positive attitude score towards oral health.

On further analysis it was noted that more than 3/4th of our study participant had good knowledge regarding eight elements, nearly ½ of them had average knowledge regarding six elements, 1/3rd of them had poor knowledge regarding four elements of oral health and 1/10th of them had very poor knowledge regarding change of toothbrush, importance of dental visit, significance of bleeding gum and four different types of adult teeth. With regards to attitude towards oral health 3/4th of the study subject had positive attitude in six components, whereas 1/3rd of them would make fun of children who had dental health problem and 3/4th of them would avoid talking or sitting next to children who have bad breath. More than 3/4th of school children had good practice in six elements of oral health, nearly ½ of them had average practice in four elements and 1/10th of them had poor practice regarding change of toothbrush and visit to a dentist. About 83% of study population ate fresh fruits several times a week, whereas the other poor practices regarding consumption of food items noted in our study ranged from 25% to 70%.

The positive attitude towards oral health was significantly higher in female study population and school children whose fathers' had more than degree or postgraduation education. Similarly good practice regarding oral health was significantly associated with younger age group, lower standard of studying and male participant.

VIII. RECOMMENDATION

Based on our study findings, the following recommendations are made.

1. Awareness generation and school health education programme towards good practice of oral health by periodic orientation and training organized by government health authorities at individual school level for students, parents and teachers.

2. Parental vigilance and guidance to children for proper practice and maintenance of good oral health

3. Behavior Change Communication talks regarding good oral health practices in order to overcome the unfavorable practices among the younger population can be conducted at the school level.

4. Aspects of oral health care practices needs to be incorporated in school syllabus, so that the school students and teachers know the significance of maintaining and practicing good oral health.

5. Further research in this area is required, to assess the existing situation regarding oral health knowledge, attitude and practice across various sub-groups of populations.

IX. LIMITATION OF THE STUDY

Following limitations were noted in our study

1. The prevalence of oral diseases among study participants was not carried out due to Covid 19 Pandemic.

2. The study was conducted among school students of Belagavi city, thus the result may not represent the knowledge, attitude and practice of the whole community.

3. The findings and interpretations are restricted to co-educational English medium private school students only. Therefore, cannot be generalized.

X. SUMMARY

The present study cross sectional study was conducted among 800 school students of Belagavi city during the period January to December 2021. It was carried out to assess the knowledge, attitude and practice regarding oral health. In Belagavi city there were 322 co-educational schools, out of which four schools were selected randomly one school from each zone of Belagavi city namely the north, south, east and west.

The mean ± SD age of the participant was 13.5 ± 1.87 years, median age was 13.5 years and range was 11 to 16 years. In our study 200 (25.00%) students were studying in 7^{th} standard and more than half 410 (51.25%) were male participant. Majority of our study subject, 600 (75.00%) were Hindu by religion and 600 (75.00%) of the study participant were staying in nuclear family. Most of the parents' of the students: father 798 (99.75%) and mother 794 (99.26%) were literates. Study shows that majority 751 (93.88%) of the study participant, belonged to socio-economic class I according to modified BG Prasad classification.

More than $3/4^{th}$ of our study participant had correct knowledge regarding: teeth are an important part of our body 792 (99.00%), brushing of teeth twice daily 784 (98.00%), use of toothbrush or mouthwash or dental floss all three for cleaning teeth 787 (98.40%), use of toothpaste or toothpowder for cleaning teeth 782 (97.70%), irregular brushing of teeth causes tooth ache 740 (92.50%), adverse effect of fizzy drink 655 (81.88%) & sweet on teeth 711 (88.88%), improper cleaning of tongue causing bad breath 706 (88.25%) and rinsing of mouth with water after every meal 604 (75.50%). Nearly ½ of the school children had correct knowledge regarding:

necessity of regular visit to the dentist 474 (59.25%), fluoride containing toothpaste will help in strengthening of teeth 441 (55.12%), should brush teeth in front of their parent 406 (50.75%), dental plaque are hard and soft debris in the teeth 392 (49.00%), brushing teeth regularly will prevent oral health problems 364 (45.50%) and dental plaque leads to dental caries 320 (40.00%). About 1/3rd of the study subject had correct knowledge regarding: vitamin C is important for oral health 306 (38.25%), duration of brushing of teeth for two complete minutes 287 (35.88%) and number of permanent teeth in adult 240 (30.00%) and child 159 (19.88%) respectively. Less than 1/10th of the participant had correct knowledge regarding: changing toothbrush every three month 72 (9.00%), dental visit should be done every 6 months 71 (8.88%), gum bleeding means inflamed gum 31 (3.88%) and four different type of teeth in adult oral cavity 20 (2.50%). The mean knowledge score was 12.67 with standard deviation of 2.67, median was 11.5 and the range was 6 to 17. Out of 800 children, 219 (27.38%) had good knowledge, 490 (61.24%) had average knowledge and 91 (11.38%) had poor knowledge regarding oral health. None of the sociodemographic factors studied had an influence on knowledge score regarding oral health ($p > 0.05$).

More than 3/4th of our study participant had positive attitude towards: maintaining healthy teeth is an individual responsibility 738 (92.25%), maintaining good oral hygiene prevents them from development of dental caries 680 (85.00%), dental caries will affect the overall appearance 665 (83.13%), oral health problem will force them to miss school 620 (77.50%), poor dental hygiene prevents them from smiling with friends 589 (73.63%) and dentist will help them in maintenance of oral health 605 (75.63%). More than ½ of study participant responded that they will not make fun of children who have dental health problem 529 (66.10%). With regards to bad breath, 605 (75.60%) of study participant felt that they will avoid talking or

sitting next to whom who have bad breath whereas 195 (24.40%) did not feel so. The mean attitude score was 5.21 with standard deviation of 1.40, median was 5 and range was 2 to 8. Out of 800 children, 409 (51.12%) had positive attitude, whereas 391 (48.88%) had negative attitude score towards oral health. The positive attitude score towards oral health was significantly associated with sex of the study participant (χ^2=4.88, p = 0.02) and literacy status of father (χ^2 = 5.42, p = 0.01).

More than 3/4th of our study participant had correct practice regarding: rinsed mouth with water after every meal 787 (98.40%), used toothpaste for cleaning teeth 787 (98.38%), used toothbrush for cleaning teeth 776 (97.00%), brushed their teeth regularly 773 (96.70%), cleaned their tongue while brushing 635 (79.40%) and brushed teeth in front of parent 607 (75.90%). Nearly ½ of our study subject had correct practice regarding: use of tooth paste containing fluoride 448 (56.00%), brushed their teeth twice per day 405 (50.63%), brushed in the morning and night 410 (45.30%) and brushed their teeth for complete two minutes 361 (45.13%). Less than 1/10th of school children had correct practice regarding: change of toothbrush every 3 month 39 (4.88%) and dental visit in the recent past 19 (2.40%). Majority of our study participant 669 (83.62%) ate fruits several times a week whereas 560 (70.00%), 321 (40.12%), 300 (37.50%), 297 (37.13%), 244 (30.50%), 281 (35.13%), 215 (26.88%) and 204 (25.53%) ate bakery products, consumed coffee with sugar, tea with sugar, sweets/candy, chewing gum containing sugar, milk with sugar, jam/honey and aerated drinks several times a week respectively. The mean practice score was 8.31 with standard deviation of 1.51, median was 8.5 and the range was 5 to 12. Out of 800 study subject, 170 (21.25%) had good practice, 489 (61.12%) had average practice and 141 (17.63%) had poor practice score regarding oral health.

The good practice score regarding oral health was significantly associated with age of study subject (χ^2 = 18.75, p = 0.04), standard of the study participant (χ^2 = 16.04, p = 0.04) and sex of the study participant (χ^2 = 7.43, p = 0.02).

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XII. ANNEXURES

ANNEXURE I- ETHICAL CLEARANCE LETTER

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed – to- be- University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
Website: http//www.jnmc.edu
E-Mail : dome@jnmc.edu
Phone: (+91-(0)831 Office : 2472550
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ 76 **Date: 25/01/2021**

To,
REG NO. BD0120001
PG student in Community Medicine
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"KNOWLEDGE, ATTITUDE AND PRACTICE OF ORAL HEALTH AMONG SCHOOL CHILDREN AGED 11-16 YEARS OF AN URBAN AREA"**, is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Smita Sonoli)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Harsha Hegde)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

ANNEXURE II- INFORMED CONSENT FORM

"Knowledge, Attitude and Practice of oral health among school children aged 11–16 years of an urban area''.

Investigator: _____
PG Student, Department of Community Medicine
J.N. Medical College, KAHER University, Belagavi

Guide: _____
Professor & Head, Department of Community Medicine
J.N. Medical College, KAHER University, Belagavi.

Co-Guide: _____
Professor, Department of Periodontics
KLE VKIDS, KAHER University, Belagavi.

Objective / Purpose of the study:

Your child is being invited to participate in this study to assess the Knowledge, Attitude and Practice of oral health among school children aged 11 – 16 years of an urban area. In school children, permanent teeth caries is common in the age group of 10 – 12 years. Dental caries not only cause pain, discomfort, difficulty in sleeping and eating but also considered to be one of the main causes of absenteeism from school which consequently affects the overall school performance of the child. Over more than 50 million school hours are lost annually in India due to oral health diseases in children.

Methodology:

As per the list obtained from Deputy Director of Public Instruction there are a total of 361 schools in Belagavi city, out of which 4 Co-Educational schools will be selected. One school from each zone of Belagavi city namely the north, south, east and west, will be selected randomly. Letter will be sent to the selected schools explaining the purpose of the study. Once approved, the principal of each school is asked to inform the students and their parents about the study and seek permission. Data will be collected after obtaining informed written consent from the Parents and Assent from the students of the selected schools.

Explanation of Procedure:

I will personally interview each child using a pre designed and pre tested questionnaire. The Questionnaire includes; 1. The socio-demographic factors, 2. knowledge, attitude and practices of study participants regarding oral health and dental treatment. The interview will take not more than 40 minutes per participant.

Possible benefits:

The investigator does not promise or guarantee you any direct benefits or services from this study to your child. This study is going to help to assess Knowledge, Attitude and Practice of oral health among school children aged 11 – 16 years of an urban area.

Possible risks:

There are no risks involved in this study to your child.

Privacy and Confidentiality:

Your child's identity will not be revealed and all information collected will be coded so that, no one other than the investigator will know your child's identity.

Withdrawal from the study:

You can withdraw your child from the study at any point of time.

Cost of participation:

The cost of the study will be entirely borne by the researcher. There will be no cost to you for your child's participation in this study.

Financial incentives for Participation:

There will be no incentives to you or your child for participating in this study.

Legal rights:

By signing this consent form, you are not waiving off any of your legal rights.

Authorization to publish the results:

The researcher may use the information gathered from this study for presentation or publication in scientific journals. However, your child's personal identity will not be revealed.

Questions:

If you still have any queries, you can contact **Dr. Harsha Hegde Chairperson, JNMC, IEC & Scientist D, ICMR, National Institute of Traditional Medicine** – 590010, or **Dr. (Mrs.) N.S. Mahantshetti**, Principal, J.N. Medical College, Belagavi-590010, Ph no: 0831-2471350.

CONSENT STATEMENT

"I have been explained in my own understandable language about the contents of this form and my queries have been clarified by the investigator and I have been told that I have the right to withdraw my child from participating in this study at any point of time. I have been assured that confidentiality will be maintained and will be used only for this study and my child's identity shall never be revealed in future".

I hereby give consent for my child to participate in the study **"Knowledge, Attitude and Practice of oral health among school children aged 11 – 16 years of an urban area''** voluntarily and not under the influence of the investigator or any other influence.

Name of the parent. Signature/ left thumb impression

Name of the interviewer Signature/ left thumb impression

Date: __/__/_____

Place: _____.

ASSENT FORM

"I have been explained in my own understandable language about the contents of this form and my queries have been clarified by the investigator and I have been told that I have the right to withdraw from participating in this study at any point of time. I have been assured that confidentiality will be maintained and will be used only for this study and my identity shall never be revealed in future".

I hereby give my assent for the participation in this study **"Knowledge, Attitude and Practice of oral health among school children aged 11 – 16 years of an urban area''** voluntarily and not under the influence of the investigator or any other influence.

Name of the participant Signature/ Left thumb impression.

Name of the interviewer Signature.

Date: __/__/_____

Place: _____.

ANNEXURE III- PROFORMA

TITLE: - "Knowledge, Attitude and Practice of oral health among school children aged 11 – 16 years of an urban area''

SCHOOL NAME: Sl. No: _____

A. SOCIO DEMOGRAPHIC DETAILS:

1] Name : _____

2] Age : ____ years

3] Class i) VI iii) VII iv) VIII v) IX vi) X

4] Sex i) Male ii) Female

5] Religion i) Hindu ii) Muslim iii) Christian iv) Jain v) others, specify_____

6] Type of the family i) Nuclear ii) Joint iii) Broken

7] Educational qualification of father i) Illiterate ii) if studied till 10^{th} standard iii) PUC iv) Diploma v) Degree vi) Post graduate

8] Educational qualification of mother i) Illiterate ii) if studied till 10^{th} standard iii) PUC iv) Diploma v) Degree vi) Post graduate

9] Occupation of father i) Farmer ii) Laborer iii) Self-employed iv) Govt. employee v) Pvt. Employee vi) Unemployed

10] Occupation of mother i) Farmer ii) Laborer iii) Self-employed iv) Govt. employee v) Pvt. Employee vi) Home maker

11] Total monthly income : Rs _____

12] Number of family members : ____

13] Per capita income : Rs _____/ month

B. CHILDREN'S ORAL HEALTH SURVEY QUESTIONNAIRE:

Knowledge Questions

Q1. How many permanent teeth are there normally in the oral cavity of a child?

1) 26 2) 28 3) 32 4) 34

Q2. How many permanent teeth are there normally in the oral cavity of an adult?

1) 26 2) 28 3) 32 4) 34

Q3. Name the 4 different types of teeth present in the adult oral cavity?

……

……

……

……

Q4. Are teeth an important part of your body. 1.Yes 2. No 3. Don't know

Q5. We should brush our teeth twice daily? 1.Yes 2. No 3. Don't know

Q6. Brushing teeth regularly will prevent oral health problems?

1.Yes 2. No 3. Don't know

Q7 Irregular tooth brushing causes tooth ache? 1.Yes 2. No 3. Don't know

Q8. Improper cleaning of tongue results in bad breath? 1.Yes 2. No 3. Don't know

Q9. How long should we brush our teeth?

1. Less than one minute.

2. One minute.

3. Two minutes.

4. More than two minutes

Q10. Should you brush your teeth in front of your parent? 1.Yes 2. No 3. Don't know

Q11. How often should we change our Toothbrush?

1.Every month

2.every Two month

3.every Three month

4.every six months

Q12. What should be used for cleaning teeth? (multiple response allowed)

1.Tooth brush

2. Mouth wash

3.Finger

4. Dental floss

5.Tooth pick

6.Safety pin

7.Neem stick

Q13. What material should be used for cleaning teeth? (multiple response allowed)

1.Tooth paste

2.Tooth powder

3.Salt

4.Charcoal

5.Ash

Q14. Using fluoride containing toothpaste strengthens the teeth.

1.Yes 2. No 3. Don't know

Q15. Regular visits to the dentist are necessary? 1.Yes 2. No 3. Don't know

Q16. How often should you visit your dentist?

1.every 6 months.

2.Once a year

3.Occasionally.

4. When we have dental problem.

Q17.Should you rinse your mouth with water after every meal?

1.Yes 2. No 3. Don't know

Q18.Can sweets/bakery products consumption affect the teeth adversely?

1.Yes 2. No 3. Don't know

Q19. Can Fizzy drinks affect the teeth adversely?

1.Yes 2. No 3. Don't know

Q20.What does plaque mean?

1. Hard and soft debris on the teeth.

2. Staining of the teeth.

3. I do not know

Q21. What does dental plaque lead to?

1. Inflammation of the gum.

2. Staining of the teeth.

3. Dental caries.

4. I do not know

Q22.What does gum bleeding mean?

1. Healthy gum.

2. Inflamed gum.

3. Gum recession.

4. I do not know

Q23.Which vitamin is important for oral health?

1.Vitamin A

2.Vitamin E

3.Vitamin C

4.Vitamin D

Attitude Questions

Q24. Tooth decay can affect the teeth appearance. 1.Yes 2. No 3. Don't know

Q25. Do you think poor oral hygiene prevents you from smiling & laughing with friends? 1.Yes 2. No 3. Don't know

Q26. Do you think oral problems force you to miss school? 1.Yes 2. No 3. Don't know

Q27. Do you think maintaining healthy teeth is an individual responsibility?

1.Yes 2. No 3. Don't know

Q28.Do you avoid talking or sitting next your classmates who are having bad oral breath? 1.Yes 2. No

Q29.Maintaining a good oral hygiene prevents tooth decay? 1.Yes 2. No

Q30.Do you think dentist helps to maintain oral health? 1.Yes 2. No 3. Don't know

Q31.Do you make fun of children who have Dental problem? 1.Yes 2. No

Practice Questions

Q32.Do you brush your teeth regularly 1. Yes 2. No

If no, reason for not brushing regularly…….

Q33. How many times do you brush your teeth?

1. Less than once per day.

2. Once per day.

3. Twice per day.

4. More than twice per day.

Q34.When do you brush your teeth?

1.morning

2.morning and night

3.night

4.never

Q35. How long do you brush your teeth?

1. Less than one minute.

2. One minute.

3. Two minutes.

4. More than two minutes

Q36.Do you brush your teeth in front of your parents? 1.Yes 2. No

Q37. How often do you change your toothbrush?

1.every month

2.every Two months

3.every Three month

4.every six months

Q38.What do you use to clean your teeth?

1.Tooth brush

2. Mouth wash

3.Finger

4. Dental floss

5.Tooth pick

6.Safety pin

7.Neem stick

Q39.What material do you use to clean your teeth?

1.Tooth paste

2.Tooth powder

3.Salt

4.Charcoal

5.Ash

Q40.Do you use tooth paste containing fluoride? 1.Yes 2. No

Q41.Do you rinse your mouth with water after every meal 1. Yes 2. No

Q42.Do you clean your tongue while brushing? 1.Yes 2. No

Q43.Did you visit your dentist recently 1. Yes 2. No

If yes, when?

1. below 3 months

2. 3-6 months.

3. 6months -1 year

4. More than 1 year.

Reason for visit……

What was the intervention?.....

If no, why? ……

Q44. How often do you eat or drink any of the following foods

Several times a day	Every day	several times a week	once a week	several times a month	never
(6)	(5)	(4)	(3)	(2)	(1)
Fresh fruits					
Bakery products					
Aerated drinks/ other soft drinks					

Jam/honey

Chewing gum containing sugar

Sweets/candy

Milk with sugar

Tea with sugar

Coffee with sugar