

# Assessment of Oral Health Awareness among Residential and Day School-going Children in South Bengaluru: A Questionnaire-based Survey

Shakuntala B Siddaiah<sup>1</sup>, Jaya A Ramachandra<sup>2</sup>, Divya V Mehta<sup>3</sup>, Gayathri Gopinath<sup>4</sup>

## ABSTRACT

**Aim:** This study was conducted to assess and evaluate the knowledge, attitude, and practice among 9–13 years old day scholars and residential schoolchildren in South Bengaluru, Karnataka.

**Materials and methods:** A total of 2,155 schoolchildren aged between 9 years and 13 years from 13 schools in South Bengaluru participated in the study out of which 1,039 were residential schools and 1,116 were day scholars. All children were given 36 close-ended questionnaires pertaining to knowledge attitude, diet, practice, and behavior regarding oral health and were requested to complete them within 15 to 20 minutes on the school premises only.

**Results:** The results of our study showed about 89.2% of the participants had good knowledge about maintaining healthy and good teeth for their good health. Also, 75.7% of children knew that sugar is the cause of tooth decay, 94% of the study participants had good oral hygiene practice, but the awareness regarding other oral hygiene aids (flossing) was found to be 11%.

**Conclusion:** Results of our study showed general awareness of oral health was quite good and children had a positive attitude toward oral hygiene practices but exhibited limited knowledge on the preventive dental practices. This suggests the need for implementation of the importance of the early preventive dental visit, through effective oral health promotion through school dental health programs.

**Clinical significance:** Good oral hygiene keeps teeth free from dental plaque buildup, fights off cavities, and bad breath. A healthy diet that is low in sugary foods, regular dental visits, oral hygiene instructions provided by the dentist is an essential part of the maintenance of good oral hygiene. Based on the study, we recommend establishing oral health programs under school health that addresses oral health promotion and awareness of dental diseases.

**Keywords:** Attitude awareness knowledge, Mixed dentition, Oral health, Questionnaire survey.

*World Journal of Dentistry* (2021); 10.5005/jp-journals-10015-1815

## INTRODUCTION

Oral health has always been a key indicator of overall health, well-being, and quality of life. It encompasses a range of diseases and conditions that include dental caries and periodontal disease.<sup>1</sup> Despite much advancement in preventive and interventional approaches a range of oral diseases remain prevalent in children. To combat these oral health diseases, basic oral health practices are to be installed from early childhood as this is an important period of life that needs to be monitored closely.<sup>2</sup>

Good knowledge and a positive attitude toward oral health care play a vital role in preventive dentistry.<sup>3</sup> Parents with good oral hygiene skills and positive attitude have shown to reflect their child's oral health, brushing practices, and dietary sugar intake.<sup>2</sup>

For improving oral health in a community, improvement in oral health-related knowledge is considered to be an essential prerequisite. Very few studies have been done to assess the level of oral health-related knowledge, attitude, and practices of children in developing countries, especially those residing in rural areas as compared to that of children in developed countries.<sup>4</sup>

Here, knowledge pertains to the information about general dental health and provision of care. Attitude is the behavioral approach of the child toward oral habits. Awareness is the consciousness of the child about their own oral health status, implicating their dental health knowledge.

School provides a comprehensive environment for a child's overall development such as intellectual development, skill acquisition,

<sup>1-4</sup>Department of Pedodontics and Preventive Dentistry, RajaRajeswari Dental College and Hospital, Kumbalgodu, Bengaluru, Karnataka, India

**Corresponding Author:** Divya V Mehta, Department of Pedodontics and Preventive Dentistry, RajaRajeswari Dental College and Hospital, Kumbalgodu, Bengaluru, Karnataka, India, Phone: +91 9900295444, e-mail: divyavmht@gmail.com

**How to cite this article:** Siddaiah SB, Ramachandra JA, Mehta DV, et al. Assessment of Oral Health Awareness among Residential and Day School-going Children in South Bengaluru: A Questionnaire-based Survey. *World J Dent* 2021;12(3):234–240.

**Source of support:** Nil

**Conflict of interest:** None

and achievement of goals in life. Residential or boarding schools are institutions where students live and learn outside their family homes whereas nonresidential/day schoolchildren go home after their fixed working time. A boarding school or residential school has both positive and certain limitations. Many kinds of literature have reported that the prevalence of dental caries among residential schoolchildren was high as compared to nonresidential schoolchildren suggesting timely emphasis and interventions.<sup>5</sup> Therefore, our study mainly aims to assess and evaluate the knowledge, attitude, and practice regarding oral health among the residential and day school-going children in South Bengaluru, Karnataka.

## MATERIALS AND METHODS

A total of 2,155 children aged between 9 years and 13 years, out of which 1,039 children were from 5 residential schools and 1,116 from 8 nonresidential schools, from south Bengaluru, Karnataka participated in the study. The study was approved by the ethical committee of RajaRajeswari Dental College and Hospital and consent for participation of schoolchildren was obtained from the heads of the schools. All the children who were present on the day of the data collection were included in the study. All the participants were requested to complete a close-ended questionnaire, which consisted of 36 questions 9 questions pertaining to knowledge, 8 questions assessing attitude, 4 questions regarding diet, and 15 questions related to practice and behavior regarding oral health.

The bilingual (local language and English) questionnaire was made and steps were taken to ensure the reliability of the language-translation. All the participants were asked to complete the questionnaires under our supervision. Interpersonal communication was not allowed and the children were informed of the importance of answering the question honestly. The duly filled questionnaire was collected from the participant on the same day after 15–20 minutes. Any query in the structured questionnaire was clarified by the investigator; the data collected were entered in the SPSS for Windows, Version 22.0, and were further analyzed.

## RESULTS

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) for Windows, Version 22.0. Released 2013. Armonk, NY, USA, IBM Corp. The descriptive analysis includes the expression of responses for the study questionnaire in terms of frequency and proportions. The Chi-square test was used to compare the responses for the study questionnaire between two study groups. The level of significance ( $p$  value) was set at  $p < 0.05$ .

### General Awareness on Oral Health and its Impact on Social Interaction

Table 1 presents the general awareness on oral health perceived by both the residential and day schoolchildren and they agreed in common with a score of 89.2% of the healthy tooth is white and strong and its importance in maintaining good health, 49.4% did not know about dental plaque and 75.7% agreed that sugar is the cause of tooth decay and 11.7% were not satisfied with the appearance of their teeth.

### Food Habits, Oral Habits, and Oral Hygiene Practices

Table 2 describes the distribution of study participants by frequency of consumption of sugary items and fruits. 62.5% of study participants in both groups reported having hidden sugar every day. About 71.5% of residential schoolchildren and 57.2% of day schoolchildren have fresh fruits daily.

About 26.7% of study participants in both groups have a habit of mouth breathing and/or thumb sucking. 99.8% of children from both schools brushed their teeth regularly. 88.9% of day scholars and 92.4% of residential schoolchildren did not know about fluoride and approximately the same results of about 89% of the children from both the groups were not aware of flossing. About 74.7% and 65.3% of day school and 61.6% and 47.5% of residential schoolchildren cleaned their tongue and rinsed their mouth after having their meals.

## Dental Care Visits and Attitude

Table 3 presents the awareness of dental care among the study participants.

About 32% of results were common among both the groups who visited a dentist twice a year and similarly among both the groups 34.4% of never visited a dentist. 28.4% of day scholars and 20.9% of residential schoolchildren were afraid to visit a dental doctor. Common results of 38% were shared in both the groups for information regarding oral health from teachers. The source of information regarding oral health from parents was 24.6% of day scholars and 39.9% of residential schoolchildren. 17.8% of day scholar and 6.6% of residential schoolchildren got information regarding oral health from television.

## DISCUSSION

The children in the age group of 9–13 years were selected since they could read and answer the questions on their own. Studies have shown a high prevalence of dental caries in this age group, which has made it a high priority for the dental profession.<sup>6–8</sup> Goel et al. found identical results and stated that children aged 9 years were affected by caries more frequently in both primary and permanent dentition as compared with other age groups.<sup>9</sup>

To get appropriate data coverage, children brought up under different environments were included, like the residential children whose eating habits are consuming regular meals on a regular schedule and the day scholar children who have a habit of in-between-meal consumption.

In our study, it was found that general awareness on oral health among both the study participants was quite good, where most of the children had a satisfactory understanding of healthy teeth (87.1%) and the importance of good teeth for maintaining good health (89.2%), but only 29% were aware of the number of teeth present. Studies done by Al-Darwish, Wahengbam, and Wyne et al. have shown children understand the importance of good and healthy teeth.<sup>10–12</sup>

Only 49.4% of children among both groups knew about dental plaque and its effect on the teeth. Al-Darwish's study was supportive of our results. This suggests that awareness regarding the harmful effects of dental plaque should be implemented in the curriculum.

The emphasis on dental esthetics is increasing in daily life and concerns about outward appearance also affect children. In the present study, only 11.7% of children were unhappy and dissatisfied with the appearance of their teeth, which is in accordance with the results obtained by Varenne et al., Harikiran et al., and Petersen et al.<sup>13–15</sup> Thus, improving the dental esthetics definitely improve the self-confidence socialization and academic performance.

In the present study, about 75.7% of participants agreed that sugar is the cause of tooth decay. Though children had a good knowledge of the cariogenic properties of sugar the consumption of chocolates/sweets (62.5%) and aerated soft drinks (31.1%) between both the study groups was more when compared to other studies done by Priya et al. and El Qaderi and Taani.<sup>16,17</sup> However, studies conducted by Blaggana et al., Al-Darwish, and Varenne et al. showed the majority of children were not aware on the fact that sugar is the cause of tooth decay.<sup>7,10,13</sup> Appropriate guidance regarding the ill-effects of sugary foods must be given. Consumption of natural fruits should be promoted as 71.5% of children of the residential school

Table 1: General awareness on oral health and its impact on social interaction

Questions	Day scholars (n = 1,116)		Residential (n = 1,039)		Total (n = 2,155)		$\chi^2$ value	p value	
	n	%	n	%	n	%			
How many teeth do you have?	Between 20 and 24	222	19.9	333	32.1	555	25.8	46.783	<0.001*
	Between 25 and 28	327	29.3	298	28.7	625	29.0		
	Between 29 and 32	567	50.8	408	39.3	975	45.2		
A healthy tooth is?	White and strong	978	87.6	900	86.6	1,878	87.1	1.908	0.39
	Little yellow also ok	90	8.1	81	7.8	171	7.9		
	Do not know	48	4.3	58	5.6	106	4.9		
Dental problems can affect general health	Yes	686	61.5	508	48.9	1,194	55.4	126.388	<0.001*
	No	285	25.5	186	17.9	471	21.9		
	Not sure	145	13.0	345	33.2	490	22.7		
Good teeth are important for maintaining good health	Yes, it is important	977	87.5	946	91.0	1,923	89.2	7.077	0.03*
	No, it is not related	75	6.7	53	5.1	128	5.9		
	Not completely	64	5.7	40	3.8	104	4.8		
Do you know about the dental plaque?	Do not know	590	52.9	475	45.7	1,065	49.4	12.564	0.002*
	Know little	441	39.5	488	47.0	929	43.1		
	Understand fully	85	7.6	76	7.3	161	7.5		
"Sugar is a cause of tooth decay"	Yes	824	73.8	807	77.7	1,631	75.7	10.101	0.006*
	No	125	11.2	124	11.9	249	11.6		
	Do not know	167	15.0	108	10.4	275	12.8		
How many oral or dental diseases are you aware of?	Do not know any	477	42.7	294	28.3	771	35.8	52.845	<0.001*
	1-2 Diseases	506	45.3	556	53.5	1,062	49.3		
	More than 2 diseases	133	11.9	189	18.2	322	14.9		
Are you satisfied with the appearance of your teeth?	Yes, it is good	704	63.1	575	55.3	1,279	59.4	39.109	<0.001*
	It is ok	259	23.2	364	35.0	623	28.9		
	It is bad and not ok	153	13.7	100	9.6	253	11.7		
Do you avoid smiling and laughing because of your teeth?	No	656	58.8	579	55.7	1,235	57.3	55.712	<0.001*
	Sometimes	275	24.6	376	36.2	651	30.2		
	Yes	185	16.6	84	8.1	269	12.5		
Do other children make fun of your teeth?	No	705	63.2	686	66.0	1,391	64.5	10.272	0.006*
	Sometimes	219	19.6	151	14.5	370	17.2		
	Yes	192	17.2	202	19.4	394	18.3		

\*Statistically significant



**Table 2:** Food habits, oral habits, and oral hygiene practices

Questions	Day scholars (n = 1,116)		Residential (n = 1,039)		Total (n = 2,155)		$\chi^2$ value	p value	
	n	%	n	%	n	%			
Chocolates/candies/sweets do you eat every day	0–2 nos	694	62.2	653	62.8	1,347	62.5	3.437	0.18
	3–6 nos	308	27.6	259	24.9	567	26.3		
	More than 6 nos	114	10.2	127	12.2	241	11.2		
Frequency of milk/milk shake/tea/coffee with sugar every day	Never	238	21.3	105	10.1	343	15.9	51.028	<0.001*
	Once or twice	731	65.5	788	75.8	1,519	70.5		
	> 2 times	147	13.2	146	14.1	293	13.6		
Frequency of aerated soft drinks or packaged juices	Never	225	20.2	207	19.9	432	20.0	0.176	0.92
	Once daily	351	31.5	320	30.8	671	31.1		
	At least once a week	540	48.4	512	49.3	1,052	48.8		
How often do you eat fresh fruits?	Never	167	15.0	47	4.5	214	9.9	79.488	<0.001*
	Once daily	638	57.2	743	71.5	1,381	64.1		
	At least once a week	311	27.9	249	24.0	560	26.0		
Do you have a habit of mouth breathing or thumb sucking?	Yes	145	13.0	125	12.0	270	12.5	14.659	0.001*
	No	844	75.6	736	70.8	1,580	73.3		
	Sometimes	127	11.4	178	17.1	305	14.2		
Do your gums bleed while brushing your teeth?	No	670	60.0	571	55.0	1,241	57.6	7.518	0.02*
	Sometimes	347	31.1	381	36.7	728	33.8		
	Always	99	8.9	87	8.4	186	8.6		
Do you have a problem with bad breath?	No	729	65.3	711	68.4	1,440	66.8	3.241	0.20
	Sometimes	294	26.3	239	23.0	533	24.7		
	Yes	93	8.3	89	8.6	182	8.4		
Do you brush your teeth?	Yes	1,111	99.6	1,039	100.0	2,150	99.8	4.666	0.03*
	No	5	0.4	0	0.0	5	0.2		
	Once	354	31.7	451	43.4	805	37.4		
Frequency of cleaning your teeth every day	Twice	727	65.1	570	54.9	1,297	60.2	33.437	<0.001*
	>2 times	35	3.1	18	1.7	53	2.5		
	Morning only	360	32.3	450	43.3	810	37.6		
When should you brush your teeth?	Morning and night	752	67.4	589	56.7	1,341	62.2	31.101	<0.001*
	Not sure	4	0.4	0	0.0	4	0.2		
	Tooth brush	1,062	95.2	962	92.6	2,024	93.9		
Which is the cleaning aid used by you?	Fingers	42	3.8	39	3.8	81	3.8	15.841	<0.001*
	Others	12	1.1	38	3.7	50	2.3		
	<1 minute	226	20.3	329	31.7	555	25.8		
How much time you spend for cleaning your teeth	1 to 2 minutes	540	48.4	381	36.7	921	42.7	44.520	<0.001*
	>2 minutes	350	31.4	329	31.7	679	31.5		

Contd...

Questions	Day scholars (n = 1,116)		Residential (n = 1,039)		Total (n = 2,155)		$\chi^2$ value	p value
	n	%	n	%	n	%		
What do you use to brush your teeth?								
Toothpaste	1,076	96.4	963	92.7	2,039	94.6	14.912	0.001*
Tooth powder	37	3.3	72	6.9	109	5.1		
Others	3	0.3	4	0.4	7	0.3		
Do you know about fluoride?								
Yes	124	11.1	79	7.6	203	9.4	7.759	0.005*
No	992	88.9	960	92.4	1,952	90.6		
Which type of toothpaste do you use?								
Fluoridated	80	7.2	76	7.3	156	7.2	60.023	<0.001*
Nonfluoridated	140	12.5	49	4.7	189	8.8		
Do not know	871	78.0	848	81.6	1,719	79.8		
How much paste do you apply on the brush?								
Not using paste	25	2.2	66	6.4	91	4.2		
<half brush	248	22.2	309	29.7	557	25.8	17.533	<0.001*
Half brush	623	55.8	545	52.5	1,168	54.2		
Full brush	245	22.0	185	17.8	430	20.0		
Frequency of change of your toothbrush								
When it is damaged	536	48.0	604	58.1	1,140	52.9	25.731	<0.001*
3-6 months	517	46.3	370	35.6	887	41.2		
>6 months	63	5.6	65	6.3	128	5.9		
How do you brush your teeth?								
Horizontal motion	574	51.4	642	61.8	1,216	56.4	24.235	<0.001*
Circular motion	499	44.7	359	34.6	858	39.8		
Do not know	43	3.9	38	3.7	81	3.8		
Do you know about flossing?								
Yes	121	10.8	117	11.3	238	11.0	0.096	0.76
No	995	89.2	922	88.7	1,917	89.0		
Should you floss your teeth?								
Yes	155	13.9	207	19.9	362	16.8	14.312	0.001*
No	299	26.8	249	24.0	548	25.4		
Do you clean your tongue after meals or during brushing?								
Not sure	662	59.3	583	56.1	1,245	57.8	45.038	<0.001*
Regularly	834	74.7	640	61.6	1,474	68.4		
Not every time	237	21.2	351	33.8	588	27.3		
Never	45	4.0	48	4.6	93	4.3		
Do you rinse your mouth after eating food?								
Regularly	729	65.3	491	47.5	1,220	56.8	95.368	<0.001*
Not every time	231	20.7	230	22.3	461	21.5		
Never	156	14.0	312	30.2	468	21.8		

\*Statistically significant



**Table 3:** Dental care visits and attitude

Questions	Day scholars (n = 1,116)		Residential (n = 1,039)		Total (n = 2,155)		χ <sup>2</sup> value	p value	
	n	%	n	%	n	%			
How many times do you visit to a dentist clinic?	Once a year	383	34.3	341	32.8	724	33.6	0.18	
	Twice a year	369	33.1	320	30.8	689	32.0		
When was the last time you visited the dentist's clinic?	Never visited	364	32.6	378	36.4	742	34.4	<0.001*	
	In last 30 days	231	30.5	105	15.9	336	23.7		
	2-6 months	285	37.6	238	36.0	523	36.9		
	>6 months	241	31.8	318	48.1	559	39.4		
Are you afraid to visit a dental doctor?	Yes	317	28.4	217	20.9	534	24.8	<0.001*	
	No	590	52.9	674	64.9	1,264	58.7		
Source of information regarding oral health and dental care	Sometimes afraid	209	18.7	148	14.2	357	16.6	104.874	<0.001*
	Friends	56	5.0	49	4.7	105	4.9		
	Teachers	426	38.2	392	37.7	818	38.0		
	Dentist	153	13.7	114	11.0	267	12.4		
	TV program	199	17.8	69	6.6	268	12.4		
	Radio	8	0.7	0	0.0	8	0.4		
	Parents/relatives	274	24.6	415	39.9	689	32.0		

\*Statistically significant

have fresh fruits daily as compared to 57.2% of day schoolchildren, which means residential schoolchildren have a more balanced diet.

Awareness regarding adverse effects of oral habits was found to be less and only 26.7% of both group children accepted having thumb sucking/mouth breathing habit which is in accordance with the study conducted by Blaggana et al.<sup>7</sup>

In our study, majority of children from both the study groups brushed regularly (99.8%) with 62.2% of children brushing twice daily, similar results were obtained from studies conducted by Jamjoum and Shailee et al.<sup>18,19</sup> However, variation in results was noted by studies conducted by Petersen et al. and Kamath et al. where 77% and 52% of participants brushed twice daily.<sup>15,20</sup>

88.9% of day scholar and 92.4% of residential children were ignorant of the benefits of fluoride and its presence in toothpaste, thus they should be educated about fluoride and its benefits on teeth. The results of the study conducted by Wyne et al. showed a positive response among the children (55.4%) for the knowledge on the benefits of fluoride. Fluoride when provided consistently, topically helps to maintain resistance to dental caries that counteracts the effects of acids produced from bacterial metabolism of dietary carbohydrates.

The use of dental floss to prevent dental diseases was apparently less understood by both the study groups (89%) which are in accordance with studies conducted by Jamjoum and Kamath et al.<sup>18,20</sup> The evidence from the studies suggests the improvement of knowledge toward the use of dental floss is much needed. Our participants had a good habit of tongue cleaning and rinsing the mouth after meals about 74.7% and 65.3% of day school and 61.6% and 47.5% of residential school. The results of the study conducted by Pereira are in accordance with our study.<sup>21</sup> It will be an ideal habit for all the remaining pupils to inculcate this habit in their routine.

In our study, approximately about 65.6% of participants among the study groups visited the dentist out of which 39.4% visited in the last 6 months. Fear of the dentist and low awareness of routine dental check-ups could be the reason for 34.4% of participants among both the study groups never visiting a dentist. Similar results were obtained by Harikiran et al., Priya et al., and this attitude could be due to previous negative dental experience or negligence of parents.<sup>14,16</sup>

In our study, the source of information regarding oral health was 38% from teachers for both the study participants, from parents 24.6% of day scholar and 39.9% of residential schoolchildren, which is in accordance with the study conducted by Varenne et al.<sup>13</sup> However, studies conducted by Jamjoum and Kamath et al. showed a majority of children gained information regarding oral health from parents.<sup>18,20</sup> Since children spend adequate time with teachers, the school curriculum is the optimal way to raise children's dental health awareness and knowledge about oral health and practices. Since day scholars spend time at home and have more exposure to television, 17.8% of day schoolchildren receive their information regarding oral health from television which is more than residential children 6.6%.

### LIMITATIONS

The limitation of this study is it is a 1-day program and long-term follow-up of the program needs to be conducted to evaluate the long-term impact on oral health practices, or altering dental health behavior that would positively influence the outcome of the program. More emphasis on the effect of culture and



socioeconomic status on oral health status and practices should also be stressed in future studies.

## CONCLUSION

This survey furnishes the background data to get insight into the status of awareness of schoolchildren aged 9–13 years regarding oral health, as school age is the right time when the behavior can still be molded. The knowledge attitude and practices regarding oral health status, practices and food habits were found to be satisfactory. Oral hygiene is an essential part of school health services that have to be highlighted.

Based on our study, we recommend establishing age-appropriate oral health awareness on dental education under school dental health programs that address oral health promotion and diseases.

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