

Oral Hygiene Behavior of School Children in Saudi Arabia: A Descriptive Cross-sectional Survey

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ABSTRACT

Aim: Oral health is an integral part of general health, and good knowledge and oral hygiene practices are the key to achieving oral health. This study assessed the knowledge, attitude, and oral hygiene practices of school children in Saudi Arabia and the need for dental health education and intervention.

Materials and methods: This descriptive cross-sectional study was conducted among male school children ($n = 451$), aged 6–12 years, in the Al-Zulfi region of Saudi Arabia. Participants were included in this study using one-stage cluster sampling. The subjects completed a questionnaire, and the oral hygiene index-simplified was recorded. The collected data were statistically analyzed using SPSS version 21.

Results: Only 41.9% of the children had good oral hygiene. Of the sampled children, 72.7% used a toothbrush and toothpaste, but only 2.2% were aware of dental floss; 62.7% children brushed for 1–2 minutes and had good oral hygiene, but 55.9% of children had no knowledge about periodontal health. Only 30.1% parents observed their children during tooth brushing.

Conclusion: Use of a toothbrush and toothpaste is the most commonly used and most effective oral hygiene aid. Brushing twice a day for 1–2 minutes seems to be effective. Oral health care education should be included in the school curriculum, and a parental awareness program is needed to emphasize their role in the dental health of their children.

Keywords: Attitude, Dental caries, Dentistry for children, Knowledge, Oral hygiene practice.

International Journal of Clinical Pediatric Dentistry (2020): 10.5005/jp-journals-10005-1710

INTRODUCTION

Good oral hygiene is considered the way to achieve a healthy mouth, but oral health cannot be achieved if the basic principles of dental hygiene are not incorporated into day-to-day life. Moreover, poor oral health has been proven to have adverse effects on general health. Good oral hygiene practices are best inculcated from childhood, and educating children in proper oral hygiene methods is the collective responsibility of parents, teachers, and dental professionals.¹

Prevention is considered to be the foundation of modern dental practice; effective control of dental plaque is the main feature of preventive dentistry of oral diseases. The main goal of dental hygiene is to prevent the formation of plaque. Poor oral hygiene allows the accumulation of bacteria that cause dental caries, gingivitis, and periodontitis, which can eventually lead to the loss of teeth.² Use of oral cleaning aids in oral hygiene practices has long been part of human civilization. Achieving ideal oral health should begin from childhood, and it is the collective responsibility of parents, teachers, and dentist to create a positive attitude regarding oral hygiene in children.³

This study assessed the knowledge, attitude, and oral hygiene practices of school children and the need for dental health education and intervention.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted among male school children, aged 6–12 years, in two primary and two intermediate schools in Al-Zulfi, Riyadh Province, in Saudi Arabia. A total of 451 school children were included in this study using one-stage cluster sampling. Permission was obtained from the concerned school authorities and Ministry of Education before starting the study.

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How to cite this article: Kannan SPK, Alfahaid SF, Alharbi AS, *et al.* Oral Hygiene Behavior of School Children in Saudi Arabia: A Descriptive Cross-sectional Survey. *Int J Clin Pediatr Dent* 2020;13(1):66–71.

Source of support: Nil

Conflict of interest: None

Before the survey procedure, all participating children were subjected to an oral hygiene index-simplified assessment.⁴ To evaluate knowledge, attitude, and practices regarding oral health, a questionnaire comprising 33 questions, translated into Arabic, was used.^{5,6} The Arabic questionnaire was pretested for accuracy in a group of 30 school children on two occasions, with an interval of 10 days: responses to the questions were highly similar, with a kappa test coefficient for all questions of 0.92.

With the prior permission from the Dean of the school and the children's parents, the dental health questionnaire was then explained to the students. Thereafter, the questionnaire was distributed among the children in the classrooms at the start of class, with the team of researchers present to clarify the questions and to collect all responses when the questionnaires had been completed.

The collected data were statistically analyzed using SPSS version 21 (SPSS Inc., Chicago, IL, USA). Data were compared using

Table 1: Use of various tooth-cleaning aids used by children

Material used for brushing × oral hygiene status cross tabulation

		Count	Oral hygiene status			Total	Chi-square value	p value
			Poor	Fair	Good			
Material used for brushing	Brush + toothpaste		49	137	142	328	23.575	0.003
		% within oral hygiene status	53.8	80.1	75.1	72.7		
	Dental floss		3	4	3	10		
		% within oral hygiene status	3.3	2.3	1.6	2.2		
	Mouthwash		8	9	8	25		
		% within oral hygiene status	8.8	5.3	4.2	5.5		
	Toothpicks		8	5	9	22		
		% within oral hygiene status	8.8	2.9	4.8	4.9		
	Other methods		23	16	27	66		
		% within oral hygiene status	25.3	9.4	14.3	14.6		
Total		Count	91	171	189	451		
		% within oral hygiene status	100.0	100.0	100.0	100.0		

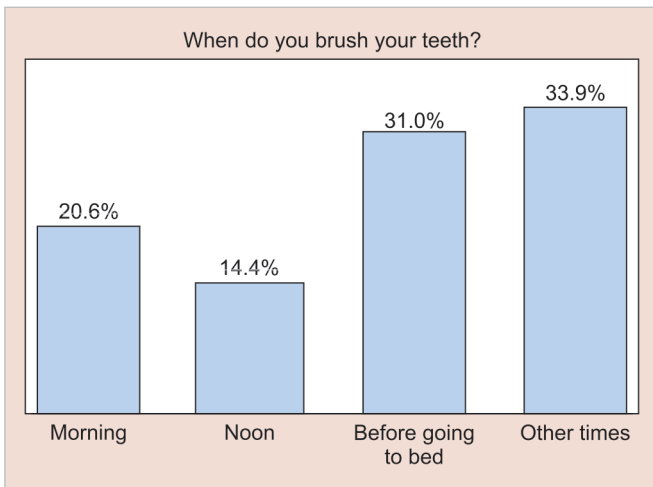


Fig. 1: Frequency of brushing

Chi-square tests, and if the calculated *p* value is less than <0.05, then the difference is considered significant.

RESULTS

We found that 72.7% (328/451) of the children used a toothbrush and toothpaste for cleaning their teeth, whereas 14.6% (66/451) used other oral hygiene methods. Among the participants who had good oral hygiene, 75.1% (142/189) used a toothbrush and toothpaste, and 14.3% (27/189) used other hygiene methods. In contrast, among the participants who had poor oral hygiene, 53.8% (49/91) used a toothbrush and toothpaste, whereas 25.3% (23/91) used other oral hygiene methods. Only 2.2% (10/451) of the children overall used dental floss; only 1.6% (3/10) of these participants had good oral hygiene (Table 1).

Figure 1 shows that 31% (102/328) of children brushed their teeth before going to bed; 20.7% (68/328) of children overall brushed their teeth in the morning. Around 62.7% (283/451) children brushed their teeth for 1–2 minutes and accounted for 67.2% (127/189) of participants with good oral hygiene. In contrast, 26.6% (120/451) children brushed their teeth for less than 1 minute; among

them 41.8% (38/120) of the participants were with poor oral hygiene. The difference was statistically significant *p* = 0.005 (Table 2).

Only 27% (122/451) of the children correctly answered that plaque is a soft debris adherent to teeth (Fig. 2). Surprisingly, 55.9% (252/451) of the children did not know about the signs of periodontal diseases, such as bleeding gums and recession. In addition, 56.8% (256/451) of the children had no idea about the preventive and protective measures that should be followed to avoid gum bleeding, and only 11.3% (51/451) of them knew about healthy gingivae (Table 3).

During the children’s last visit to a dentist, 22.8% (103/451) of them received restorations, 20.0% (90/451) of them had a checkup, 17.5% (79/451) had extractions, 10% (45/451) had scaling, 6.2% (28/451) had periodontal treatment, 5.1% (23/451) underwent dental radiography, 4.7% (21/451) received topical fluoride application, 2.7% (12/451) underwent orthodontic treatment, and 2.2% (10/451) received a crown and bridge (Table 4).

Fifty-eight percent (262/451) of the children visited a dental surgeon only when they had pain and only 11% (50/451) of the children regularly visited a dentist once in 6–12 months (Fig. 3). Around 29.5% (133/451) of children experienced severe dental pain when they first visited a dentist. A total of 32.2% (145/451) children were not afraid during their first dental visit and 22% (99/451) of them were scared and reluctant to undergo treatment during their first visit (Table 5).

Sixty-one to eighty-two percent of students affirmed that carious teeth can affect their appearance, sweets affect teeth, brushing can prevent dental caries, fizzy drinks can affect teeth, and fluoride can be beneficial to teeth (Table 6). This study showed that only 41.9% (189/451) of children had a good oral hygiene status, whereas 20.2% (91/451) had a poor oral hygiene status (Fig. 4).

In terms of the role of parents, 48.3% (218/451) of the children’s parents gave advice about tooth brushing to their children, but never watched them during brushing. Only 13.5% (61/451) of the parents closely observed children during tooth brushing and 21.5% (97/451) of parents never cared about tooth brushing (Fig. 5).

DISCUSSION

The habit of maintaining general hygiene and the formation of an appropriate attitude toward health mainly develop during childhood.

Table 2: Duration of brushing

Average duration taken for single brushing × oral hygiene status cross tabulation

			Oral hygiene status				Chi-square	
			Poor	Fair	Good	Total	value	p value
Average duration taken for single brushing	Less than 1 minute	Count	38	44	38	120	18.575	0.005
		% within oral hygiene status	41.8	25.7	20.1	26.6		
	1 minute	Count	24	68	66	158	26.4	39.8
		% within oral hygiene status	26.4	39.8	34.9	35.0		
	2 minutes	Count	23	41	61	125	25.3	24.0
		% within oral hygiene status	25.3	24.0	32.3	27.7		
	More than 2 minutes	Count	6	18	24	48	6.6	10.5
		% within oral hygiene status	6.6	10.5	12.7	10.6		
Total		Count	91	171	189	451	100.0	100.0
		% within oral hygiene status	100.0	100.0	100.0	100.0		

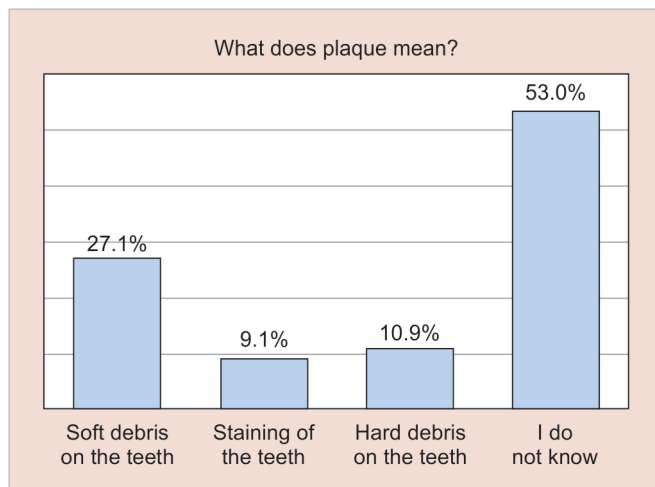


Fig. 2: Knowledge about dental plaque

Oral health is considered an integral component of general health. In this study, we assessed the knowledge and oral hygiene practices of male school children aged 6–12 years.

We found that 72.7% of children used a toothbrush and toothpaste, 2.2% used dental floss, 5.5% used mouth wash, and 4.9% used a toothpick. Similar findings were reported in a study from North Jordan, where 83% of the participating children used a toothbrush and toothpaste, 2% used dental floss, 6% used mouth wash, and 7% used a toothpick.⁵ In contrast, a study from Rijal Almaa (a rural area in southern Saudi Arabia) reported that only 58.4% of the participating children cleaned their teeth with a toothbrush and toothpaste, 32.1% used miswak, 7.2% used a toothpick, and 2.3% used dental floss.⁶ These comparable findings show that the target population have a positive attitude and practice of dental hygiene procedures.

In this study, 48.3% of children brushed their teeth at a convenient time rather than in the morning or before going to bed. Only 31% of children had a habit of brushing before going to bed, which is similar to the studies from Madinah and Rijal Almaa, in Saudi Arabia, in which 64.3% and 75% children brushed once daily, respectively.^{3,6} In contrast, in studies from Jordan, India, and Finland, 69%, 61%, and 51% of participating children brushed their teeth twice daily, respectively.^{5,7,8}

In this study, 62.7% of children generally brushed for around 1–2 minutes. Only 10.6% of them brushed for more than 2 minutes;

Table 3: Children’s knowledge about periodontal infection and gum-protective aids

		Count	Column valid n%
What does gum bleeding mean?	Healthy gum	51	11.3
	Inflamed gum	125	27.7
	Gum recession	23	5.1
	I do not know	252	55.9
How do you protect yourself from gum bleeding?	Using toothbrush, paste, and dental floss	110	24.4
	Using soft food	49	10.9
	Using vitamin C	36	8.0
	I do not know	256	56.8

our results were comparable to similar study from Jordan and contrary to a study from Egypt, with values of 71% and 18.8%, respectively.^{5,9} In this study, only 27.7% of children knew about gum bleeding and 24.4% knew that it could be prevented by tooth brushing and by use of floss, whereas 77.8% children knew that brushing could prevent decay. Regarding their diet, 82.7% of children agreed that sweets affect teeth and 71.8% agreed that fizzy drinks affect teeth adversely. These findings are in contrast to a study conducted in Africa, where only 52% were aware that brushing prevents gingival bleeding, 65% believed that brushing would prevent decay, and only 30% agreed that sweets affect teeth.¹⁰

In this study, 58% of children responded that they would visit the dentist only when they have a toothache, and only 11% had gone for regular dental checkups, whereas 18% had never visited a dentist. A study conducted in a rural area of Asser province in Saudi Arabia similarly reported that 54.6% of children’s visits to dentists was for toothache.⁶ In a comparable study from Karachi, only 31.7% of the participants had visited a dentist; among them 26% children visited the dentist only when they had a dental problem, 3.5% children visited a dentist once a year, and 0.4%–0.7% visited a dentist every 3–6 months, whereas 69.3% of children never visited a dentist.¹¹ This finding could be attributed to the greater availability of information technology, and the availability of free medical and dental services from governmental medical institutions for the citizens of Saudi Arabia.

In this study, 61% of children had a good knowledge about fluoride and knew that it prevents dental caries. This is in contrast

Table 4: Treatment of the child underwent during his/her last dental visit

		Count	Column valid n%
The treatment(s) I sought during my last visit to the dentist was (were):	Check my teeth	90	20.0
	Take X-rays	23	5.1
	Have scaling	45	10.0
	Have fluoride on my teeth	21	4.7
	Treat my gums	28	6.2
	Have filling	103	22.8
	Have crown/bridge	10	2.2
	Have orthodontic treatment	12	2.7
	Have tooth extraction	79	17.5
Others	40	8.9	

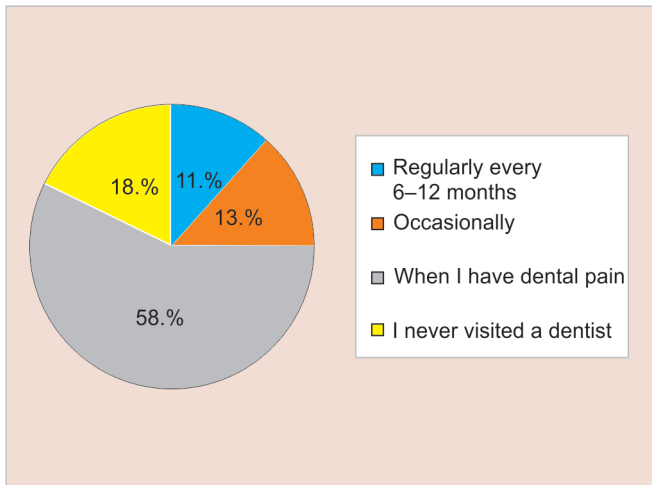


Fig. 3: Frequency of dental visit

to a similar study from Nepal, in which 82% of children aged 10–13 years did not know about fluoride and its benefit to teeth.¹² A study from Qatar showed that only 38.9% participant children were aware of fluoride and only 23.9% identified the preventive action of fluoride on dental decay.¹³ These differences could be attributed to socioeconomic factors and exposure to information on television and on the internet.

A study from Timis county showed that 11.2% children had never met a dentist. Of 87.8% of those who had visited a dentist,

30.5% went for caries-related issues, 16.6% for extraction, and 8.1% for toothache.¹⁴ Among the children in this study, 75.4% knew that caries can affect the appearance of a tooth. During their last visit to the dentist, 22.8% received restorations, 17.5% underwent tooth extraction, and 20% went for a checkup. A total of 65.2% of children in this study believed that regular visits to the dentist are necessary, whereas 17.7% never visited the dentist, indicating the attitude of children regarding oral hygiene. This finding indicates the present dental needs of Saudi school children, which is much higher than that in developed nations and signifies the role of creating awareness and preventive dental programs among school children. A study from Lithgow, Australia, reported that 53% of children had visited the dentist within the previous 6 months and 77% had done so within the previous year; the study also suggested that the age of the child and health insurance coverage was an influential factor in dentist visits.¹⁵ The attitude of children toward dentists or dental procedures was influenced by various factors, such as fear of the dental setup, lack of toothache, or lack of parental encouragement.¹⁶

A study from Finland reported that children who had mothers with highly skilled occupations had good oral health-related knowledge, attitude, and oral hygiene behavior.¹⁷ A study from Qatar revealed that children received oral health information from parents (69.1%), dentists (8.6%), teachers (5.1%), the media (3%), house maids (2.1%), and relatives (1.8%).¹³ We agree with the statement made by Jalevik et al. in 1999 that lack of parents' regular visits to a dentist might be reflected in the children's attitude to dental matters.¹⁸ A similar study among school children in Al Hassa

Table 5: Child's first experience in the dental office

		Count	Column valid n%
When I first visited the dentist:	There was no dental pain	94	20.8
	There was severe dental pain	133	29.5
	There was little dental pain	95	21.1
	I was not feeling comfortable	50	11.1
	I felt nothing	51	11.3
	There was not enough time for treatment	10	2.2
	There was enough time for treatment	18	4.0
When I first visited the dentist:	I was scared and reluctant	99	22.0
	Slightly afraid	118	26.2
	Very slightly afraid	89	19.7
	I was never afraid	145	32.2

Table 6: Child's knowledge on etiology of dental caries

		Count	Column valid n%
Do you think you can decide the treatment you need?	Yes	215	47.7
	No	236	52.3
Is it necessary for patients to decide their dental treatment needs?	Yes	314	69.6
	No	137	30.4
Cariou teeth can affect teeth appearance	Yes	340	75.4
	No	111	24.6
Sweets affect the teeth adversely	Yes	373	82.7
	No	78	17.3
Brushing teeth prevents dental decay	Yes	351	77.8
	No	100	22.2
Fizzy drinks affect the teeth adversely	Yes	324	71.8
	No	127	28.2
Using fluoride strengthens the teeth	Yes	277	61.4
	No	174	38.6

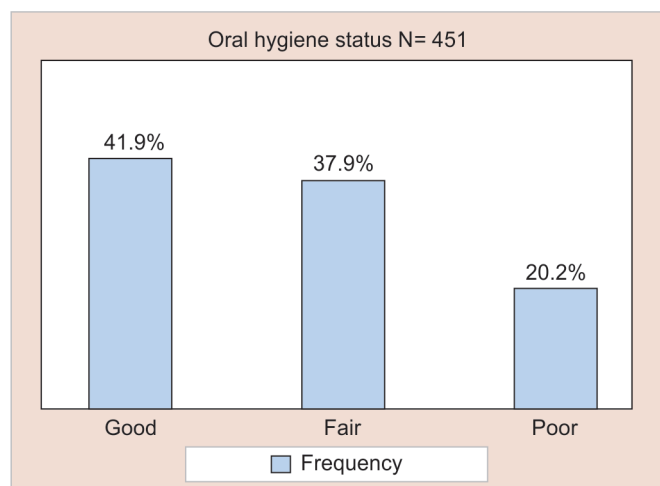


Fig. 4: Children's oral hygiene status

in 2008 revealed that the dental caries prevalence was higher among children with parents with a low education status, working mothers, and large families.¹⁹ Parental monitoring during tooth brushing is an influential factor for maintaining good oral hygiene; in this study, 48.3% of the parents did not supervise, but advised their children regarding brushing. A similar finding of 46% was reported by a study from Egypt.⁹ This finding reflects the necessity of dental preventive awareness programs and parental counseling.

In this study, only 41.9% of the children had a good oral hygiene status and 20.2% had a poor oral hygiene status; this indicates the necessity of educating children about oral hygiene. A similar study conducted among school children in India reported that 70.42% of children had a poor oral hygiene status and emphasized the importance of including education and motivation regarding maintaining oral health in the regular school curriculum.²⁰ In a global school-based student survey conducted across 44 countries,

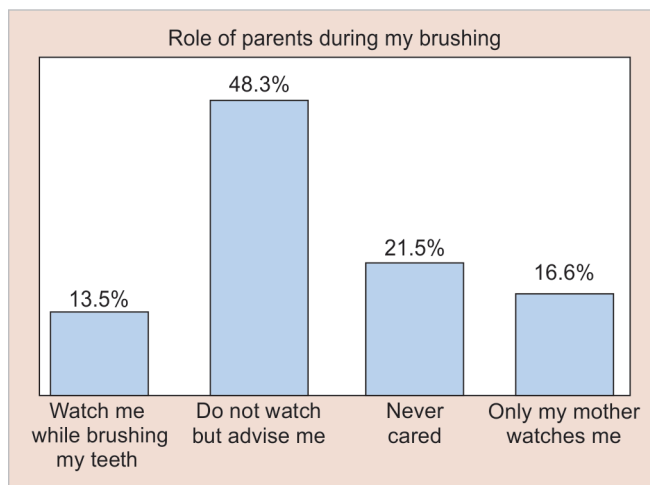


Fig. 5: Parental role in children's brushing habit

80% of children brushed their teeth at least once daily, in 39 countries. Distressingly, more than 5% of children reported that they brushed less than once daily or never in 23 out of 44 countries.²¹ A study conducted among intermediate school students in Riyadh showed that education had a positive effect on students' knowledge about oral hygiene, indicating the necessity of school dental health education programs.²²

In summary, most of the children in this study knew that tooth brushing with a toothbrush and toothpaste helps to prevent dental caries, and they implement this behavior, but were unaware of the beneficial role of dental floss. Even with better awareness, only 41.9% had good oral hygiene. Moreover, the knowledge of these children about periodontal health was poor and around half of the students who participated in this study were not monitored by their parents during tooth brushing. These findings indicate the need for a comprehensive oral health education and motivational program including the children, teachers, and parents and also oral preventive care should be included in the school curriculum.

CLINICAL RELEVANCE

Brushing with toothpaste is the most prevalent and most effective oral hygiene aid. Brushing twice a day, in the morning and before going to bed, for 1–2 minutes each time is beneficial. Oral health education should be included in the school curriculum, and a parental awareness program is needed to emphasize their role in the dental health of children.

The study was approved by Institutional ethical committee, and prior permission was obtained for this study in schools from Ministry of Education: L. no. 39374840.

CONSENT FOR PARTICIPATION

Participants' parent consent was obtained.

REFERENCES

- Priya M, Devdas K, Amaral D, et al. Oral health attitudes, knowledge and practice among school children in Chennai, India. *J Educ Ethics Dent* 2013;3:26–33. DOI: 10.4103/0974-7761.126940.
- Arrow P, Raheb J, M Miller. Brief health promotion intervention among parents of young children to reduce early childhood dental decay. *BMC Public Health* 2013;13:245. DOI: 10.1186/1471-2458-13-245.

3. Al-Samadani KH, Ahmad MS, Bakeer HA, et al. Oral health knowledge and practice among 9-12-year-old schoolchildren in the region of Madinah, Saudi Arabia and its impact on the prevalence of dental caries. *Eur J Gen Dent* 2017;6:54–58. DOI: 10.4103/2278-9626.198615.
4. Greene JC, Vermillion JR. The simplified oral hygiene index. *J Am Dent Assoc* 1964;68:7–13. DOI: 10.14219/jada.archive.1964.0034.
5. Al-Omiri MK, Al-Wahadni AM, Saeed KN. Oral health attitudes, knowledge, and behaviour among school children in north Jordan. *J Dental Ed* 2006;70(2):179–187.
6. Al Subait AA, Alousaimi M, Geeverghese A, et al. Oral health knowledge, attitude and behavior among students of age 10–18 years old attending Jenadriyah festival Riyadh; a cross-sectional study. *Saudi J Dental Res* 2016;7:45–50. DOI: 10.1016/j.sjdr.2015.05.001.
7. Rafi AT, Syed MY, Zakirulla M, et al. Oral hygiene knowledge and practices among school children in a rural area of southern Saudi Arabia. *Int J Contemp Dent* 2012;3:57–62.
8. Pathania V, Sachdev V, Kirtaniya BC, et al. Oral health-related knowledge, attitude and practices amongst school children in Himachal Pradesh, India. *Global J Med Res* 2015;15:1–5.
9. Ahmed SM, Soliman AMA, Elmagrabi NM, et al. Oral health knowledge, attitude and practice among primary school children in rural areas of Assiut Governorate. *Egypt J Com Med* 2015;33:1–12. DOI: 10.21608/ejcm.2015.693.
10. Varenne B, Petersen PE, Ouattara S. Oral health behaviour of children and adults in urban and rural areas of Burkina Faso, Africa. *Int Dental J* 2006;56(2):61–70. DOI: 10.1111/j.1875-595X.2006.tb00075.x.
11. Bashir R, Rizvi K. Assessment of levels of oral hygiene awareness, knowledge, attitude and practice among the students of a government school in Karachi. *Br J Med Med Res* 2016;15:1–11. DOI: 10.9734/BJMMR/2016/24794.
12. Kumar A, Singh VP. Knowledge, attitude and practice of oral hygiene in children of eastern Nepal. *J Dent Med Sci* 2014;13:93–99. DOI: 10.9790/0853-13619399.
13. Al-Darwish MS. Oral health knowledge, behaviour and practices among school children in Qatar. *Dent Res J* 2016;13:342–353. DOI: 10.4103/1735-3327.187885.
14. Matichescu A, Matichescu ML, Ogodescu AS, et al. Oral hygiene behaviour, caries study of primary school children from Timis county. *Rev Cercet Intervent Soc* 2016;54:142–155.
15. John JR, Mannan H, Nargundkar S, et al. Predictors of dental visits among primary school children in the rural Australian community of Lithgow. *BMC Health Serv Res* 2017;17:264–274. DOI: 10.1186/s12913-017-2232-1.
16. Taani DQ. Dental attendance and anxiety among public and private school children in Jordan. *Int Dent J* 2002;52(1):25–29. DOI: 10.1111/j.1875-595X.2002.tb00593.x.
17. Poutanen R, Lahti S, Hausen H. Oral health-related knowledge, attitudes, and beliefs among 11 to 12-year-old Finnish school children with different oral health behaviours. *Acta Odontol Scand* 2005;63(1):10–16. DOI: 10.1080/00016350510019676.
18. Jalevik B, Sjostrom O, Noren JG. Evaluation of three years of dental care of adolescents in the public dental service in west Sweden. *Sweden Dent J* 1999;23(4):141–148.
19. Amin TT, Al-Abad BM. Oral hygiene practices, dental knowledge, dietary habits and their relation to caries among male primary school children in Al Hassa, Saudi Arabia. *Int J Dent Hygiene* 2008;6(4):361–370. DOI: 10.1111/j.1601-5037.2008.00310.x.
20. Vishwanathaiah S. Knowledge, attitudes, and oral health practices of school children in Davangere. *Int J Clin Pediatr Dent* 2016;9(2):172–176. DOI: 10.5005/jp-journals-10005-1358.
21. Mckittrick TR, Jacobsen KH. Oral hygiene practices among middle school students in 44 low-and middle-income countries. *Int Dent J* 2014;64(3):164–170. DOI: 10.1111/idj.12094.
22. Alotaibi AS, Jad A, Al-Sadhan AS. The impact of school based oral health education program on the level of oral health knowledge among public intermediate school girls at Riyadh. *Dentistry* 2016;7:430–441.