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Oral health and oral hygiene related literacy and behaviors among Saudi school children in Al-Qassim region

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ABSTRACT

Background: Individual characteristics such as awareness, perspective, and routines significantly influence one's oral health. This survey explored the Saudi school children's knowledge, attitude and behaviors related to oral hygiene in the Al Qassim province. *Materials and Methods:* A cross sectional study using a pretested online questionnaire was conducted among school children in the Al Qassim region. The first section of the questionnaire recorded students' age and dental history, and experiences were recorded. The second part covered dental hygiene and dental visits. In the third part, students' oral hygiene knowledge was tested. *Results:* Oral hygiene knowledge was found to be good in 39% of the students, whereas it was found to be significantly higher in those students who brushed frequently or twice a day ($p<0.001$). About 56.8% of the students reported having some dental problems, and 20.7% mentioned they had never been to the dentist in their lives. Students over the age of 12 years had a significantly higher frequency of dental visits last year ($p=0.010$). *Conclusion:* Schools in Saudi Arabia need to begin implementing a comprehensive oral health education program that targets not only the students but also their parents.

Keywords: Preventive dentistry, dental caries, oral health education, tooth brushing.

1. INTRODUCTION

The World Health Organization recommends oral health promotional programs in schools to improve knowledge, attitudes, and behaviors attributed to oral health and to prevent and control dental diseases among school children (WHO, 2003). Oral diseases such as caries, gingivitis periodontitis can be exacerbated by poor oral hygiene and excessive sugar consumption, which are two of the most common risk factors (Hunter, 1988; Nyvad & Takahashi, 2020). It is critical for school age children to take charge

of their own oral health behaviors at an early stage because these have a significant impact on their oral health as adults. Early intervention works best with children since their health habits and life styles are more adaptable because they are established at a younger age (Mistry et al., 2012). There's evidence to suggest that having a better understanding of oral health might lead to better oral hygiene practices and a more optimistic outlook on oral health (Al Darwish, 2016; Reddy et al., 2014; Tadin et al., 2022). Brushing the teeth twice a day and flossing your teeth once a day are two essential self care practices that can help avoid dental caries and periodontal diseases. Evidences show that brushing practices and pattern vary between two genders, with females brushing their teeth more frequently than males (Abraham et al., 2016; Beyene et al., 2018; Fantaye et al., 2022).

Several research projects in Saudi Arabia have evaluated school aged children's oral health literacy, awareness and practices. A study done among 6-12 year old school children in Riyadh province reported that 55.9% of the children didn't have knowledge regarding periodontal health, and only 2.2% knew about dental floss (Kannan et al., 2020). In Abha, Alshloul (2021) reported that more than 50% of the school children whoparticipated had positive attitudes towards oral hygiene practices, and students who had increased knowledge regarding oral health had better oral hygiene attitudes and practices. Another study in Jeddah reported that females had significantly improved oral hygiene practices and the frequency of dental visits was comparatively more than male students (Farsi et al., 2020). A study done in the Medina region reported that students who had parents with higher educational qualifications had significantly improved oral hygiene practices (Hashem et al., 2021).

The dental health services in the Kingdom have undergone a huge transformation in the last two decades. Dental services provided by the Saudi Arabian Ministry of Health (MOH) are provided at no cost to the patient (Alumran et al., 2019). On the other hand, there is no system in place for routine dental checkups, and dentists are not obliged to keep a record of their patients for monitoring purposes (Baghdadi et al., 2011). Recent studies show that the oral disease load has increased significantly in Saudi Arabia (Al Ghamdi et al., 2020; Alshammari et al., 2021). Some developing countries have implemented school based oral health education and preventive programs in an effort to combat the rising number of oral diseases among children (Bramantoro et al., 2021; Nguyen et al., 2021). Despite the notion that early childhood behavior influences adult health, little is known regarding oral health knowledge, attitudes, and behaviors among school children in Buraydah Saudi Arabia. Therefore, this study intends to gather information on school children's oral hygiene awareness, knowledge, attitudes and practices. The results of this research will serve as the basis for future oral health programs in schools across Saudi Arabia.

2. MATERIALS AND METHODS

Children attending one of the elementary schools in the Al-Qassim region were the participants of this cross sectional study. The data about oral hygiene knowledge, attitudes and behaviors were collected through the use of a questionnaire that had been pretested. The study was conducted after receiving approval from the Research and Ethics Committee of the principal author's institution. We also had taken consent from the school administration and parents of the children. Students aged nine years and above were included. Parents who didn't give consent for their children to participate in the survey were not included. The study was conducted during the month of April 2022. We included a sample of 468 students after confirming the eligibility criteria. The questionnaire was pretested on a sample of 10 students before distributing it to the whole sample of students. The questionnaire had three parts. The first part recorded students' age and dental disease history. The second part had details on oral hygiene practices and details on dental visits. And the third part had items that measured students' knowledge related to oral hygiene practices. The knowledge level was measured by identifying the correct response for each item and then totaling the percentage scores, where ascore >75% as categorized as ‘good’, 60-75% as fair and <60 as ‘poor’ knowledge.

Statistical Analysis and Data Management

The information was recorded in a Microsoft Excel spreadsheet and then imported in to IBM's Statistical Package for the Social Sciences (Version 23; SPSS Inc, Chicago, Illinois, USA) for further analysis. Categorical data were presented using appropriate tables and figures to provide descriptive statistics such as frequencies and percentages. Associations between categorical variables were analyzed by the Pearson chi square test. The threshold for statistical significance was set at a p-value<0.05.

3. RESULTS

Our analysis included responses from 468 school children from a single primary school in Buraydah. Their age distribution showed that 259 (55.3%) were 12 years and above. About 69% of the students claimed they cleaned their teeth using a tooth brush and tooth paste, but only 29.3% said they did so twice daily. It was found that 56.8% of the students experienced some dental problems, and

20.7% reported that they didn't visit a dentist at least once. It was indicated by more than half of the students (50.1%), that they did not wish to go to the dentist. About 25% reported that they visited the dentist frequently during the last year (Table 1).

Table 1 Oral hygiene practices and history dental visits

		N	%
Age (years)	9-11	209	44.7
	12-15	259	55.3
Method of cleaning teeth	Nothing	15	3.2
	Toothbrush with toothpaste	323	69.0
	Toothpick	90	19.2
	Water only	40	8.5
Frequency of tooth brushing per day	Frequently	43	9.2
	Twice	137	29.3
	Once	202	43.2
	Never	86	18.4
Experienced some dental problems	No	202	43.2
	Yes	266	56.8
Visited dentist at least once in lifetime	No	97	20.7
	Yes	371	79.3
Likes to visit dentist	No	238	50.9
	Yes	230	49.1
Frequency of dental visits last year	Frequently	117	25.0
	Twice	87	18.6
	Once	111	23.7
	Never	153	32.7

We assessed the relationship of the age of the students with oral hygiene practices and attitudes (Table 2). There was no statistically significant association seen between the age of the students and he method of cleaning, frequency of tooth brushing, and experience of dental problems ($p>0.05$). However, students aged 12 years and above visited a dentist at least once (62.5%), comparatively more than those aged lesser (37.5%), ($p<0.001$) Students who aged 12 years and more were found to have more dental visits than others ($p<0.001$).

Table 2 Relationship between age and practices related to oral health

			Age		Total	p value
			<=11 years	>=12 years		
Method of cleaning teeth	Nothing	N	8	7	15	0.312
		%	53.3%	46.7%	100.0%	
	Toothbrush	N	140	183	323	
		%	43.3%	56.7%	100.0%	
	Toothpick	N	38	52	90	
		%	42.2%	57.8%	100.0%	
	Water only	N	23	17	40	
		%	57.5%	42.5%	100.0%	
Frequency of tooth brushing per day	Frequently	N	17	26	43	0.063
		%	39.5%	60.5%	100.0%	
	Once	N	78	124	202	
		%	38.6%	61.4%	100.0%	
	Twice	N	69	68	137	

		%	50.4%	49.6%	100.0%	
	Never	N	45	41	86	
		%	52.3%	47.7%	100.0%	
Experienced some dental problems	No	N	94	108	202	0.477
		%	46.5%	53.5%	100.0%	
	Yes	N	115	151	266	
		%	43.2%	56.8%	100.0%	
Visited dentist at least once in lifetime	No	N	70	27	97	<0.001
		%	72.2%	27.8%	100.0%	
	Yes	N	139	232	371	
		%	37.5%	62.5%	100.0%	
Likes to visit dentist	No	N	75	163	238	<0.001
		%	31.5%	68.5%	100.0%	
	Yes	N	134	96	230	
		%	58.3%	41.7%	100.0%	
Frequency of dental visits last year	Frequently	N	38	79	117	0.010
		%	32.5%	67.5%	100.0%	
	Once	N	50	61	111	
		%	45.0%	55.0%	100.0%	
	Twice	N	40	47	87	
		%	46.0%	54.0%	100.0%	
	Never	N	81	72	153	
		%	52.9%	47.1%	100.0%	

The relationship between the frequency of dental visits last year and the frequency of tooth brushing showed that those who bushed more than twice (frequently) daily visited the dentist more frequently than others, and at the same time, students who reported that they didn't brush at all were higher in frequency among those who never visited the dentist last year (p=0.001). No significant association observed between dental problems experienced and the frequency of dental visits (p=0.237) (Table 3).

Table 3 Relationship between frequency of dental visits with oral hygiene practices and dental problems

			Frequency of dental visits last year				Total	P value
			Frequently	Never	Once	Twice		
Frequency of tooth brushing per day	Frequently	N	18	10	7	8	43	0.001
		%	41.9%	23.3%	16.3%	18.6%	100.0%	
	Twice	N	46	34	32	25	137	
		%	33.6%	24.8%	23.4%	18.2%	100.0%	
	Once	N	37	69	57	39	202	
		%	18.3%	34.2%	28.2%	19.3%	100.0%	
	Never	N	16	40	15	15	86	
		%	18.6%	46.5%	17.4%	17.4%	100.0%	
Experienced some dental problems	No	N	42	71	53	36	202	0.237
		%	20.8%	35.1%	26.2%	17.8%	100.0%	
	Yes	N	75	82	58	51	266	
		%	28.2%	30.8%	21.8%	19.2%	100.0%	

After conducting an assessment to determine the students' levels of knowledge on oral hygiene practices, we observed that only 39% of the students have good knowledge, while 38% showed poor knowledge (Figure 1).

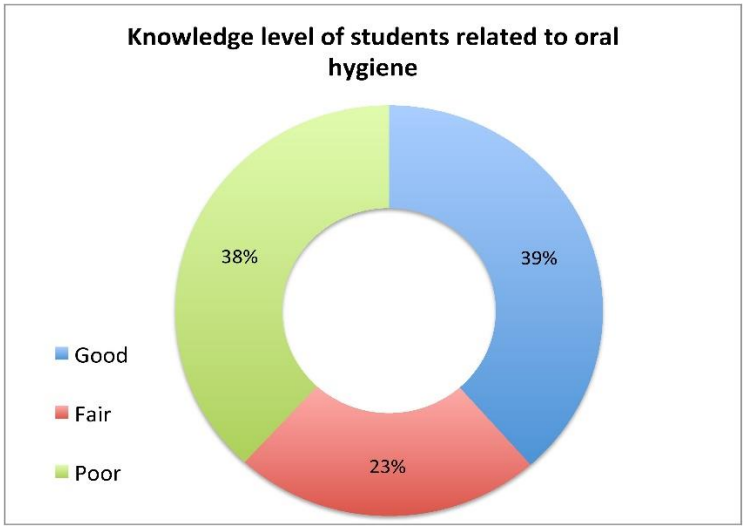

Figure 1 Knowledge level of students related to oral hygiene

When we evaluated the relationship between knowledge related to oral hygiene practices, it was found that students who brushed frequently or twice a day significantly showed more 'good' knowledge level than those who bushed less ($p<0.001$). The knowledge level was significantly more 'poor' in students who experienced some dental problems than those who didn't experience any ($p<0.001$). Also, students who had demonstrated 'good' knowledge had visited a dentist at least once in their lifetime than those who didn't ($p<0.001$) (Table 4).

Table 4 Relationship of knowledge level with oral hygiene practices, experienced dental problems and dental visits

		Knowledge level			Total	p value
		Good	Fair	Poor		
Frequency of tooth brushing per day	Frequently	23 (53.5%)	6 (14.0%)	14 (32.6%)	43 (100%)	<0.001
	Twice	67 (48.9%)	39 (28.5%)	31 (22.6%)	137 (100%)	
	Once	64 (31.7%)	47 (23.3%)	91 (45.0%)	202 (100%)	
	Never	26 (30.2%)	17 (19.8%)	43 (50%)	86 (100%)	
Experienced some dental problems	No	89 (44.1%)	57 (28.2%)	56 (27.7%)	202 (100%)	<0.001
	Yes	91 (34.2%)	52 (19.5%)	123 (46.2%)	266 (100%)	
Visited dentist at least once in lifetime	No	21 (21.6%)	19 (19.6%)	57 (58.8%)	97 (100%)	<0.001
	Yes	159 (42.9%)	90 (24.3%)	122 (32.9%)	371 (100%)	

4. DISCUSSION

The outcomes of this study indicated that students had a moderate degree of knowledge of oral hygiene practices, and a statistically significant positive relationship was identified between students' knowledge level and oral hygiene behaviors. Concerns regarding the seriousness of having regular oral examinations, both for the treatment of already existing tooth problems and as a preventative measure are highly debated topics in the field of preventive dentistry. According to a report published by the Global Burden of Disease Collaborative Network (2019), untreated oral diseases and poor oral health might have a major impact on the quality of life of both children and adults. In our study, 79.3% of the students visited a dentist at least once in a lifetime, and 25% reported that they visited a dentist frequently during the last year. Regular dental attendance practices are a good indicator of an individual's ability to get oral care services, which can help avoid numerous dental problems (Rockville et al., 2000). The preservation of good oral health and a higher standard of living can only be achieved by regular dental checkups, which also benefit one's overall well being. Moreover, regular dental visits during childhood are linked to better oral health outcomes and good quality of life in adulthood (Crocombe et al., 2012). A study done in Dammam province reported that regular dental visits were significantly

connected with higher levels of mothers; educational status, daily brushing of teeth, absence of toothache, and less consumption of sugary beverages (Alhareky et al, 2021). This is somewhat consistent with our findings, which demonstrated that students' who brushed or cleaned their teeth frequently had more dental visits compared to those who didn't have regular brushing practices. The lesser dental visits could also be attributed to the panic created by the COVID-19 pandemic, as dental clinics are high risk locations for virus transmission.

In an Italian study conducted by Calcagnile and colleagues, only 24% of the parents knew that cariogenic bacteria could transmit from mothers to children, and 57% mentioned that their children began brushing their teeth between the age of 2 and 3 years (Calcagnile et al., 2019). Another study done by Pullishery et al in India reported that the majority of the mothers had the opinion that agreed that tooth brushing supervision in children should be continued till 5 to 6 years (Pullishery et al., 2013). This evidence shows that improving parents' knowledge of oral health is essential for improving the oral health status of the children in order to have a good quality of life related to oral health. Moreover, teachers can also play a pivotal role in helping children maintain good oral health through preventive school programs (Vozza et al., 2019). The significant burden of oral diseases on young children, their families, as well as the healthcare systems is attributable to their predisposition to oral health inequalities (Northridge et al., 2020). As a result, a multi disciplinary approach is required to raise public awareness about the importance of regular dental care for children and make it more readily available. This study adds to the growing body of knowledge on the topic of dental appointments among Saudi students.

The outcomes of this research convey the message that students' knowledge, attitudes and behaviors regarding oral hygiene are still not at an acceptable level. In the same vein as what Al-Omari and his colleagues have indicated, we concur that students ought to be urged to take personal responsibility for maintaining one's own oral health (Al-Omari et al., 2006). Schools are an ideal setting for spreading information about good oral health, as students spend the majority of the day time in school. When they are younger, children are more receptive to being guided and are more familiar with the surroundings and culture of their schools. Because healthy behaviors that are taught at a young age may have a long term influence on an individual's overall health thus, it is imperative to educate young children on the significance of maintaining excellent dental hygiene. There is mounting evidence that oral education programs in schools of nations like Australia and New Zealand have significantly contributed to a decline in dental caries prevalence among their students over the past few decades (Petersen et al., 2003). Thus we have the opinion that oral health education must be added as an integral part of school curricula in Saudi Arabia to ensure that it becomes a part of their everyday life.

5. CONCLUSION

The knowledge, attitude and practices related to oral health and oral hygiene were moderate among the students of Al-Qassim Region. It is imperative that comprehensive oral health education programs be implemented in Saudi schools, which should involve parents as well in these initiatives. Preventive dental care can only be promoted if parents are made aware of the need of good oral hygiene and encouraged to participate. It can be accomplished if school administrator's permit for the education of parents and teachers. Also, schools should implement preventative measures to eliminate inequalities in oral health among students.

Author contributions

The authors Vivek Prabhu and Malik Abdulaziz Alayed were involved in the concepts, design, definition of intellectual content, and manuscript preparation. Abdulaziz, Sulaiman Alnasyan, Mohammed M Alzaben, and Omar Fahad Altowaijri were responsible for relevant data acquisition and manuscript review. Fawaz Pullishery was incharge of data analysis and final editing and review. All authors have read and approved the final version of the work. All the authors acknowledge and accept full responsibility for the work that was performed.

Ethical Approval

The research was approved by the Research and Ethics Committee of Mustaqbal Univeristy IRB No: EAC 112/2109.

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Conflict of interest

The authors declare that there is no conflict of interests

Data and materials availability

All data associated with this study are present in the paper.

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