

## Saudi School Children's Oral Health and Hygiene Literacy and Behaviors

Saleh Ahmed Moied Alwadie<sup>1</sup>, Abdulaziz Ali Al Mastur<sup>2</sup>, Fatemah Ahmed Jawad Alkhars<sup>3</sup>, Seham Ageel Alenezi<sup>4</sup>, Ebtisam Saeed Mohammed Alqhtani<sup>5</sup>, Amerah Mohammed Alaqade<sup>6</sup>, Turki Ibrahim Ayad Alanazi<sup>7</sup>, Fawwaz Mugbel Dukiman Alharbi<sup>8</sup>, Ali Radhi Ali Almutairi<sup>9</sup>

<sup>1-9</sup>Ministry of Health, Saudi Arabia

### ABSTRACT

**Background:** Awareness, attitude, and routines greatly affect oral health. This survey examined Saudi schoolchildren's oral hygiene knowledge, attitude, and behavior in Al Qassim. **Materials and Methods:** A cross-sectional study was conducted in the Al Qassim region, focusing on school children. The study utilized a pretested online questionnaire as the primary data collection tool. The initial segment of the questionnaire documented the participants' age and dental background, while also capturing their respective experiences. The subsequent section addressed the topics of dental hygiene and dental appointments. The third section of the study was the assessment of students' knowledge on oral hygiene. **Results:** The study revealed that 39% of the students possessed a satisfactory level of oral hygiene knowledge. However, it was observed that students who brushed their teeth regularly or twice a day exhibited a considerably greater level of oral hygiene knowledge ( $p < 0.001$ ). Approximately 56.8% of the student population indicated experiencing oral issues, whereas 20.7% disclosed never having sought dental care during their lifetime. There was a statistically significant difference in the frequency of dental visits seen among students aged 12 years and older last year ( $p = 0.010$ ). **Conclusion:** It is imperative for educational institutions in Saudi Arabia to initiate the integration of a comprehensive oral health education program that encompasses both students and their parents.

**KEYWORDS:** Preventive dentistry, dental caries, oral health education, toothbrushing.

### ARTICLE DETAILS

**Published On:**  
**05 December 2023**

**Available on:**  
<https://ijmscr.org>

### INTRODUCTION

According to the World Health Organization (WHO, 2003), it is recommended to implement oral health promotional programs inside schools as a means to enhance knowledge, attitudes, and behaviors related to oral health. These programs aim to prevent and manage dental problems among school children. Oral illnesses, including caries, gingivitis, and periodontitis, can be aggravated by inadequate oral hygiene practices and excessive consumption of sugar. These characteristics have been identified as prevalent risk factors in numerous studies (Hunter, 1988; Nyvad & Takahashi, 2020). The assumption that school-age children should assume responsibility for their oral health habits during their formative years is of utmost importance due to the profound influence these behaviors have on their oral health outcomes in adulthood. Early intervention is more effective in children because to their greater adaptability to health behaviors and lifestyles, which are developed at a younger age (Mistry et al., 2012). Several studies (Al Darwish, 2016; Reddy et al., 2014; Tadin et al., 2022) have provided evidence indicating that an enhanced comprehension of oral health may result in

improved oral hygiene habits and a more positive perspective on oral health. Brushing the teeth twice a day and flossing your teeth once a day are two key self care routines that can help avoid dental caries and periodontal illnesses. Research findings indicate that there are differences in tooth brushing habits and patterns between genders, with females exhibiting a higher frequency of tooth brushing compared to males (Abraham et al., 2016; Beyene et al., 2018; Fantaye et al., 2022).

Numerous research endeavors conducted in Saudi Arabia have assessed the oral health literacy, awareness, and habits among children of school age. According to a study conducted by Kannan et al. (2020), it was found that a significant proportion of school students aged 6-12 in Riyadh province lacked awareness of periodontal health, with 55.9% of the participants exhibiting this knowledge gap. Furthermore, the survey revealed that only a small percentage, namely 2.2%, of the children possessed knowledge regarding tooth floss. According to a study conducted by Alshloul (2021) in Abha, it was found that over 50% of the participating school children exhibited favorable

## Saudi School Children's Oral Health and Hygiene Literacy and Behaviors

attitudes towards oral hygiene practices. Furthermore, the research revealed a significant correlation between enhanced knowledge about oral health and improved attitudes and practices related to oral hygiene among students. According to a study conducted in Jeddah, it was shown that female students exhibited notable enhancements in their oral hygiene practices, and their frequency of dental appointments was substantially higher than that of male students (Farsi et al., 2020). According to a study conducted in the Medina region, it was shown that there was a notable enhancement in oral hygiene habits among adolescents whose parents possessed greater levels of educational attainment (Hashem et al., 2021).

The oral health services inside the Kingdom have experienced a significant development over the past two decades. The dental services offered by the Ministry of Health (MOH) in Saudi Arabia are supplied to patients without any charge (Alumran et al., 2019). In contrast, it should be noted that there is currently a lack of an established framework for regular dental examinations, and dental practitioners are not mandated to maintain patient records for the purpose of ongoing monitoring (Baghdadi et al., 2011). According to recent research conducted by Al Ghamdi et al. (2020) and Alshammari et al. (2021), there has been a notable rise in the prevalence of oral diseases in Saudi Arabia. In an attempt to address the increasing prevalence of oral disorders among children, certain developing nations have introduced school-based initiatives focused on oral health education and preventative measures (Bramantoro et al., 2021; Nguyen et al., 2021). Despite the existing assumption that there is a correlation between early childhood behavior and adult health, there is a lack of comprehensive understanding of the oral health knowledge, attitudes, and behaviors specifically among school children in Buraydah, Saudi Arabia. Hence, the primary objective of this research is to collect data pertaining to the level of oral hygiene awareness, knowledge, attitudes, and practices among school-aged children. The findings of this study will establish a fundamental framework for forthcoming oral health initiatives in educational institutions in Saudi Arabia.

### MATERIALS AND METHODS

The participants of this cross-sectional study were children enrolled in one of the primary schools located in the Al-Qassim region. The data pertaining to knowledge, attitudes, and actions regarding oral hygiene were obtained by administering a pretested questionnaire. The study was carried out subsequent to obtaining approval from the Research and Ethics Committee of the primary author's institution. Consent was obtained from both the school administration and the parents of the students. The study

sample consisted of students that were nine years of age or older. The inclusion of minors in the survey was contingent upon obtaining parental agreement. The investigation was carried out in April 2022. After ensuring the fulfillment of the eligibility conditions, a sample of 468 pupils was incorporated. Prior to delivering the questionnaire to the entire student sample, a pretest was conducted on a subset of 10 students. The questionnaire was divided into three sections. The initial segment of the study involved the collection of data pertaining to the age of the pupils as well as their dental disease history. The subsequent section included information about oral hygiene habits and elaborated on the specifics of dental visits. The final section consisted of items designed to assess students' understanding of oral hygiene procedures. The assessment of knowledge level was conducted by determining the accurate response for each item and afterwards calculating the overall percentage score. A score exceeding 75% was classified as 'excellent' knowledge, while a score ranging from 60% to 75% was considered 'fair' knowledge. Any score below 60% was defined as 'bad' knowledge.

### Statistical Analysis and Data Management

The data was documented in a Microsoft Excel spreadsheet and subsequently imported into IBM's Statistical Package for the Social Sciences (Version 23; SPSS Inc, Chicago, Illinois, USA) for subsequent analysis. The presentation of categorical data involved the utilization of suitable tables and figures in order to offer descriptive statistics, including frequencies and percentages. The analysis of associations between categorical variables was conducted using the Pearson chi-square test. The statistical significance level was established at a p-value of less than 0.05.

### RESULTS

The present study encompassed data obtained from a sample of 468 students attending a solitary primary school located in Buraydah. The analysis of their age distribution revealed that a total of 259 individuals, accounting for 55.3% of the sample, were aged 12 years and above. Approximately 69% of the surveyed students reported utilizing a toothbrush and toothpaste for oral hygiene maintenance. However, a mere 29.3% of respondents indicated that they engaged in this practice twice daily. A study revealed that a majority of the student population, specifically 56.8%, encountered various dental issues.

A total of 20.7% of respondents indicated that they did not avail dental services on at least one occasion. A majority of the students (50.1%) expressed a lack of desire to visit the dentist. Approximately 25% of the respondents said that they made regular visits to the dentist within the previous year, as depicted in Table 1

## Saudi School Children's Oral Health and Hygiene Literacy and Behaviors

		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

The study examined the correlation between students' age and their oral hygiene practices and attitudes (Table 2). No statistically significant correlation was seen between the age of the students and the method of cleaning, frequency of tooth brushing, and experience of dental disorders ( $p > 0.05$ ). However, it was observed that a higher percentage of students

aged 12 years and above (62.5%) saw a dentist at least once, in comparison to those who were younger (37.5%) ( $p < 0.001$ ). The study revealed that those aged 12 years and older exhibited a significantly higher frequency of dental visits compared to their counterparts ( $p < 0.001$ ).

**Table 2 Relationship between age and practices related to oral health**

		Age		Total	p value	
		$\leq 11$ years	$\geq 12$ 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	
		%	39.5%	60.5%	100.0%	

## Saudi School Children's Oral Health and Hygiene Literacy and Behaviors

		%	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 study examined the association between the frequency of dental visits in the previous year and the frequency of tooth brushing. The findings revealed that individuals who brushed their teeth more than twice daily had a higher likelihood of visiting the dentist more frequently. Conversely, it was observed that students who reported not brushing their teeth

at all were more prevalent among those who did not visit the dentist in the previous year. This association was found to be statistically significant ( $p=0.001$ ). There was no statistically significant correlation found between the occurrence of dental issues and the frequency of dental appointments ( $p=0.237$ ) (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	0.001
		%	41.9%	23.3%	16.3%	18.6%	
	Twice	N	46	34	32	25	
		%	33.6%	24.8%	23.4%	18.2%	
	Once	N	37	69	57	39	
		%	18.3%	34.2%	28.2%	19.3%	
	Never	N	16	40	15	15	
		%	18.6%	46.5%	17.4%	17.4%	
Experienced some dental problems	No	N	42	71	53	36	0.237
		%	20.8%	35.1%	26.2%	17.8%	
	Yes	N	75	82	58	51	
		%	28.2%	30.8%	21.8%	19.2%	

Upon completion of an examination aimed at ascertaining the students' proficiency in oral hygiene practices, it was noted that a mere 39% of the students shown a commendable level

of knowledge, whilst 38% exhibited a deficient level of knowledge (Figure 1).

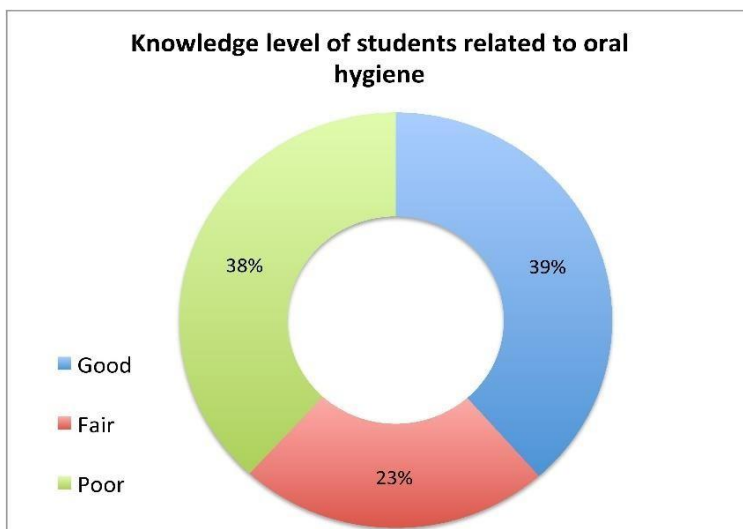


Figure 1 Knowledge level of students related to oral hygiene

In the assessment of the association between information pertaining to oral hygiene practices, it was observed that students who engaged in frequent or twice-daily brushing had a substantially higher level of 'excellent' knowledge compared to those who brushed less frequently ( $p < 0.001$ ). Students who encountered dental problems had a notably

lower level of knowledge compared to those who did not encounter any dental problems ( $p < 0.001$ ). Furthermore, it was observed that students who exhibited a higher level of knowledge were more likely to have sought dental care at least once in their lives compared to those who did not ( $p < 0.001$ ) (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%)	

DISCUSSION

The findings of this study revealed that students possessed a reasonable level of understanding regarding oral hygiene practices. Furthermore, a statistically significant correlation was seen between the knowledge level of students and their engagement in oral hygiene activities. The issue of the need of regular oral examinations, both in terms of addressing current dental issues and as a preventive strategy, is a subject of extensive debate within the area of preventive dentistry. The impact of untreated oral diseases and poor oral health on the quality of life of individuals, including both children and adults, has been highlighted in a report issued by the Global Burden of Disease Collaborative Network in 2019. In the present investigation, it was shown that a significant

proportion of the student population, specifically 79.3%, had sought dental care on at least one occasion throughout their lives. Additionally, a noteworthy 25% of participants reported regular visits to the dentist within the past year. The frequency with which individuals attend dental appointments serves as a reliable measure of their access to oral care services, hence contributing to the prevention of various dental issues (Rockville et al., 2000). Regular dental checkups are essential for maintaining optimal oral health and improving overall quality of life. These exams play a crucial role in preserving good oral health and contribute to an individual's overall well-being. Furthermore, it has been established that consistent dental appointments from childhood are associated with improved oral health outcomes

## Saudi School Children's Oral Health and Hygiene Literacy and Behaviors

and a higher standard of living in adulthood (Crocombe et al., 2012). According to a study conducted in the Dammam province, there was a substantial correlation between regular dental visits and many factors like the educational status of mothers, daily tooth brushing habits, absence of toothache, and reduced use of sugary beverages (Alhareky et al., 2021). This observation aligns to a certain extent with our research results, as they indicate that students who engaged in frequent tooth brushing or dental cleaning exhibited a higher frequency of dental visits in comparison to individuals who did not adhere to regular brushing habits. The decrease in dental appointments may also be due to the heightened anxiety caused by the COVID-19 pandemic, as dental clinics are considered high-risk environments for the spread of the virus.

According to a study conducted by Calcagnile et al. (2019) in Italy, a mere 24% of parents demonstrated awareness of the potential transmission of cariogenic germs from mothers to their children. Additionally, 57% of parents reported that their children commenced tooth brushing between the ages of 2 and 3 years. In a study conducted by Pullishery et al. (2013) in India, it was shown that a significant proportion of mothers expressed the belief that monitoring of tooth brushing in children should be maintained till the age of 5 to 6 years. This research demonstrates the significance of enhancing parental understanding of oral health as a crucial factor in enhancing the oral health status of children, hence contributing to a higher quality of life in relation to oral health. Furthermore, it has been suggested that instructors can assume a crucial role in supporting children's dental health by implementing preventive programs inside educational institutions (Vozza et al., 2019). The prevalence of oral disorders among young children, along with the associated impact on their families and healthcare systems, can be attributed to their susceptibility to oral health disparities (Northridge et al., 2020). Consequently, the implementation of a multidisciplinary strategy becomes imperative in order to enhance public consciousness regarding the significance of consistent dental care for children and facilitate its accessibility. This research contributes to the expanding corpus of literature concerning dental appointments among Saudi students.

The findings of this study indicate that students' knowledge, attitudes, and practices pertaining to oral hygiene remain inadequate. Consistent with the findings of Al-Omari et al. (2006), we agree that it is imperative to encourage students to assume personal accountability for the preservation of their oral health. Educational institutions provide as an optimal environment for disseminating knowledge pertaining to proper oral hygiene, given that students devote a significant portion of their diurnal hours within these scholastic establishments. During their early developmental stages, children exhibit a heightened receptivity towards guidance and possess a greater level of familiarity with the environment and cultural aspects of their educational

institutions. The education of young children regarding the importance of maintaining optimal dental hygiene is crucial due to the potential long-term impact of healthy practices instilled during early stages of development on an individual's overall health. Petersen et al. (2003) have seen a growing body of research indicating that the implementation of oral education programs in schools within countries such as Australia and New Zealand has had a substantial role in reducing the frequency of dental caries among kids over the course of recent decades. Hence, it is argued that the inclusion of oral health education within the school curricula in Saudi Arabia is imperative in order to foster its integration into the daily lives of individuals.

### CONCLUSION

The students in Al-Qassim Region exhibited a modest level of knowledge, attitude, and habits pertaining to oral health and oral hygiene. The implementation of comprehensive oral health education programs in Saudi schools, with the inclusion of parental involvement, is of utmost importance. The promotion of preventive dental care necessitates raising parental awareness on the need of maintaining good oral hygiene and actively engaging them in the process. The achievement of this goal is contingent upon the authorization of school administrators to facilitate the involvement of parents and teachers in the educational process. Furthermore, it is imperative for educational institutions to adopt proactive strategies aimed at mitigating disparities in oral health among their student population.

### REFERENCES

- I. Abraham A, Pullishery F, Raghavan R. Dental caries and calculus status in children studying in Government and Private Schools in Malappuram, Kerala, India IAIM 2016; 3(3):35-41.
- II. Al-Darwish MS. Oral health knowledge, behaviour and practices among school children in Qatar. Dent Res J (Isfahan) 2016; 13:342-353. doi: 10.4103/1735-3327.187885
- III. Al-Ghamdi A, Almarghlani A, Alyafi R, Ibraheem W, Assaggaf M, Howait M, Alsofi L, Banjar A, Al-Zahrani M, Kayal R. Prevalence of periodontitis in high school children in Saudi Arabia: A national study. Ann Saudi Med 2020; 40:7-14. doi: 10.5144/0256-4947.2020.7
- IV. Alhareky M, Nazir MA. Dental Visits and Predictors of Regular Attendance among Female School children in Dammam, Saudi Arabia. Clin Cosmet Investig Dent 2021; 13:97-104. doi: 10.2147/CCIDE.S300108
- V. Al-Omari MK, Al-Wahadni MA, Saeed KN. Oral health attitudes, knowledge and behaviour among school children in north Jordan. J Dent Edu 2006; 70:179-187.
- VI. Alshammari FR, Alamri H, Aljohani M, Sabbah W,

## Saudi School Children's Oral Health and Hygiene Literacy and Behaviors

- O'Malley L, Glennly AM. Dental caries in Saudi Arabia: A systematic review. *J Taibah Univ Med Sci* 2021; 16(5):643-656. doi: 10.1016/j.jtumed.2021.06.008
- VII. Alshloul MN. Oral Health Knowledge, Attitude, and Practice among School Children in Abha Saudi Arabia. *J Sch Nurs* 2021; 10598405211012981. doi: 10.1177/10598405211012981
- VIII. Alumran A, Almulhim L, Almolhim B, Bakodah S, Aldossary H, Alrayes SA. Are dental care providers in Saudi Arabia prepared to treat patients with special needs? *J Multi Health* 2019; 12:281. doi: 10.2147/JMDH.S201155
- IX. Baghdadi ZD. Managing dental caries in children in Saudi Arabia. *Int Dent J* 2011; 61:101-8. doi: 10.1111/j.1875-595X.2011.00021.x
- X. Beyene DH, Shashamo BB, Digesa LE, Tariku EZ. Oral Hygiene Practices and Associated Factors among Patients Visiting Private Dental Clinics at Hawassa City, Southern Ethiopia, 2018. *Int J Dent* 2021; 8868308. doi: 10.1155/2021/8868308
- XI. Bramantoro T, Santoso CMA, Hariyani N, Setyowati D, Zulfiana AA, Nor NAM, Nagy A, Pratamawari DNP, Irmalia WR. Effectiveness of the school based oral health promotion programmes from preschool to high school: A systematic review. *PLoS One* 2021; 16:e0256007. doi: 10.1371/journal.pone.0256007
- XII. Calcagnile F, Pietrunti D, Pranno N, Di Giorgio G, Ottolenghi L, Voza I. Oral health knowledge in preschool children: A survey among parents in central Italy. *J Clin Exp Dent* 2019; 11(4):e327-e333. doi: 10.4317/jced.55378
- XIII. Crocombe LA, Broadbent JM, Thomson WM, Brennan DS, Poulton R. Impact of dental visiting trajectory patterns on clinical oral health and oral health related quality of life. *J Public Health Dent* 2012; 72(1):36-44. doi: 10.1111/j.1752-7325.2011.00281.x
- XIV. Fantaye W, Nur A, Kifle G, Engida F. Oral health knowledge and oral hygiene practice among visually impaired subjects in Addis Ababa, Ethiopia. *BMC Oral Health* 2022; 22(1):167. doi: 10.1186/s12903-022-02199-x
- XV. Farsi NJ, Merdad Y, Mirdad M, Batweel O, Badri R, Alrefai H, Alshahrani S, Tayeb R, Farsi J. Oral Health Knowledge, Attitudes, and Behaviors Among University Students in Jeddah, Saudi Arabia. *Clin Cosmet Investig Dent* 2020; 12:515-523. doi: 10.2147/CCIDE.S272986
- XVI. Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019). Seattle: Institute of Health Metrics and Evaluation (IHME) 2020; Available from <http://ghdx.healthdata.org/gbd-results-tool>
- XVII. Hashem D, Abu Hammad OA, Farran J, Faran A, Odeh ND. Oral health practice of primary school children in the region of Madinah, Saudi Arabia: A cross sectional study. *J Int Oral Health* 2021; 13:449-55. doi: 10.4103/jioh.jioh\_73\_21
- XVIII. Hunter PB. Risk factors in dental caries. *Int Dent J* 1988; 38:211-7. PMID: 3063664.
- XIX. Kannan SP, Alfahaid SF, Alharbi AS, Almutairi BS, Alanazi AH, Alsaab FA, Alatallah SS, Aldhuwayhi SD. Oral Hygiene Behavior of School Children in Saudi Arabia: A Descriptive Cross sectional Survey. *Int J Clin Pediatr Dent* 2020; 13:66-71. doi: 10.5005/jp-journals-10005-1710
- XX. Mistry KB, Minkovitz CS, Riley AW, Johnson SB, Grason HA, Dubay LC, Guyer B. A new frame work for childhood health promotion: The role of policies and programs in building capacity and foundations of early childhood health. *Am J Public Health* 2012; 102(9):1688-96. doi: 10.2105/AJPH.2012.300687
- XXI. Nguyen VTN, Zaitsu T, Oshiro A, Tran TT, Nguyen YHT, Kawaguchi Y, Aida J. Impact of School Based Oral Health Education on Vietnamese Adolescents: A 6-Month Study. *Int J Environ Res Public Health* 2021; 18(5):2715. doi: 10.3390/ijerph18052715
- XXII. Northridge ME, Kumar A, Kaur R. Disparities in Access to Oral Health Care. *Annu Rev Public Health* 2020; 41:513-535. doi: 10.1146/annurev-publhealth-040119-094318
- XXIII. Nyvad B, Takahashi N. Integrated hypothesis of dental caries and periodontal diseases. *J Oral Microbiol* 2020; 12:1710953. doi: 10.1080/20002297.2019.1710953
- XXIV. Petersen PE. The world oral health report continuous improvement of oral health in the 21st century the approach of the WHO Global Oral Health Programme. *Community Dent Oral Epidemiol* 2003; 31:3-24. doi: 10.1046/j..2003.com122.x
- XXV. Pullishery F, Abuzenada BM, Alrushnudi NM, Alsafri MM, Alkhaibari WM, Alharbi MF, Aladani JA, Mohammed Z. Comparison of Efficacy of Different Supervision Methods of Tooth brushing on Dental Plaque Scores in 7-9 year old Children. *Int J Clin Pediatr Dent* 2021; 14:263-268. doi: 10.5005/jp-journals-10005-1927
- XXVI. Pullishery F, Shenoy Panchmal G, Shenoy R. Parental Attitudes and Tooth Brushing Habits in Preschool Children in Mangalore, Karnataka: A Cross sectional Study. *Int J Clin Pediatr Dent* 2013; 6:156-160. doi: 10.5005/jp-journals-10005-1210
- XXVII. Rockville M. Oral Health in America: A Report of the Surgeon General. US Department of Health and Human Services of Dental and Craniofacial of Health. National Institute of Health 2000.
- XXVIII. Tadin A, Poljak Guberina R, Domazet J, Gavic L.

## Saudi School Children's Oral Health and Hygiene Literacy and Behaviors

Oral Hygiene Practices and Oral Health Knowledge among Students in Split, Croatia. *Healthcare (Basel)* 2022; 10:406. doi: 10.3390/healthcare10020406

- XXIX. Vozza I, Capasso F, Calcagnile F, Anelli A, Corridore D, Ferrara C, Ottolenghi L. School age dental screening: Oral health and eating habits. *Clin Ter* 2019; 170:e36-e40. doi: 10.7417/CT.2019.210530. World Health Organisation WHO Information Series on School Health Oral Health Promotion: An Essential Element of a Health Promoting School. Geneva 2003; Available from: [https://apps.who.int/iris/bitstream/handle/10665/70207/WHO\\_NMH\\_NPH\\_ORH\\_School\\_03.3\\_eng.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/70207/WHO_NMH_NPH_ORH_School_03.3_eng.pdf?sequence=1&isAllowed=y)