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Research Article

Knowledge About Dental Erosion

Knowledge and Attitudes Toward Erosive Tooth Wear Among Dental Professionals in Saudi Arabia

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Abstract: Tooth erosion is the loss of tooth structure caused by chemical dissolution without the involvement of oral bacteria. This study aimed to assess the knowledge and attitudes about erosive tooth wear among dental professionals in Saudi Arabia. This cross-sectional study involved 201 dental students and dentists in Saudi Arabia. Data were collected by a questionnaire adapted from a previous study designed to assess knowledge of and attitudes about dental erosion. SPSS software was used to analyze the data, along with t-test and ANOVA. The total knowledge score had a mean of 11.47 (standard deviation [SD]=2.14). Most participants (96.52%) know that erosive tooth wear may lead to pain and sensitivity. However, only 36.82% know that drinking a whole bottle of soda in several sittings rather than just one sitting decreases the risk of erosive tooth wear. The total knowledge score was not significantly different about gender (p=0.102), marital status (p=0.255), qualification (p=0.513), region (p=0.249), or nationality (p=0.495). The total attitude score was moderate and ranged from a mean of 3.21 with an SD of 1.43 for "I think prevention is better than a cure" to a mean of 4.12 with an SD of 1.48 for "I am concerned with whether or not drinks I consume are acidic." Knowledge about dental erosion among dental professionals in Saudi Arabia is better than moderate, while attitudes about dental erosion were moderate. It is recommended for dental professionals to have more instruction on dental erosion topics to improve their knowledge. Future studies are needed using a random sample to achieve more generalizable results.

Keywords: Knowledge, Attitude, Erosion. Toothwear, Saudi Arabia.

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1. INTRODUCTION

A growing concern among researchers and clinicians is erosive tooth wear, described as the permanent loss of hard tissues caused by a chemical process without the participation of microbes.[1,2] It is a multifactorial condition that can be caused by intrinsic factors, such as stomach acid reflux or frequent vomiting, as well as extrinsic factors, such as acidic meals and drinks such as (soft drinks, sports drinks, energy drinks, juices, iced tea, and sparkling water), or acid fumes at work.[3-6] The main three factors that lead to establishing an erosive tooth lesion are time, duration, and frequency of consuming beverages.[7] Carbonated drink consumption has increased significantly in the last few decades and is dramatically associated with particular types of tooth wear.[8] The prevalence of erosive tooth wear is progressively rising, particularly in young individuals.[9,10] For children and adolescents aged 8 to 19, the estimated global prevalence of erosive tooth wear is 30.4%.[11] In China, a survey found that 27.3% of children aged 12 to 13 had evidence of erosive tooth wear.[12] In Hong Kong, three-quarters of 12-year-olds and nearly half of all university students exhibited symptoms of erosive tooth wear.[13] In a Saudi Arabian study, dental erosion was fully evident in 34% of children aged 5–6 and 26% of children aged 12–14.[14] In the United Arab Emirates, dental erosion was noticeable in 58.8% of preschoolers aged 5, with 55.09% displaying enamel degradation and 3.72% displaying uncovered dentin.[1]Early erosion has no visible clinical signs or discoloration.[1] However, in more advanced phases, erosion frequently results in the loss of dental hard tissues and widespread dentin exposure, causing tooth hypersensitivity, loss of occlusal vertical height, and pulp degeneration.[1] The clinical diagnosis of dental erosion is known to be difficult for dental practitioners. [15-17] This may be because this condition is not well-known among the public [18] and most patients will not seek dental treatment until the condition reaches the advanced stage.[19] Teeth erosion is not only a dental disorder but also requires inter-professional attention from other health practitioners.[20,24] According to Chu et al., adults in Hong Kong between the ages of 25 and 45 have poor awareness and understanding of erosive tooth wear.[18] Although there is a gradient of awareness of erosive tooth wear, with dental experts having the highest level of understanding, followed by healthcare professionals, then laypersons,[25] the degree of dental practitioners' expertise falls short of expectations. Findings from Yemen, Brazil, and the United Kingdom indicate that dental practitioners lacked an adequate understanding of erosive tooth wear,[26–28] highlighting the urgent need to enhance erosive tooth wear education globally. To the best of our knowledge, little is known about the awareness of dental erosion among dental students and dentists in Saudi Arabia. Thus, this study aimed to assess the level of knowledge and attitudes about dental erosion among dental students and dentists in Saudi Arabia.

2. MATERIALS AND METHODS

2.1 *Study Design and Sample*

From May 2023 to June 2023, a cross-sectional survey of dentists and dentistry students was carried out in Saudi Arabia. The study was questionnaire-based and composed of 31 questions. The first six questions collected demographic data. Next, there were 15 knowledge questions with possible answers of yes or no. Each question had one correct choice, which received 1 point, and wrong answers received 0 points. The final section had 10 questions assessing attitudes about dental erosion. The knowledge and attitude questions were adapted from a previous study.[29]

2.2 Data collection and questionnaire

In recruiting study participants, a convenience sampling strategy was used to distribute an online survey to users of various social media sites, including Twitter, WhatsApp, TikTok, Instagram, and Snapchat. Participants had to be dentists or dentistry students in Saudi Arabia and accept and sign the informed consent statement for the study. Individuals under 18 and those without signing the study consent form were not allowed to participate. Each questionnaire was granted an identifying number to safeguard respondent privacy and confidentiality of individual respondent data.

2.3 Ethical consideration and statistical analysis

SPSS software was used to analyze the study data. During data analysis, the research team calculated the count, percentage, mean (m), and standard deviation (SD) using descriptive statistics. The data were analyzed with a t-test and ANOVA to determine relationships between the variables. Ethical Consideration: The study obtained ethical approval from Taibah University with the Approval Number TUCDREC/280323/IAbdo.

3. RESULTS

This study had 201 participants with a mean age of 30.01 years and an SD of 5.88. Of the total participants, 36.82% were male (74 participants), and 63.18% were female (127 participants). Regarding marital status, 37.31% were married (75 participants), while 62.69% were non-married (126). When considering qualifications, 18.91% were students/interns (38 participants), 64.18% were graduates (129 participants), and 16.92% were specialists/consultants (34 participants). The regional distribution showed that the majority were from the Western region (63.68%, 128 participants), followed by the Central region (11.94%, 24 participants), Southern region (3.48%, 7 participants), Eastern region (13.93%, 28 participants), and Northern region (6.97%, 14 participants). Additionally, 88.06% of participants were Saudi (177 participants), while 11.94% were non-Saudi (24 participants). Participant demographic data are shown in Table 1.

Table 1: Participant demographic data			
Variable		**n**	**%**
Gender	Male	74	36.82%
	Female	127	63.18%
Age	Mean	30.01	-
	SD	5.88.	-
Marital status	Married	75	37.31%
	Non-married	126	62.69%
Qualification	Student/Intern	38	18.91%
	Graduate	129	64.18%
	Specialist/Consultant	34	16.92%
Region	Western	128	63.68%
	Central	24	11.94%
	Southern	7	3.48%
	Eastern	28	13.93%
	Northern	14	6.97%
Nationality	Saudi	177	88.06%
	Non-Saudi	24	11.94%

The responses to the 15 knowledge questions about dental erosion varied, as shown in Table 2 and Figure 1. When the total score for knowledge was calculated, the mean was 11.47 (SD=2.14). According to the t-test and ANOVA, the total knowledge score was not significantly different about gender (p=0.102), marital status (p=0.255), qualification (p=0.513), region (p=0.249), or nationality (p=0.495).

Table 2: Participant answers to knowledge questions about dental erosion			
Statement	**Yes**	**No**	**I do not know**
Erosive tooth wear is a form of cavities and tooth decay.	56 (27.86%)	142 (70.65%)*	3 (1.49%)
Bacteria cause erosive tooth wear.	21 (10.45%)	169 (84.08%)*	11 (5.47%)
Erosive tooth wear is an irreversible disease.	160 (79.60%)*	34 (16.92%)	7 (3.48%)
One leading cause of tooth wear is acid in our food and drinks.	184 (91.54%)*	15 (7.46%)	2 (1.00%)
Saliva is one of the most important defense mechanisms against erosion.	162 (80.60%)*	18 (8.96%)	21 (10.45%)
Erosive tooth wear can occur if you often work in acidic environments.	135 (67.16%)*	33 (16.42%)	33 (16.42%)
Erosive tooth wear can occur if you vomit frequently.	190 (94.53%)*	6 (2.99%)	5 (2.49%)
Brushing your teeth immediately after consuming acidic foods or drinks may worsen erosive tooth wear.	146 (72.64%)*	39 (19.40%)	16 (7.96%)
Drinking an acidic beverage before bed is a risk factor for developing erosive toothwear.	183 (91.04%)*	6 (2.99%)	12 (5.97%)
Drinking sports drinks immediately after strenuous exercise increases a person's risk for erosive tooth wear.	79 (39.30%)*	28 (13.93%)	94 (46.77%)
Erosive tooth wear may lead to pain and sensitivity.	194 (96.52%)*	5 (2.49%)	2 (1.00%)
Erosive tooth wear can lead to progressive tooth surface loss.	193 (96.02%)*	6 (2.99%)	2 (1.00%)
Drinking a whole bottle of soda in several sittings rather than just one sitting decreases the risk of erosive tooth wear.	74 (36.82%)*	95 (47.26%)	32 (15.92%)
Using a fluoride toothpaste will prevent erosive tooth wear.	129 (64.18%)*	41 (20.40%)	31 (15.42%)
Using a straw when you drink soda may help avoid erosive toothwear.	167 (83.08%)*	9 (4.48%)	25 12.44%)

P<0.5

Participants answered the attitude questions about dental erosion differently as well, and those responses are shown in Table 3. The statements were answered on a Likert scale ranging from 1, strongly disagree, to 5, strongly agree.

Table 3. Participant attitudes about dental erosion	
Statement	**Mean ±SD**
I think oral health is just as important as general health.	4.1± 1.5
I think prevention is better than a cure.	4.12± 1.48
It is essential to visit a dentist at least every half year for a regular dental checkup.	4.05± 1.49
I would think it would be bad if I learned that acid had damaged my teeth.	3.36± 1.61
It is worth spending more time and energy learning about erosive toothwear.	3.4± 1.54
I am concerned with whether or not the drinks I consume are acidic.	3.21± 1.43

	I am concerned with whether or not a toothpaste contains fluoride.	3.34± 1.58
	To prevent erosive tooth wear, I would change my dietary habits (such as controlling my consumption of soft drinks).	3.79± 1.46
	To prevent erosive tooth wear, I would change my habits (such as changing to drink from a straw).	3.63± 1.49
	I would see a doctor immediately if I learned that acid had damaged my teeth.	3.84± 1.52

SD = Standard deviation.

4. DISCUSSION

This study aimed to assess the knowledge and attitudes about erosive tooth wear among dental professionals in Saudi Arabia. The study population was relatively young and within a narrow age range. The majority were female (63.18%), highlighting the significance of gender representation in the study. Marital status showed a relatively even distribution, with 62.69% being non-married and 37.31% being married. It suggests the study captured participants from both marital status categories, ensuring a diverse sample. The qualifications of the participants revealed that the majority were graduates (64.18%). Geographically, the Western region was the most represented (63.68%), followed by the Eastern (13.93%), Central (11.94%), Northern (6.97%), and Southern (3.48%) regions. The nationality distribution showed that the majority were Saudi (88.06%), with a smaller proportion being non-Saudi (11.94%). Dental erosion is commonly seen in children and adolescents; recently, researchers have shown little interest. Systematic reviews have classified dental erosion diagnosis, prevention, and treatment as knowledge gaps.[30] This study aimed to assess the knowledge and attitudes about erosive tooth wear among dental professionals in Saudi Arabia. The results indicate that dental professionals have above-average knowledge scores considered moderate to high. This knowledge was not significantly differentiated when compared with the demographic variables. Most participants know that erosive tooth wear may lead to pain and sensitivity; however, only one-third know that drinking a whole bottle of soda in several sittings rather than just one sitting decreases the risk of tooth wear. The participants had moderate attitudes about dental erosion, and the lowest was in response to the statement, "I am concerned with whether or not drinks I consume are acidic." Our results differ from previous studies conducted in Yemen, Brazil, and the United Kingdom, which indicated that dental practitioners lacked an adequate understanding of erosive tooth wear.[26,28] However, our study showed similarity to a previous study that found 74.5% of medical undergraduates know the relationship between acidic dietary intake and dental erosion in Pakistan.[31] Also, a study made in Turkey showed that 87% of dental students have good knowledge about nutritional aspects and dental erosion.[32] Our results were also similar to a study conducted in China.[29] One potential reason for this is the differences in the two countries' educational systems. Also, the similarity to the Chinese study may be due to our study using the same questionnaire, in which case, the comparison might be more meaningful. Also, Chinese students were reported in many studies to have a high prevalence of dental erosion.[12,13,35] This can explain the high level of knowledge because it is a local problem in China. The last known item was "Drinking sports drinks immediately after strenuous exercise increases a person's risk for erosive tooth wear." It was found in a previous systematic review,[34], that indicated an association between excessive exercise, sports drinks, and dental erosion. The sports drinks were discovered to have low pH levels, which increases the likelihood of an acidic environment in the mouth. These beverages exhibit a diminished pH value; citric acid, an organic acid that triggers a decline in salivary pH, is an ingredient.[35] We also noted that our study and the Chinese study,[29] both found the lowest level of knowledge was regarding the items" Drinking sports drinks immediately after strenuous exercise increases the risk of erosive tooth wear" and "Drinking a whole bottle of soda in several sittings rather than just one sitting decreases the risk of erosive tooth wear." This result indicates that those items might not be commonly known among dentists and dental students in general. In a study of medical undergraduates, Hakeem et al.[31] showed that around half of the participants did not brush their teeth after consuming an acidic drink. In contrast, in our study, most participants (72.64%) thought brushing immediately after consuming acidic food or drinks may worsen erosive tooth wear. Also, in our study, 64.18% said fluoride toothpaste will prevent erosive tooth wear. It is a higher proportion than other studies, such as a study in Yemen, where only 37.5% of dentists and 37.0% of dental students said brushing with fluoride toothpaste can prevent erosive wear.[27] In another study conducted in Brazil, only 47.9% advised using a fluoridated toothpaste.[28] Regarding attitudes, the participants had a moderate level of attitude toward dental erosion in general. Previous studies in Norway were concerned about acid damage to teeth,[36] suggesting a less positive attitude than in our study and previous studies conducted in China.[29] Nevertheless, there is some variation in attitudes, which may be due to the different references for each university. For this reason, it is recommended that more attention be given by educators and continuing education departments to dental erosion topics to boost dental student's and dentist's knowledge of the topic in Saudi Arabia. This study is the first to measure knowledge and attitudes about dental erosion among dental professionals in Saudi Arabia. It is one of only a few that investigated dentists as the population with this topic. In this study, we used a self-reported online questionnaire, which increases the chance of self-reported biases. In addition, this study had a small sample size and used a convenience sampling method, which may reduce the external validity of the research. Future studies are needed on this topic using random sample size and a large population to achieve more generalizable results.

5. CONCLUSION

Dental professional knowledge about dental erosion in Saudi Arabia is considered high to moderate, while attitudes about dental erosion are moderate. Further education on dental erosion topics is recommended for dental professionals to improve their knowledge. Furthermore, future studies are needed using a random sample to have more generalizable results.

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7. AUTHORS CONTRIBUTION STATEMENT

All authors contributed to the research and preparation of the manuscript. Somaya Abdulrahman, Fatmah Basalama, Amjad Alsulami, Bashayer Majrashi, Bashaier Baeisa, and Amal Alharbi: Study design, data collection, writing–original draft preparation, writing–review and editing.: Study design, data collection, statistical analysis, writing review, and editing. Ismail Abdouh contributed to the study design, data collection, review, and editing. All authors read and approved the final version of this manuscript.

8. CONFLICT OF INTEREST

Conflicts of interest declared none.

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