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Research Article

Knowledge and Practice of Fissure Sealants among Dentists, Dental Students, and Interns in Saudi Arabia

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Abstract

Background: Dental caries is the most common oral illness. Fissure sealants (FS) are a viable alternative to traditional dental caries treatments. The aim of our study was to assess the knowledge and practice of FS among dental practitioners in Saudi Arabia.

Methods: This was a cross-sectional study using a questionnaire. Participants were invited through multiple social media apps using a convenience sampling method. A total of 281 participants, including 72.3% dental general practitioners, with a mean age of 28.16 years, contributed to this survey to provide data on knowledge and practice of FS throughout Saudi Arabia. SPSS was used for data analysis.

Results: The total knowledge score of the participants' correct answers had a mean of 8.54 (out of 11 questions), with a standard deviation of 1.35. A total of 8.5% of the participants had not previously used FS, and 38.8% of participants avoided using FS due to the possibility of sealing over caries. Although less than 45% of participants used rubber dams during the installation of FS, more than 82% of candidates stated that they used traditional partial isolation. Moreover, the majority of participants thought that utilizing FS in conjunction with fluoride treatment would produce greater benefits than using FS alone.

Conclusion: Dental practitioners in Saudi Arabia have good levels of knowledge about FS. However, the level of evidence-based clinical knowledge about the ideal use of sealant needs improving. Future efforts must be made to enforce the use of evidence-based clinical practices regarding FS.

Keywords: *Knowledge; Practice; Fissure Sealants; Dental Practitioners; Saudi Arabia*

Introduction

Dental caries is an infectious disease that can affect any age group, and it can lead to inflammation of the dental pulp and associated tissues, eventually resulting in tooth loss, cellulitis, and, rarely, brain abscesses [1]. In mandibular and maxillary molars, pits and supple-

mentary grooves are one of the sites most susceptible to caries due to their tendency to retain food debris. That encourages the presence of bacterial biofilm, which increases the risk of developing carious lesions [2].

Dental caries is a highly prevalent disease around the globe [3]. Extension and form are the main factors in the prevalence of caries [4]. In contrast to previous studies, the occurrence of dental caries has recently increased in various nations around the world [5]. Approximately 80% - 90% of permanent molars and 44% of primary molars are affected by dental caries [6]. In Saudi Arabia, dental caries remains the most widespread oral disease and one of the most untreated dental problems [7].

Tooth decay and the early loss of teeth can lead to malnutrition and other significant related health problems; it can also impact the quality of life, both physically and psychologically [5]. Almost 50% of tooth loss causes are related to dental caries and its complications [8]. Nevertheless, dental caries is one of the most common preventable infections [9]. Systematic reviews have contained more than 11 guidelines and recommendations regarding the use of sealants for patients who are prone to people [6,10,11]. In 2008, the American Dental Association (ADA) Council on Scientific Affairs published evidence-based clinical recommendations for using pit-and-fissure sealants as a preventive measure of occlusal caries [6].

Fissure sealants (FS) excel over other preventive measures for dental caries, such as the application of application [10-12]. FS is a flowable material composed of either glass ionomer cement or resin [13]. Children and individuals who have a higher risk of caries are recommended to have FS used to prevent caries progression. FS use for caries prevention is the first line of defense due to its fluoride content, and it is mainly used in newly erupted teeth, especially permanent first and second molars [13].

A study among dentists in the United States found that most dentists used sealants in their practices, and dentists had high levels of positive attitudes about [14], although their total knowledge about the appropriate ways to use FS was [14]. In Greece, a study showed that nearly two-thirds of general dentists do not use pit-and-fissure sealants in their practices due to a lack of knowledge, while the other one-third use them regularly [15]. Despite recommendations to use dental sealants for preventing occlusal decay, many dentists do not use them in India [16], Spain [14], or the United States [17]. Therefore, the lack of knowledge among dental practitioners is the main factor underlying the lack of implementation of pit-and-fissure sealants [17]. An article in Riyadh, Saudi Arabia, stated that 88% of participants knew the effectiveness of FS, and around 90% exhibited an understanding of the instructions for sealant placement [4]. Another study measured the use of FS and dental caries prevalence in first permanent molars among primary school girls in Riyadh, Saudi Arabia. The study showed that only 0.8% of them had one or more FS applied [18]. However, no study has been conducted on a national level in Saudi Arabia.

Aim of the Study

The aim of our study was to assess the knowledge about and practice of FS use among dental practitioners in Saudi Arabia.

Methods

This was a cross-sectional study that used a questionnaire to assess the knowledge and practices of FS use among dental practitioners in Saudi Arabia. The study used a convenient sampling technique to recruit participants from all around Saudi Arabia through social media platforms such as WhatsApp, Instagram, Facebook, Telegram, ResearchGate, and Twitter. The inclusion criteria were that participants were dentists, dental interns, or dental students living in Saudi Arabia and working in either private or governmental institutions. The exclusion criterion was a refusal to sign the information consent document. Data collection was conducted between July and August 2021. The questionnaire was adapted from a previous study [19] and consisted of items divided into three main sections. The first section included 9 questions regarding sociodemographic status. The second section encompassed 12 questions about whether they had previ-

ously used FS and questions regarding the effectiveness and application technique of FS, which had true or false answers. The final section included 14 questions regarding the practice and use of FS in clinics, which the participants answered by choosing yes or no. There was only one correct answer for each question, and the correct answers were summed into a total score ranging from zero as the lowest score to 26 as the highest. Answering the questionnaire took approximately 6 minutes.

The questionnaire was validated by a pilot study of 20 dentists. The data were collected, tabulated, and analyzed using SPPS version 25 (IBM Corp., Armonk, NY, USA). Descriptive analysis was conducted by mean, standard deviation (SD), frequency, and percentage. Statistical significance was a p-value of 0.05. Chi-square, t-test ANOVA, and linear regression were used for data analysis. All data were treated anonymously. This study was approved ethically by Ministry of Health, the Institutional Review Board, General Directorate of Health Affairs, Tabuk Region (H-07-TU-077).

Results

A total of 281 participants in this study completed the survey. The mean age of the participants was 28.2, with an SD of 5.72. The median of the years in practice was 1 year, with a range of 0 - 30 years. More than half of the participants were females (69.4%), general practitioners (72.6%), and from the western region (52.0%). The demographic data of the participants are provided in table 1.

Variable		n	%
Gender	Male	86	30.6
	Female	195	69.4
Qualification	Student	31	11.0
	Intern	32	11.4
	General practitioner/ resident	204	72.6
	Specialist/consultant	14	5.0
Study school	Governmental college	168	59.8
	Private college	113	40.2
Current workplace	Dental student/intern	69	24.6
	Governmental	140	49.8
	Private	72	25.6
Region	Western	146	52.0
	Central	59	21.0
	Southern	23	8.2
	Eastern	24	8.5
	Northern	29	10.3
Nationality	Saudi	253	90.0
	Non-Saudi	28	10.0

Table 1: *Study participants' demographic data (N = 281).*

Only 8.5% of participants had never used FS. Knowledge questions regarding pit and FS and the participants' answers are presented in table 2. The total knowledge score of the participants' correct answers was a mean of 8.54 (out of 11 questions), with an SD of 1.35.

Question	Correct Answer	n	%
I think that the effectiveness of dental sealant is supported by strong scientific evidence.	True	264	94
I am familiar with the technique of placing dental sealants.	True	265	94.3
I understand the instructions for placing sealants.	True	265	94.31
Sealants should only be used on newly erupted teeth.	False	201	71.5
Sealants wear out easily.	False	145	51.6
Pit-and-fissure sealant had adverse effects.	False	193	68.7
The technique of application is the most important factor in the success of the treatment.	True	265	94.3
Resin sealants are more effective than glass ionomer sealants.	False	106	37.7
It is recommended that proper acid etching should be applied to get the best adhesion.	True	238	84.7
Sealants are a preventive method, have a restorative effect, and can be used on incipient caries.	True	199	70.8
This sealing technique, when used alongside fluoride application, may more significantly reduce the rate of decay.	True	261	92.9

Table 2: *Participants' answers to FS knowledge questions.*

The relationships between total knowledge score and gender, qualification, age, years of practice, and study school are given in table 3. According to a t-test, there was no significant relationship between total knowledge score and gender (p = 0.122), but there was a significant relationship with school of study (p = 0.037) with governmental colleges having significantly higher scores (m = 8.69, SD = 1.27) than private colleges (m = 8.34, SD = 1.46). A linear regression test revealed that there were no significant relationships between total knowledge score and age (p = 0.332) or years of practice. The ANOVA showed a significant relationship between total knowledge score and educational level (p = 0.008), and a Tukey's post hoc test showed significance in the relationship of general practitioners/residents (m = 8.67, SD = 1.36) a higher level of knowledge than students (m = 7.90, SD = 1.35), but there were no significant differences with interns, general practitioners, or consultants.

Variable		Mean	SD	P-value
Gender	Male	8.36	1.34	0.122
	Female	8.63	1.36	
Qualification	Student	7.90	1.35	0.008
	Intern	8.21	1.28	
	General practitioner/ resident	8.67	1.35	
	Specialist/consultant	8.92	0.99	
Age				0.332
Study school	Governmental college	8.69	1.27	0.037
	Private college	8.34	1.46	

Table 3: *Relationships between total knowledge score and gender, qualification, age, years of practice, and study school. SD = Standard Deviation.*

The participants' clinical practice and understanding of FS placement instructions are displayed in table 4. A total of 38.8% reported avoiding the use of FS due to the possibility of sealing over caries. Only 43.1% of participants used a rubber dam when placing an FS, but most participants reported using a conventional method, such as cotton roll isolate (82.2%). Only 66.2% used a prophylaxis paste without fluoride before placing a sealant.

Question	n	%
I clean the tooth surface before placement of a fissure sealant.	271	96.40%
I remove excess sealant material to ensure good occlusal contact.	271	96.40%
One of the most important factors for adhesion is that sealant is placed in proper isolation.	269	95.70%
I follow the manufacturer's instructions for using a light cure on a tooth where I have put sealant materials.	259	92.20%
I repeat the application of a fissure sealant if a technical mishap occurred.	252	89.70%
One of the most important factors for sealant placement adhesion is proper acid etching.	244	86.80%
In case of partial or total loss of sealant, I would recommend reapplication.	242	86.10%
I use conventional methods, such as cotton rolls to isolate adjacent soft tissue, when applying a sealant.	231	82.20%
The benefits of using a sealant should be considered with regard to the patient's risk.	210	74.70%
I apply a prophylaxis paste without fluoride before placing a sealant.	186	66.20%
I apply a bonding agent after acid etching on the occlusal surface.	151	53.70%
I use a rubber dam when I am placing a fissure sealant.	121	43.10%
I avoid dental sealant due to the possibility of sealing over caries.	109	38.80%
I put an extra amount of sealant in pits and fissures to ensure maximum retention.	72	25.60%

Table 4: *Participants answering yes to clinical practice questions.*

Discussion

The aim of this study was to assess the knowledge and practice of FS among dental practitioners in Saudi Arabia. Overall, the participants showed good levels of knowledge about pit and FS and had acceptable levels of clinical practice. However, around 8.5% of participants had never used FS. This may be explained by the students' lack of clinical exposure to pediatric or preventive dentistry [14].

Moreover, the level of knowledge of participants was significantly higher among dental practitioners and interns compared to undergraduate dental students. Similar studies have shown that there is generally a level of ignorance about FS among dental students. For example, a study conducted among Indian dental students reported that 8.4% of the students lacked knowledge of FS [20]. In addition, a similar study conducted among Yemeni dentists reported that 8.4% of participants had never heard of FS [19]. Furthermore, 12% of Yemeni dentists were concerned about insufficient evidence of FS effectiveness [19]. These results demonstrate that the lack of knowledge regarding FS is widespread despite FS use being well known. Preventive measures must be implemented to improve dental care in

regions with insufficient dental training. For example, dental students must receive up-to-date dental curricula that include scientifically supported FS literature. In addition, dental practitioners must also stay up-to-date with current practice guidelines by attending educational seminars, workshops, and conferences [4,10,14,21-24]. Interestingly, we found that dental students/practitioners who studied in governmental universities had more knowledge about FS than those who studied in private collages. No previous studies have looked at the level of dental students' knowledge about FS, comparing governmental and private dental schools.

The majority of participants understood the instructions for FS application and were familiar with the FS application technique. Moreover, most participants believed that the FS application technique was the most important aspect of successful treatment. Furthermore, most participants also believed that the effectiveness of FS is scientifically supported. These findings are consistent with previous studies [14-17,25-28].

In this study, most of the participants believed that the application of FS and fluoride together is superior to FS application alone. Also, 70.82% stated that FS is a preventive measure and has restorative properties in the early stages of dental caries. Similar studies reported that using FS alongside fluoride prevented dental caries, including studies by Al-Maweri., *et al*. [19], Asawa., *et al*. [16], and Ealla., *et al* [20]. Other studies have reported that the use of fluoride before FS application has the potential to prevent caries progression due to the cariostatic effect, without compromising the sealant's properties [28-31].

There was no significant relationship between the level of knowledge about FS and years of clinical practice. Similar results were found by Al-Maweri., *et al*. [19] and Govindaiah., *et al* [14]. However, other researchers have reported that newly graduated students had better levels of knowledge than those who had experience [15,16]. This may indicate that dental practitioners do not use FS in their regular clinical practices, resulting in low levels of knowledge regarding of FS [15].

The majority of the participants in the present study recommend reapplication if there is partial or complete loss of FS, which is similar to the findings of other studies [15,19]. Conversely, an Indian study found that 91.7% of dentists do not recommend the reapplication of FS. There is also disagreement about FS being used in cases of partial or total loss of sealant. Some studies found that missing sealant still did not lead to caries development [27,11,32], while others have reported the opposite [6].

Around half of participants used a bonding agent after acid etching, and only 74.7% believed that the benefit of using sealant is linked with the patient's risk status and that evidence supports bonding agents increasing FS retention [33]. They also believed that FS should be used for patients who are at high or moderate risk of caries, but it is optional for low-risk [6,34]. This highlights the poor use of evidence-based practices, and continuing education lectures should concentrate on EBP to increase its use in dental practices.

Most of this study's participants reported using conventional methods of isolation, such as cotton rolls, rather than rubber dams, and most of them believed that isolation is one of the important factors for FS adhesion. Likewise, Yemeni and Chinese studies have reported high percentages of dentists using cotton rolls more than rubber dam [19,35].

The limitation of this study was that it was conducted online with a convenience sample, making it difficult to interact with participants while evaluating their data. There was also an unequal distribution of the sample across different regions of Saudi Arabia.

Conclusion

Dental practitioners in Saudi Arabia had good levels of knowledge about FS, but their levels of knowledge about the clinical use of evidence-based practices and the ideal use of sealant needs improving. Future efforts must be made to enforce the use of evidence-based standards, particularly with FS.

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