



Knowledge, attitude and performance of dentists about Fissure Sealant application in Ahvaz city

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General Note

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ABSTRACT

Tooth decay is one of the most common preventable infections in childhood. Currently, the most effective way to reduce occlusal caries is Pit and Fissure sealants. Since different factors, including knowledge, attitude and performance of dentists, can influence the use of fissure sealant, this study aimed to evaluate the knowledge, attitude and performance of dentists in Ahvaz about pit and fissure sealant application and techniques. In this descriptive cross sectional study, 147 dentists in Ahvaz selected by simple random sampling. Data were collected using a two-part questionnaire. The first part of the questionnaire included the demographic

characteristics of the dentist (including age, sex, years of clinical experience, participation in retraining). The second part contained a number of questions regarding the attitude, knowledge and performance of dentists about fissure sealant and its application. The mean scores for knowledge, attitude were 9.1 ± 1.8 , 33 ± 3.9 , respectively. In terms of performance, 62.6% of dentists always, 62.6% occasionally and 22.4% rarely used fissure sealant. Data were analyzed by T-test, chi-square, one-way ANOVA and Pearson correlation coefficient and descriptive statistics. Analysis was performed using SPSS software. The results showed that dentists had moderate knowledge and attitude about using fissure sealant in Ahvaz. So, training programs and emphasizing the importance of sealant use in prevention of dental caries is recommended.

Keywords: Knowledge, attitude, performance, fissure sealant.

1. INTRODUCTION

Dental caries is one of the most important oral diseases and various factors are involved in its onset and progression. The disease is preventable; except for rampant caries, it is slow to progress, so it gives us the opportunity to control it if appropriate preventive measures are taken. Untreated caries can lead to significant complications. Therefore, it would be difficult to achieve improved oral health without using early and effective preventive measures to inhibit the onset and spread of caries in children. About 90% of caries lesions occur in pits and fissures of teeth. This high prevalence of caries is the main rationale for using pit and fissure sealants to prevent caries at these levels. Sealants prevent caries when used as a preventive measure for a child or in a population at risk of developing caries (Mctigue et al., 2013). Fissure sealants are very effective in preventing caries in pits and fissures and in controlling incipient caries lesions. However, despite the scientific evidence supporting their effect, they were seldom used by dentists. In the United States, it was reported that only 10% of school children in Tennessee had sealants on their teeth, while in North Carolina only 12% had sealants. Chestnutt et al., (1994) reported that only 10.2% of school children had sealants, which is even higher than the sealants reported in 1996 in the rest of the UK. One study, showed the highest sealant rate, is between 30-50% in the UK (Govindaiah & Bhoopathi, 2014; Farsi, 1999). General dentists cite various reasons for limited sealant use, including the lack of insurance coverage, the need for ongoing maintenance and repair for effectiveness, difficulty for placement and its high cost. Regarding parental acceptance, recommendations made by general dentists or their staff, parental knowledge about fissure sealants, continued dental care, parental education, were also effective (Michalaki et al., 2010; Beauchamp et al., 2008). Also, if parents information gained from media, they are less likely to seek sealants for their children because of the contradictory and negative comments that dentists generally make (Michalaki et al., 2010; Beauchamp et al., 2008). Based on a national pathfinder survey of dental caries in Iran in the year 2004, the mean dmft/DMFT indices were 1.9/- for 3-year-olds, 5.0/0.2 for 6-year-olds, 3.6/0.9 for 9-year-olds and 0.6/1.9 for 12-year-olds. DMFT/dmft scores were similar or slightly higher than the first national oral health survey in 1998. It seems that the caries preventive programs in Iran were not effective and could not decrease the DMFT/dmft scores. So, Bayat Movahed's study showed a lack of satisfactory progress towards the standard international values and reflects the ineffectiveness of the national oral health programs in Islamic Republic of Iran. Clearly to achieve and maintain a marked decline in DMFT/dmft scores, application of well- oriented preventive national oral health programs are essential (Bayat Movahed et al., 2011). In addition, planning for further preventive programs and obtain data about preventive methods applied by dentists in Iran can be helpful. While the use of fissure sealant is an accepted method of caries prevention, there are still clinical questions about indications of fissure sealant placement, placement of fissure sealant on primary caries, and techniques to improve its efficacy (Truman et al., 2002; Ahovuo-Saloranta et al., 2017; Azarpazhooh & Main, 2008). Based on the scientific evidence and clinical experience, dentists use a variety of methods to apply fissure sealants (Beauchamp et al., 2008). This study considers dentists' knowledge, attitude and performance on sealant placement because accepting sealants as a preventive method for caries in clinic is not possible without the dentists' positive attitude towards sealant and their knowledge of the use and proper sealant placement.

2. MATERIALS AND METHODS

This descriptive cross-sectional study was performed on 147 dentists in Ahvaz who were selected by simple random sampling in the year 2017. Ethical approval was adopted from the Ethics Committee of Jundishapur University of Medical Sciences (code: IR.AJUMS.REC.1396.588). Referring to the general dentist's office in Ahvaz, they were first given information about the subject of research and, in the case of dentist's personal consent, data were collected. The questionnaire was obtained from two studies about the knowledge, value, opinion, and practice about dental sealants among the dental professionals (San Martin et al., 2013; Asawa et al., 2014). The validity and reliability of the second part of the questionnaire was determined before research. The validity of the

questionnaires were assessed and validated by 4 assistant professors of Ahvaz Jundishapur Dental School and the reliability of the instrument was measured by 20 dentists and Alpha Kornbach was 79.6%.

Data were collected using a two-part questionnaire. The first part of the questionnaire included the demographic characteristics of the dentist (including age, sex, years of clinical experience, participation in retraining). The second part contained a number of questions regarding the attitude, knowledge and performance of dentists about fissure sealant and its application. The second part of the questionnaire consisted of part A (8 questions) to examine Knowledge and part B (15 questions) that assessed the dentists' attitude. These questions scored by five-part Likert with "strongly agree", "agree", "neutral", "disagree" and "strongly disagree" options. In the part C of second section of questionnaire, we designed 11 questions to evaluate the performance of dentists regarding the use of fissure sealant. After data collection, data were analyzed by independent T-test, chi-square, one-way ANOVA and Pearson correlation coefficient and descriptive statistics. Analysis was performed using SPSS software and the level of significance was set at $P \leq 0.05$.

3. RESULTS

The results showed that dentists in our study most were female (56.5%), general practitioners, have been graduated between 2012-2017 years (66%) and did not take post-graduation training courses (Table 1). Dentists mean knowledge was 9.1 ± 1.8 and their knowledge rankings were 20.4% low (0 to 6), 58.5% moderate (7-12) and 21.1% high. The mean attitude of dentists in Ahvaz was 33 ± 3.9 . Dentists' attitude scores were 12.2% poor (24-28), 46.9% moderate (29-33), 32% good (34-38) and 8.8% excellent (38-44). In terms of performance, 62.6% of dentists in Ahvaz always, 62.6% occasionally and 22.4% rarely used fissure sealant.

The results also showed that the most commonly used fissure sealants among Ahvaz dentists were flowable composite with 26.5%, fluoride-containing resin with 17.7% and fluoride and flowable composite-containing resin with 11.6%. In addition, 42.2% of Ahvaz dentists used opaque fissure sealant, 26.5% used clear fissure sealant and 3.3% tooth-colored fissure sealant. The most commonly used isolation methods for fissure sealant was cotton roll and suction with 29.9% and rubber dam with 19.7%. The most common methods for cleaning teeth prior to fissure sealant were tooth brushing with 20.4%, pumice paste with 16.3% and catheter with 15.6%. The most commonly used methods for dental preparation before fissure sealant were turbine grinder with 33.3% and angle grinder with 23.1%, respectively.

Table 1 demographic characteristic of dentists

Sex	Man	46	34.5
	Female	38	65.5
Age	20-25 years old	30	20.4
	25-30 years old	16	14.5
	30-35 years	32	51.6
	35-40 years	91	21.9
	More than 40	41	9.5
Year of graduation	69-75	7	4.8
	76-80	8	5.4
	81-85	51	10.2
	86-90	20	31.6
	91-97	79	66
Pediatric retraining course on restoration primary molars	No	421	48.4
	Yes	32	51.6
Education degree	General dentist	931	49.6
	Dental specialist	8	5.4
Children only	Yes	6	4.1

	No	141	59.9
	2-4 patients	23	12.8
	4-6 patients	17	84.3
Moderate treatment per day	6-8 patients	72	81.4
	8-10 patients	11	7.5
	More than 10 patients	6	4.1

In addition, the most time of using etchant was 15-30 seconds with 52.4%. The most common time for washing etching substance was 0-10 seconds with 43.5% and 15-20 seconds with 38.8%. In addition, 52.4% of dentists used bonding agent, 21.8% did not and 25.9% of dentists used dentin bonding if they want to apply flowable composite as fissure sealant (Figures 1-11; Table 2).

Finally, the study aimed to compare the knowledge, attitude and performance of dentists towards using fissure sealant based on demographic variables. The results of t-test showed that the knowledge of dentists who only accept children was higher than other dentists ($P = 0.04$). In our study there was no statistically significant relationship between knowledge, attitude and performance of dentists and other demographic characteristic of them ($P > 0.05$).

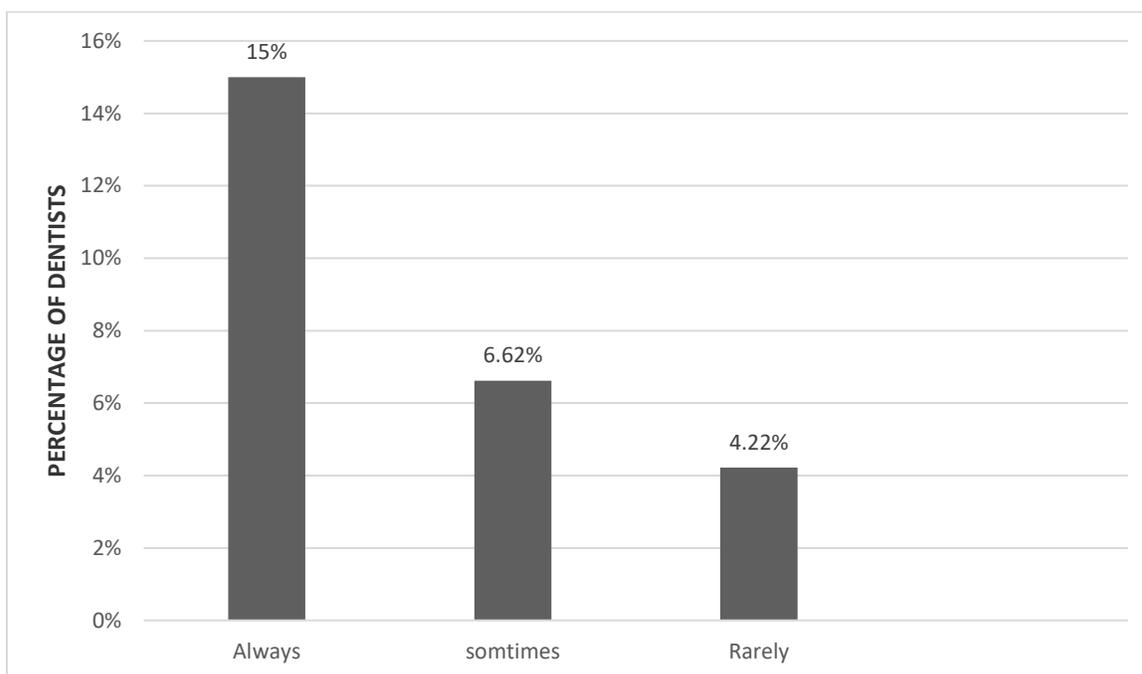


Figure 1 Using fissure sealant

Table 2 Descriptive indices of dentists' performance in Ahvaz

Variable	Number	Percentage	
Using fissure sealant	Always	22	15
	Sometimes	92	6.62
	Rarely	33	4.22
	Total	147	100
	Fluoride-containing resin	26	7.17
	Fluoride-free resin	3	2
	Glass Ionomer	8	4.5
	Resin-Modified Glass Ionomer	10	8.6

Use of fissure sealant types	Flowable composite	39	5.26
	Fluoride-containing and fluoride-free resin	2	4.1
	Resin containing fluoride and glass ionomer	7	8.4
	Resin containing fluoride and Resin-Modified Glass Ionomer	9	1.6
	Fluoride-containing resin and flowable composite	17	6.11
	Fluoride-free resin and glass ionomer	1	7.0
	Glass Ionomer and flowable composite	11	5.7
	Resin-Modified Glass Ionomer and flowable composite	4	7.2
	Resin containing fluoride, glass ionomer and flowable composite	3	2
	Fluoride-containing resin, Resin-Modified Glass Ionomer, and flowable composite	4	7.2
	Glass Ionomer, Resin-Modified Glass Ionomer and flowable Composite	3	2
	Total	147	100
Colors of fissure sealant	Opaque	62	42.4
	Clear	39	26.5
	Tooth-colored	46	31.3
Total	147	100	
Isolation method	Cotton roll	16	10.9
	Rubber dam	29	19.7
	Suction	15	10.2
	Retraction of cheek	1	0.7
	Cotton roll and rubber dam	4	2.7
	Cotton roll and suction	44	29.9
	Cotton roll and retraction of cheek	9	6.1
	Rubber dam and suction	5	3.4
	Suction and retraction of cheek	10	6.8
	Cotton roll, rubber dam and suction	4	2.7
	Cotton roll, rubber dam, suction and retraction of cheek	9	6.1
	Cotton roll, rubber dam, suction, retraction of cheeks	1	0.7
Total	147	100	
Method of cleaning teeth prior to fissure	Dental probe	23	15.6
	Pumice paste	24	16.3
	brossage	30	20.4
	Tooth brush	3	2
	Hydrogen peroxide	1	0.7
	Air abrasion	7	4.8
	Phosphoric acid	10	6.8
	Diamond bur	6	4.1
	Dental probe and pumice paste	6	4.1
	Dental probe and brossage	1	0.7

sealant	Dental probe and tooth brush	1	0.7
	Dental probe and air abrasion	1	0.7
	Dental probe and phosphoric acid	3	2
	Dental probe and diamond bur	2	1.4
	Pumice paste and brossage	1	0.7
	Pumice paste and phosphoric acid	1	0.7
	Brossage and tooth brush	3	2
	Brossage and phosphoric acid	2	1.4
	Tooth brush and diamond bur	1	0.7
	Air abrasion and phosphoric acid	1	0.7
	Air abrasion and diamond bur	2	1.4
	Dental probe, pumice paste and tooth brush	1	0.7
	Dental probe, phosphoric acid, diamond bur	5	3.4
	Brossage, phosphoric acid, diamond bur	2	1.4
	Air abrasion, phosphoric acid, diamond bur	1	0.7
	None	9	1.6
	Total	47	100
Method of dental preparation before fissure sealant	Angle grinder	34	23.1
	Turbine grinder	48	33.3
	Air abrasion	18	12.2
	Scaling	21	14.3
	None	25	17
Total	147	100	
Time of using etchant	15-30 s	77	52.4
	30-45 s	32	21.8
	60-120 s	1	0.7
	According to factory recommendation	37	25.2
Total	147	100	
Time for washing etching substance	0-10 s	64	43.5
	15-20 s	57	38.8
	30-45 s	7	4.8
	Until the etch is washed	19	12.9
Total	147	100	
Time of tooth drying after etching	0-10 s	48	32.6
	15-20 s	41	27.9
	30-45 s	2	1.4
	Until there is a frosty view	56	38.1
Total	147	100	
Using bonding	Yes	77	43.5
	No	32	38.8
	By using flowable composite	38	12.9
Total	147	100	
Method of evaluation	observation	4	2.7
	Non cutting instrument	19	12.9
	Gently by dental probe	39	26.5
	Pressure by dental probe	44	29.9

	Checking of occlusion	41	27.9
	Total	147	100

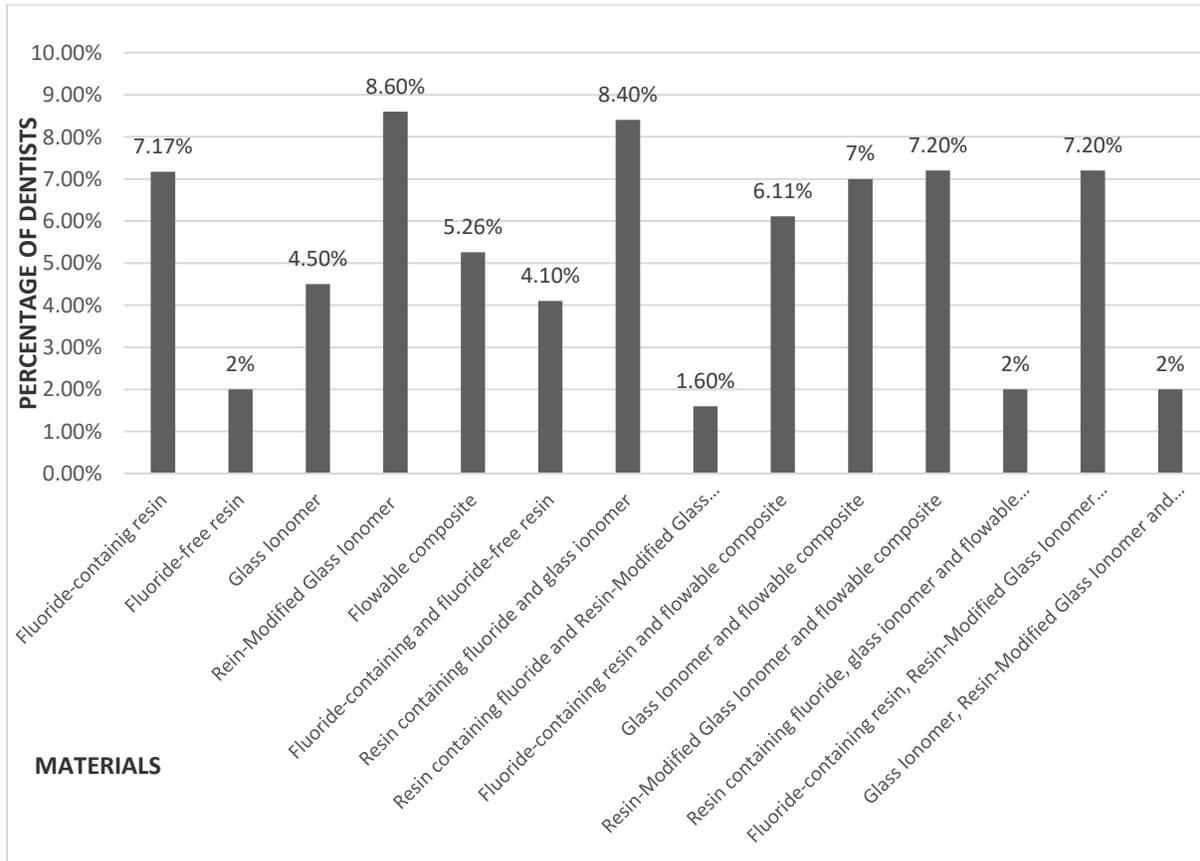


Figure 2 Uses of Fissure Sealant Types

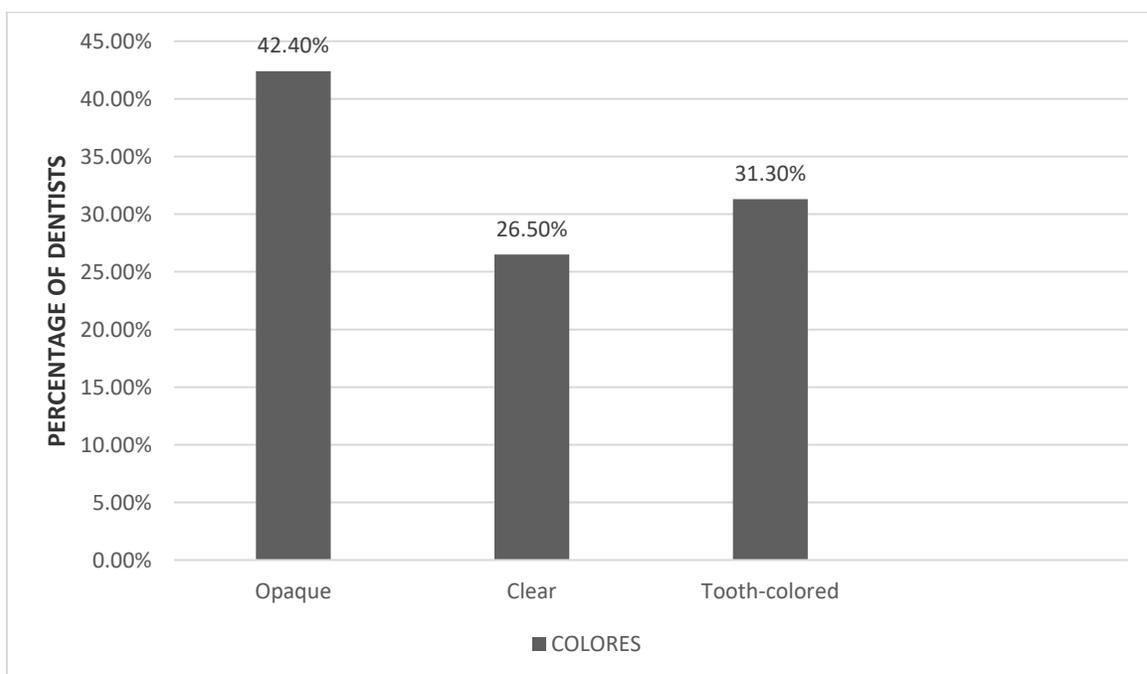


Figure 3 Colors of Fissure Sealants

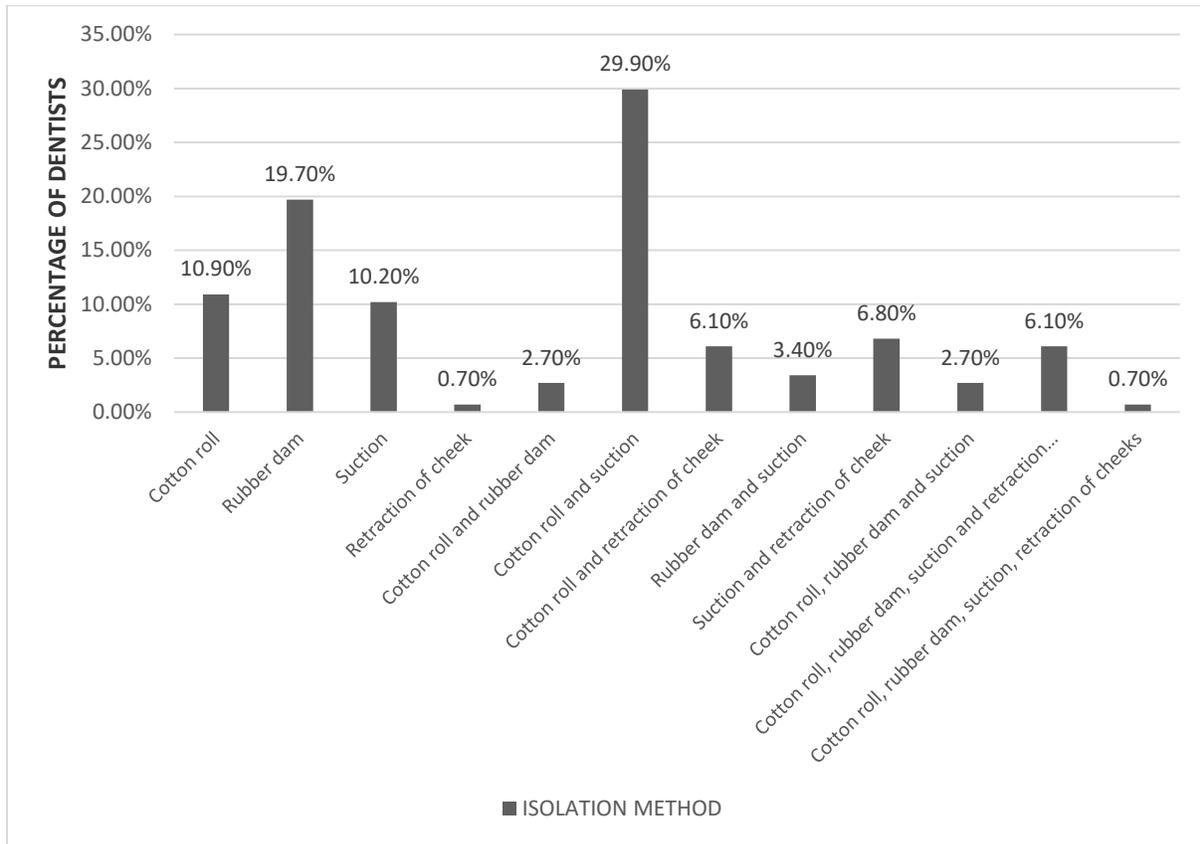


Figure 4 Isolation Method

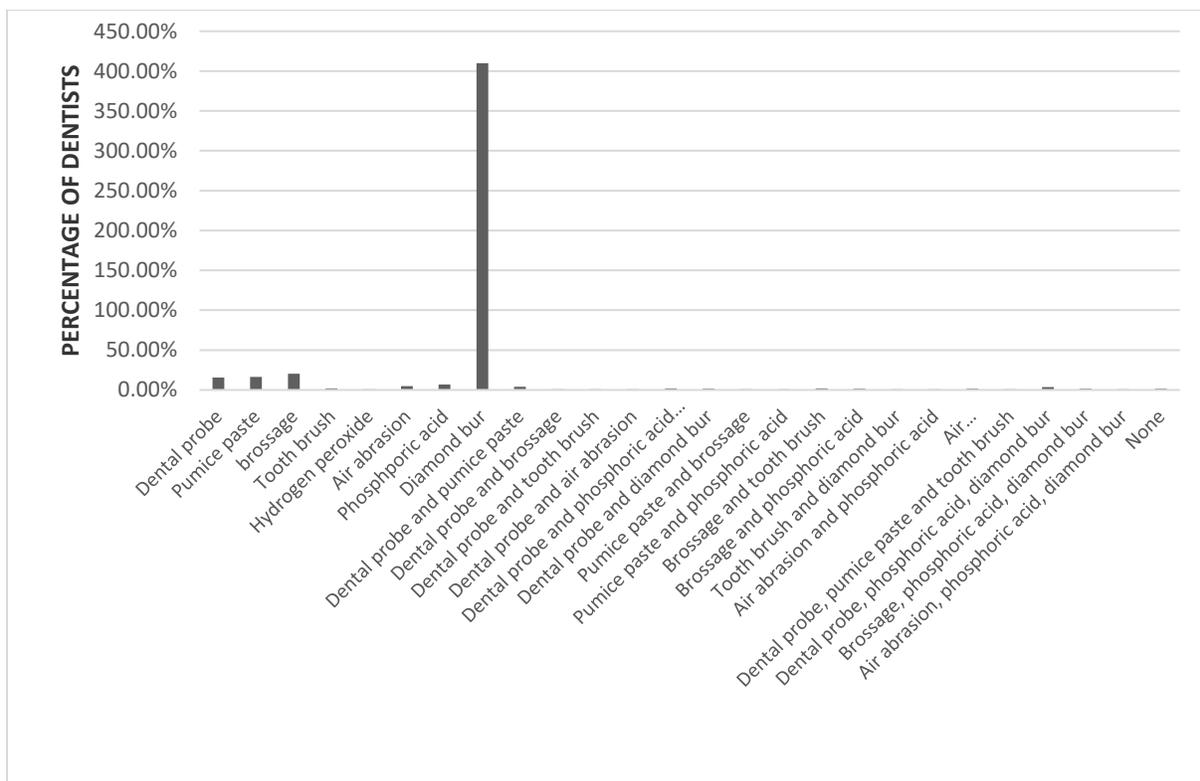


Figure 5 Method of cleaning teeth prior to fissure sealant

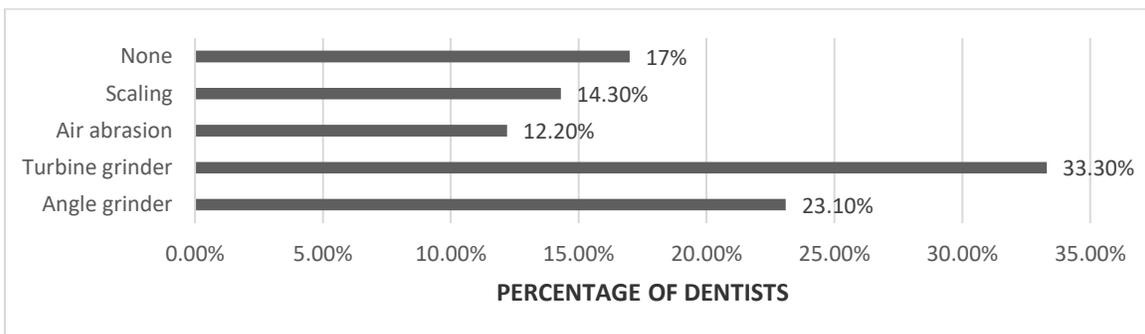


Figure 6 Method of dental preparation before fissure sealant

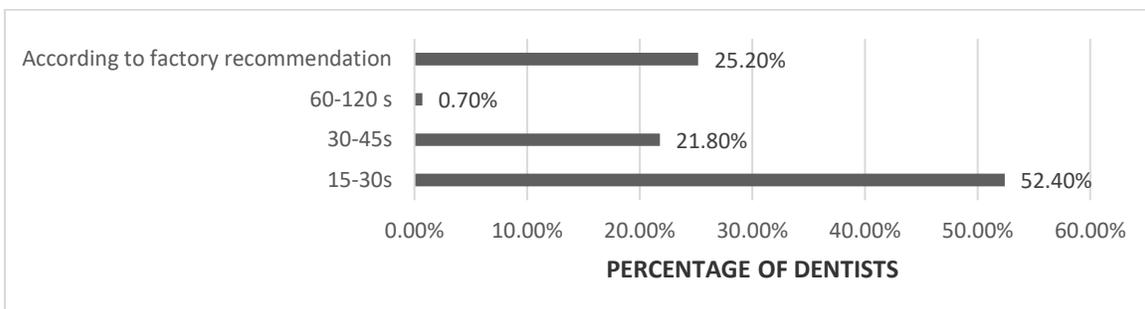


Figure 7 Time of Using Etchant

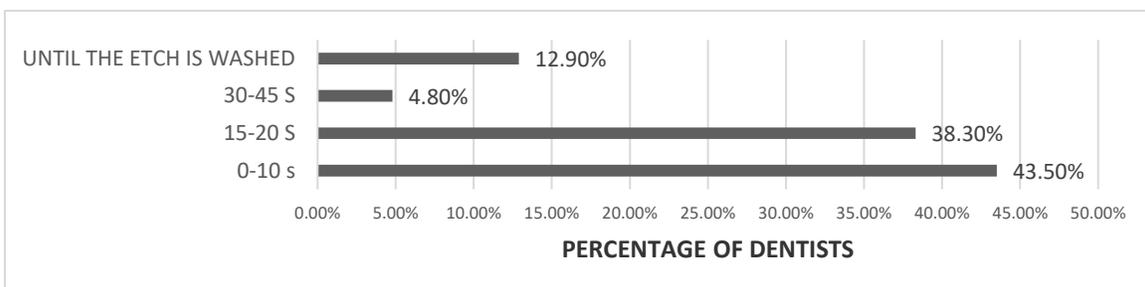


Figure 8 Time of Washing Etching Substance

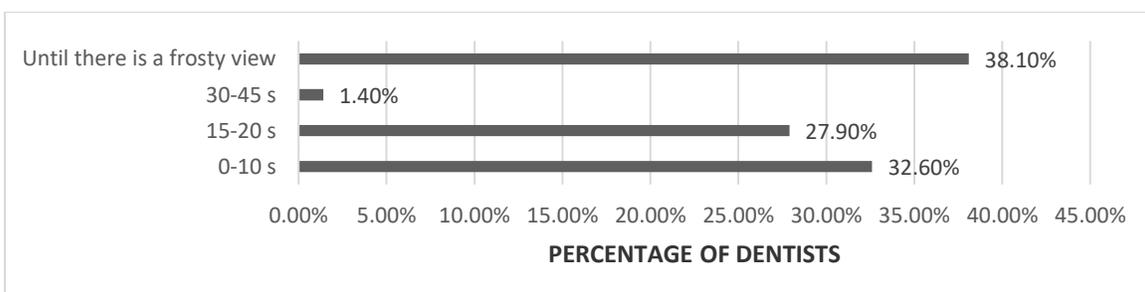


Figure 9 Time of Tooth Drying After Etching

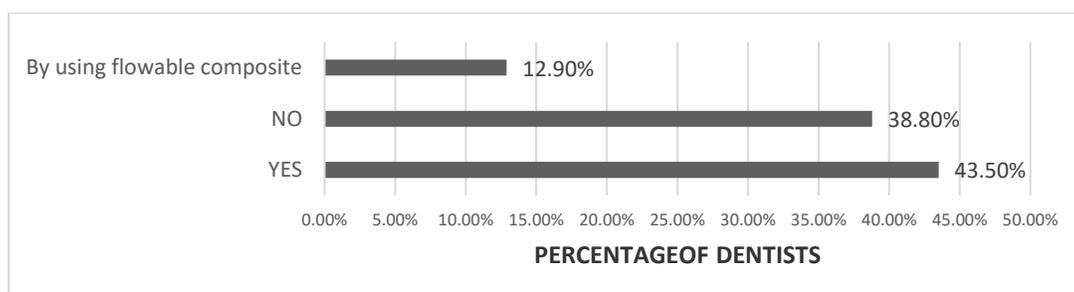


Figure 10 Using Bonding

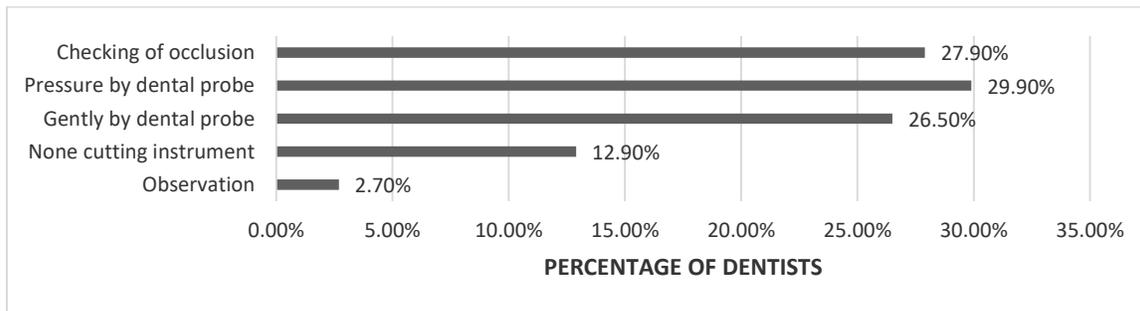


Figure 11 Method of Evaluation

4. DISCUSSION

Currently, the most effective ways to reduce occlusal caries are pit and fissure sealants, and studies have shown that sealants are effective in preventing caries (Truman et al., 2002; Ahovuo-Saloranta, 2017). Despite over 11 guidelines and systematic reviews have recommended the use of pit and fissure sealants for at-risk populations in recent years (Azarpazhooch & Main, 2008; San Martin et al., 2013), studies on the use of sealants in different countries showed that sealants use is not common (San Martin et al., 2013; Asawa et al., 2014). Since various factors, including dentists' knowledge, attitude and performance, can influence the use of fissure sealant in caries prevention programs, this study aimed to investigate the knowledge, attitude and practice of dentists in using fissure sealant in Ahvaz. Findings of this study showed that the knowledge and attitude of dentists in Ahvaz were moderate, but only 15% of them always and 62.6% sometimes used fissure sealant.

In this regard, some studies have conducted abroad which have reported similar and different results from the present study. For example, Asawa et al., (2014) in India stated that Punjab dentists were aware of the importance of sealant placement and the sealant placement was sufficient but they did not fully adhere to standard sealant placement procedures (Asawa et al., 2014). The result of this study compared to our study showed that dentists in Ahvaz outperformed in using fissure sealants. Govindaiah et al. (2014), in the United States reported that the majority of dentists, approximately 98%, used sealant in their treatment and their had a high level of positive attitude toward sealant application. However, general knowledge about the proper use of sealants among them was scarce (Govindaiah & Bhoopathi, 2014).

The results of Michalaki et al., (2010) showed that regardless of the high percentage of Greek general dentists (87.6%) who generally believed in caries prevention measures, only 35.8% of them used fissure sealant. While 64.2% did not believe in the effects of fissure sealant on caries prevention, therefore did not use those (Michalaki et al., 2010). In 2016, Chin also reported that dentists in Malaysia had a positive attitude toward fissure sealant and preventive resin restoration, but only 13.7% of dentists used it routinely. In addition, only 57.7% of dentists were aware of the recommendations for sealant placement, but most believed that these recommendations were important (Chin et al., 2016).

However, in a study in the United Kingdom, the majority of general dentists have used fissure sealant regularly since 1990 when a new payment system was introduced and promoted preventive measures for children (Hassall et al., 1999). Similarly, data from other countries, such as Germany and Australia, showed a significant, almost ten-fold increase in the use of fissure sealants in practice since social systems began to pay for them (Manton & Messer, 1995; Schulte et al., 2001). Also, a study in Ontario showed that 90% of general dentists used fissure sealant for 45% of their patients aged 6 to 16 years (Main et al., 1997). In the field of specialist dentists, studies showed that almost all US specialists used fissure sealants and offered them as a valuable and common treatment service to patients (Primosch & Barr, 2001). Based on these results, it seems that the use of sealant is not directly related to the dentists' knowledge and attitude and other factors are involved. These include insurance coverage for sealants, types of caries in different populations, and cultural factors. Therefore, these factors, in addition to the knowledge and attitude of dentists, have an impact on sealant placement in the community. In addition, Clarkson's study had shown that the role of economic factors is more influential than education in changing the behavior of dentists in increasing use of sealants (Clarkson et al., 2008). Therefore, one of the ways to increase dentist's use of sealant, in addition to awareness and retraining courses, is to provide insurance coverage with proper pay to the dentist for preventive treatments.

It should be noted that the less use of fissure sealant by dentists in this study compared to developed countries such as Canada and the US may be due to other factors such as amount of fluoride in urban drinking water. Specifically, studies have shown that drinking water fluoride levels are low in Ahvaz, because most of the citizen's drinking water is filtered by household purification devices and consequently becomes fluoride-free (Farsi & Jafarzadeh Haghightafard, 2015; Rezaeinia et al., 2018), this low fluoride level will eventually lead to increased dental caries. Accordingly, occlusal caries in this population is relatively low than interproximal caries

and fissure sealant use is not a priority because patients with proximal caries are not indicative of sealant use, so fissure sealant is less commonly used in Ahvaz. Based on dentists' responses to performance questions, our results showed that the most common types of fissure sealant in Ahvaz dentists were flowable, composite with 26.5%, fluoride-containing resin with 17.7% and fluoride-containing resin and flowable composite together with 11.6%. The study by Michalaki et al., (2010) showed that many dentists (general or specialist) prefer to use clear resin materials when using fissure sealant (Michalaki et al., 2010). Beauchamp et al., (2008) believed that resin-based fissure sealant was the first choice of dentists (Beauchamp et al., 2008). In the study by Asawa et al., (2014) 78.8% of respondents agreed about the effectiveness of resin sealants over glass-ionomer sealants (Asawa et al., 2014).

Also in this study, the use of fluoride-containing resins was relatively high, and dentists preferred fluoride-containing sealants. Consistent with the results of this study, in the study by Michalaki et al., (2010), in general 22.1% of dentists preferred fluoride-containing fissure sealant because they believed that fluoride release at the sealed surface was useful (Michalaki et al., 2010). In a study by Asawa et al. (2014), a majority of participants (85.3%) believed that the use of fluoride-based sealants could enhance prevention of dental caries. It is now accepted that adding fluoride to the sealant or perhaps to the enamel before applying the sealant, can increase the potential benefits of caries prevention without eliminating the sealant properties (Jensen et al., 1990). But in a study Selwitz et al., (1995) showed that the benefits of preventing further caries are seen when pit and fissure sealants using in combination with fluoride therapy (Selwitz et al., 1995). Additionally, releasing fluoride from fluoride containing sealants is not long lasting (Rajtboriraks et al., 2004; Muller-Bolla et al., 2006). So, use of fluoride therapy with fissure sealant in the purpose of preventing dental caries seems rational.

However, in this study dentists did not commonly use sealants, but their performance in sealant application was according to guidelines (Beauchamp et al., 2008), maybe because most of our respondents were up to date and has been graduated between 1-5 years ago. Finally, this study compared the knowledge, attitude and performance of dentists regarding the use of fissure sealant based on demographic variables. In our study, among the demographic factors, the level of knowledge of dentists treat only pediatric patients was significantly higher, indicating the impact of clinical experience on sealant use. As dental training in our curriculum is more about the basics of dentistry and the treatment of caries and restorations and less about preventative methods, it seems that education in preventive treatments is not enough and dentists are more focused on their restorative skills. They focus on restoration, which ultimately leads to a greater tendency for tooth restoration versus preventive procedures.

Findings showed that there was no significant relationship between dentists' knowledge, attitude and performance with sex, age, having retraining course, educational level, and years of practice ($P > 0.05$). In this regard, studies have been carried out. In the study by San Martin et al. (2013), the findings showed that the knowledge level of samples was significantly correlated with work experience ($p = 0.00$) and workplace ($p = 0.00$). There was also a significant difference between attitude and work experience ($p = 0.03$) and work context of samples ($p = 0.00$). In addition, findings of this study showed that there was a significant relationship between the performance of samples for using sealants and work experience ($p = 0.00$). But in this study, as in the present study, there was no significant relationship between sample performance, sex and workplace (San Martin et al., 2013). In the study by Asawa et al. (2014), the mean score of knowledge among those who had less than 5 years of experience (42.3 ± 4.2) was significantly higher than those who had more than 10 years of experience (40.7 ± 3.5) ($P = 0.001$) (Asawa et al., 2014).

In the study by Michalaki et al. (2010), dentists who frequently used fissure sealants and regularly used fluoride prevention methods, had a work experience of 5-14 years and aged up to 44 years (Michalaki et al., 2010). A study by Main et al., (1997) in the United States showed that general dentists, who used fissure sealants more, were mostly recently graduated, often used topical fluoride and participated in continuing education programs (Main et al., 1997). Mahajan et al., (2015) in a study in India reported that there was a significant relationship between age 30-35 years and men in attitude towards fissure sealant and also a significant relationship existed between dentists' scientific information and work experience of 5-10 years and knowledge, attitude and performance (Mahajan et al., 2015). These findings largely contradict the findings of the present study. This difference in the results might be related to factors such as sample size, demographic characteristics of the samples studied, and tools used to assess the level of knowledge, attitude, and performance of the studied samples.

5. CONCLUSION

The findings of this study showed that the knowledge and attitude of most dentists for using fissure sealant were moderate. Only 15% of Ahvaz's dentists always used fissure sealant and most of them sometimes used fissure sealants. Regarding these results about using fissure sealant in Ahvaz dentists, considering post graduation training programs and emphasizing the importance of using sealants in preventing dental caries is recommended.

Ethical Code

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Conflicts of Interest:

The authors declare no conflict of interest.

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