

## Relationship between Fear, Attitude and Knowledge, and COVID-19 Preventive Behaviors in Dentists

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J Babol Univ Med Sci; 23; 2021; PP: 352-358

Received: Nov 16<sup>th</sup> 2020, Revised: Feb 15<sup>th</sup> 2021, Accepted: Mar 3<sup>rd</sup> 2021.

### ABSTRACT

**BACKGROUND AND OBJECTIVE:** Dentists are at risk for respiratory diseases such as COVID-19 due to the nature of their occupation, close contact with patients, and exposure to microdroplets. One of the most important psychological variables affecting the regular implementation of preventive health behaviors is fear. Therefore, the present study was conducted to determine the relationship between knowledge, fear and attitude, and COVID-19 preventive behaviors in dentists.

**METHODS:** In this cross-sectional study, based on multi-stage sampling method, 190 dentists in Tehran were included in the study. Data were collected based on self-administered method using demographic questions: the 8-item Fear of COVID-19 Scale (range of 8 to 16), the 8-item Attitude Scale (range of 8 to 40), the 15-item Knowledge Scale (range of 0 to 15), and the 12-item COVID-19 Preventive Performance Questionnaire (range of 12 to 60).

**FINDINGS:** Only 24.74% of dentists received official training on COVID-19. The mean performance score of dentists towards COVID-19 prevention was  $52.2 \pm 7.6$  and was satisfactory. However, behaviors such as preparing disinfectants and masks for patients, regular air conditioning and disinfection of surfaces were observed in 38.95%, 17.37% and 16.32% of dentists, respectively. Preventive performance was significantly correlated with fear ( $p < 0.05$ ,  $r = 0.427$ ), attitude ( $p < 0.01$ ,  $r = 0.305$ ), knowledge ( $p < 0.01$ ,  $r = 0.276$ ) and work experience ( $p < 0.05$ ,  $r = 0.108$ ). Moreover, these variables predicted 63% of the variance of preventive performance.

**CONCLUSION:** Based on the results of this study, the overall performance of dentists in complying with COVID-19 prevention protocols was satisfactory. Moreover, there was a significant relationship between knowledge, fear and attitude and preventive performance.

**KEY WORDS:** COVID-19, Dentist, Fear, Knowledge, Health Behavior.

### Please cite this article as follows:

Mohammadi Zeidi I, Mohammadi Zeidi B, Mirzaie S. Relationship between Fear, Attitude and Knowledge with COVID-19 Preventive Behaviors in Dentists. J Babol Univ Med Sci. 2021; 23: 352-8.

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## Introduction

COVID-19 is an acute respiratory syndrome with unique features such as high transmission rate and a two-week incubation period (1-3). Statistics show a higher prevalence of infection and mortality due to COVID-19 in health care workers (4). In addition, dentists are at high risk for infectious respiratory diseases due to the nature of their professional tasks such as close contact with patients (5-7). Despite the importance of following the preventive guidelines for COVID-19, the results of various studies indicate poor performance of dentists in this area (5, 6, 8). For example, Ahmed et al. showed that 90% of dentists are unaware of changes in health guidelines and only 40% follow preventive guidelines (8).

One of the most important psychological variables affecting the regular implementation of preventive health behaviors is fear, the appropriate level of which can reduce involvement in high-risk behaviors and thus increase adherence to preventive strategies such as social distancing or hand hygiene (9, 10). Providing unrealistic statistics, inaccurate information, increasing cyberspace rumors and lack of access to appropriate treatment can lead to excessive fear and increased anxiety, which in turn leads to a decrease in protective reactions (8). A study by Consolo et al. shows an 85% prevalence of anxiety in dentists since the onset of the COVID-19 pandemic (11). Therefore, it is necessary to evaluate the psychological profile of dentists in order to determine their level of psychological readiness to resume dental activities along with the observance of health guidelines (12).

Successful control of COVID-19 requires the increase in knowledge, improved attitudes, and changes in the behavior of high-risk groups (13, 14). However, many dentists do not show the recommended behaviors for reasons such as low level of knowledge, low perceived vulnerability, inadequate perceived threat, and fear (15-20). For example, the performance of 58.7% of Lebanese dentists in the prevention of COVID-19 was good (17) and approximately 60% of dentists in Indonesia were well aware of the pathogenicity and methods of diagnosis of COVID-19 (18). Understanding the factors influencing the adoption of preventive behaviors is an essential step in designing behavior change interventions (21, 22). Obviously, evaluating the role of psychological variables such as attitudes and emotional factors such as fear in persuading health care workers to follow health guidelines can increase the effectiveness of cognitive-

behavioral interventions. Therefore, the aim of this study was to determine the relationship between knowledge, attitude and fear and COVID-19 preventive behaviors in dentists.

## Methods

This cross-sectional study was approved by the ethics committee of Qazvin University of Medical Sciences with the code IR.QUMS.REC.1399.422 and was conducted among 190 dentists working in public and private clinics in Tehran who were included by multi-stage sampling method from May to August 2020. The required sample size according to previous studies (7), using G\*Power software based on 95% confidence interval, error rate (d) of 0.05 and 10% dropout, was finally determined to be 190 people. Volunteers with PhD in general dentistry and higher, working in a public or private center in Tehran, and not suffering from any psychological or physical disorders were included in the study.

Due to cultural, economic and social differences in Tehran, a list of all dentists working in 22 districts of Tehran was prepared and then, according to the difference in the number of dentists working in different districts, the required number of samples was determined based on the proportion of dentists in each district. For this purpose, 12 people were assigned into the high-density region 1 (including eight districts of 1-3, 5-7, 11, 12), 8 people into the medium-density region 2 (including five districts of 4, 8, 9, 10 and 21) and 6 people into the low-density region 3 (including nine districts of 13-20 and 22).

Questionnaires were provided to all dentists and all individuals were asked to answer their questions within one month. During the mentioned period, 4 text messages and 2 reminder messages were sent via WhatsApp to complete the questions within the time frame. Along with the questionnaires, the participants were given two forms of written consent and a guideline for answering the questions. Completed questionnaires were collected after the specified time and in person by a trained expert. The self-administered questionnaire included the following:

- A) The contextual and demographic variables included age, gender, marital status, work experience (years), specialization, educational background and sources of information about COVID-19, etc.
- B) Fear of COVID-19 Scale in Dentists (8 questions with “yes”, “no” and “don’t know” options) (16), and

after the translation process, the face and content validity of this scale was approved by the panel of experts (content validity rate [CVR] of 0.75 and content validity index [CVI] of 0.78). Furthermore, the reliability of the scale was determined by retests at 15-day intervals among 14 general dentists ( $r=0.82$ ). In addition, Cronbach's alpha coefficient was used to evaluate the internal consistency of the scale ( $\alpha=0.88$ ).

C) The attitude scale consisted of 8 questions with a 5-point Likert type scale (from 1, "strongly disagree" to 5, "strongly agree") and a score range of 8 to 40. This scale was developed based on previous studies (11, 23) and similar to the fear scale, its internal consistency and reliability were assessed using Cronbach's alpha coefficients and retest coefficient ( $\alpha=0.89$ ,  $r=0.94$ ).

D) Knowledge Scale of COVID-19 consisted of 15 questions with "correct", "incorrect", and "don't know" options. Each correct answer was given a score of one and negative answers, and "do not know", a score of zero, and the scores ranged from 0 to 15. The final knowledge score was classified into three levels: low (0-5), medium (6-10) and high (11-15). The validity and reliability of this questionnaire were confirmed in previous studies (15, 16).

E) COVID-19 Preventive Performance Questionnaire (11, 15, 16) included 12 questions with a 5-point Likert type scale (from "never" [1] to "always" [5]). The scores of the performance questionnaire ranged from 12 to 60, with higher scores indicating better performance and vice versa. CVR and CVI indices (equal to 0.81 and 0.85, respectively) and Cronbach's alpha coefficient ( $\alpha=0.90$ ) and retest coefficient ( $r=0.88$ ) confirmed the content validity, internal consistency and reliability, respectively. The questionnaires were anonymous and their information was confidential.

Data were entered into SPSS 25.0 software and analyzed by one-way analysis of variance with LSD

post hoc test along with stepwise regression analysis to identify factors affecting preventive behaviors and  $p<0.05$  was considered significant.

## Results

The mean age of participants was  $37.54\pm 11.85$  years (ranging from 27 to 60 years) and the mean years of work experience was  $9.23\pm 7.48$  years. 80.53% of the participants were general dentists and only 24.74% had received official training about COVID-19 and the sources of information of 25.26% of cases were official sources such as the Ministry of Health. The results of one-way analysis of variance (ANOVA) showed a significant difference between the mean of variables of fear, attitude and preventive performance in terms of different levels of knowledge in the dentists participating in the study ( $p<0.001$ ). In other words, dentists who had a higher level of awareness about COVID-19, had more fear, better attitude, and better preventive performance (Table 1).

The total score of preventive performance in dentists was  $52.19\pm 7.64$ , and 64.04% of dentists stated that they always perform preventive behaviors. 17.4% and 4.87% had very poor (never) and poor (rarely) performance, respectively. Moreover, the performance of dentists in behaviors such as providing disinfectants and masks for patients, regular air conditioning and disinfection was not at optimal levels (Table 2). In the final model, with the simultaneous introduction of four variables, correlation coefficient was  $R=0.792$ , and the adjusted coefficient of determination was upgraded to  $R^2_{(Adj)}=0.627$ . In other words, based on the adjusted coefficient of determination in the final model, 62.7% of the dependent variable changes or preventive performance were explained by the four variables of work experience, knowledge, attitude and fear (Table 3).

**Table 1. Comparison of mean and standard deviation of variables in research in terms of three levels of knowledge (n=190)**

Variable	Levels of knowledge			p-value
	Low (n=20)	Medium (n=48)	High (n=122)	
	Mean±SD	Mean±SD	Mean±SD	
Fear	11.2±08.34 <sup>(a)</sup>	12.1±05.64 <sup>(b)</sup>	14.1±32.89 <sup>(c)</sup>	$p=0.0001$ , $df=2$ , $F=36.064$
Attitude	30.3±69.40 <sup>(a)</sup>	34.3±10.13 <sup>(b)</sup>	36.2±23.72 <sup>(c)</sup>	$p=0.0001$ , $df=2$ , $F=26.901$
Performance	47.7±18.13 <sup>(a)</sup>	50.7±34.72 <sup>(b)</sup>	53.8±56.38 <sup>(c)</sup>	$p=0.0001$ , $df=2$ , $F=30.176$

<sup>a-c</sup> LSD post hoc test result and significant difference of means between the three groups

**Table 2. Dentists' performance regarding COVID-19 prevention (n=190)**

Item	Never Number(%)	Rarely Number(%)	Sometimes Number(%)	Often Number(%)	Always Number(%)
Risk assessment and travel history of patients	5(2.63)	13(6.84)	11(5.79)	38(20)	123(64.74)
Evaluation of symptoms of upper respiratory tract infection and body temperature of patients	0(0)	3(1.58)	12(6.32)	58(30.53)	117(61.58)
Disinfect hands using soap and water or alcohol-based handrub	0(0)	0(0)	2(1.05)	34(17.89)	154(81.05)
Disinfection of workplace surfaces	20(10.53)	11(5.79)	11(5.79)	30(15.79)	118(62.11)
Use of personal protective equipment	0(0)	0(0)	3(1.58)	43(22.63)	144(75.79)
Hand washing before and after treatment	1(0.53)	3(1.58)	12(6.32)	22(11.58)	152(80.0)
Changing gloves for each patient	4(2.11)	4(2.11)	11(5.79)	31(16.32)	140(73.68)
Observe hand hygiene before and after using gloves	0 (0)	3(1.58)	11(5.79)	41(21.58)	135(71.05)
Observe the distance between each patient's visit	10(5.26)	6(3.16)	25(13.16)	21(11.05)	128(67.37)
Preparation of alcoholic disinfectant and mask in waiting rooms for patients	41(21.58)	33(17.37)	52(27.37)	26(13.68)	38(20.0)
Disinfect all surfaces, chairs and waiting room doors every 2 hours with chlorine solution, etc.	1(0.53)	15(7.89)	21(11.05)	54(28.42)	99(52.11)
Regular room air conditioning	13(6.84)	20(10.53)	8(4.21)	37(19.47)	112(58.95)

**Table 3. Summary of stepwise regression model with coefficient of determination, adjusted coefficient of determination, F and P**

Variable	R (correlation coefficient)	R <sup>2</sup> (coefficient of determination)	R <sup>2</sup> (Ad) (adjusted coefficient of determination)	Estimation error	F	P
Work experience	0.748	0.560	0.556	2.44	137.254	0.000
Knowledge	0.763	0.583	0.575	2.40	74.693	0.000
Attitude	0.780	0.608	0.597	2.34	54.758	0.000
Fear	0.792	0.627	0.613	2.29	44.093	0.000

**Discussion**

The results of this study showed a positive relationship between fear, attitude and performance and knowledge about COVID-19. Furthermore, despite the good performance of the majority of dentists, they did not have adequate performance levels in cases such as providing disinfectants and masks for patients, regular ventilation of the workplace and disinfection. Dentists' knowledge of topics such as incubation period, appropriate laboratory testing, duration of virus infection, and disinfection methods was undesirable. However, the majority of dentists (64.21%) had a sufficient level of knowledge about COVID-19, which was consistent with previous studies (20, 23, 24). Possible reasons for the high level of knowledge of dentists can be the frequent reception of information about COVID-19 through continuous training from the mass media. Findings of the present study showed that

only 24.74% of dentists received official training on COVID-19, which was lower compared to similar studies (17, 25, 26). Failure to receive official training may lead to disruption of the decision-making process for dealing with patients (27, 28). Therefore, consultation of health professionals with reliable media is essential to obtain the latest information and prevention strategies of COVID-19 (29). In the present study, significant relationships were shown between knowledge and attitude and practice, which were consistent with the findings of previous studies (19, 20, 27). The level of knowledge of dentists and their attitude towards the usefulness of preventive instructions affect their performance (30). Dentists who are aware of the symptoms, risk factors, and consequences of COVID-19 are more likely to believe in the need for preventative behaviors (24). For this reason, improving the level of

[DOR: 20.1001.1.15614107.1400.23.1.49.8]

[DOI: 10.22088/jbums.23.1.352]

knowledge of dentists about COVID-19 by updating the content of the sites of the Ministry of Health will play an important role in improving their performance. The general status of attitudes toward prevention of COVID-19 was relatively favorable and consistent with the findings of previous studies (20, 27, 28). Dentists can prevent COVID-19, even if they have a negative attitude towards the treatment of patients with COVID-19, if they believe that personal protective equipment is beneficial (31). Adequate feedback on the experiences of other health care professionals and participation in online group discussions can be a good strategy to change dentists' attitudes about the importance of following preventive protocols.

The mean score of fear was  $13.65 \pm 1.79$  in dentists, which was consistent with the results of previous studies (8, 33). Findings of Aly et al. indicate the prevalence of fear of coping with COVID-19 in 90% of dentists (32). Causes of fear in dentists can be factors such as the likelihood of getting infected with COVID-19 and transmitting to family members, lack of social distance with patients, post-infection quarantine, and treatment costs (33). Therefore, providing appropriate personal protective equipment and increasing the level of knowledge about the effectiveness of personal protective equipment can significantly reduce the level of anxiety and fear of dentists by changing attitudes.

The results of the study showed that 64.04% of dentists had good preventive performance and about 9% had poor performance, which is consistent with the findings of previous studies (8, 23, 24). Moreover, knowledge, attitude and fear were predictors of preventive performance of dentists, which was consistent with the findings of previous studies (8-10, 32-34). Updating the content of reliable websites and

providing training programs on new Ministry of Health guidelines can improve preventive performance by reducing anxiety and fear.

In general, the findings of the present study indicate a good level of knowledge and relatively favorable attitude in dentists. Furthermore, despite the satisfactory performance of most dentists, the level of behaviors such as providing disinfection equipment and masks for patients, continuous surface disinfection, and regular air conditioning were not favorable. The variables of knowledge, attitude, fear and work history were also able to significantly explain the variance of preventive performance in dentists.

Due to the cross-sectional nature of the present study, only the relationships between the variables could be examined, and to investigate the causal relationships, it is necessary to conduct longitudinal studies by measuring the variables at repeated intervals. In addition, the selection of samples from Tehran prevented the generalization of the results, and with the financial support and participation of dentists from different parts of the country, the generalizability of the findings can be strengthened. Another limitation of the present study was the use of questionnaire and self-report method for data collection, which is naturally not free of bias. In addition, due to the conditions of COVID-19 and the fear of the possibility of physical transmission of the disease, the design of an online questionnaire is recommended as a useful tool for rapid and safe data collection.

### Acknowledgment

We would like to thank the Vice Chancellor for Research of Qazvin University of Medical Sciences for the financial support of the research.

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