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Impact of Oral Health Literacy and COVID-19 Induced Anxiety on Dentistry Visits of the Iranian Public

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Quantitative Study

Abstract

Background: High levels of stress and fear of COVID-19 infection in high-risk places negatively affect visiting hygiene professionals and receiving health services including dentistry. This study was conducted with the aim to determine the impact of COVID-19 induced anxiety and Oral Health Literacy (OHL) on dental services during COVID-19 pandemic in the general population in Iran.

Methods: This online cross-sectional study was performed on 307 individuals (244 women and 63 men) using convenient sampling method, at the time of COVID-19 outbreak (October and November 2021) in Tehran city. A demographic characteristics form, the COVID-19 Induced Anxiety Scale (CIAS) (Riad et al., 2021), and the Oral Health Literacy Questionnaire (OHLQ) (Naghibi Sistani et al., 2013) were used to collect data with items related to the rate and reasons for visiting/not visiting dentists. Data were analyzed using ANOVA and Pearson correlation test in SPSS software.

Results: The results revealed no significant differences between those who had and those who had not had dental visits in terms of COVID-19 induced anxiety ($P > 0.05$). However, there was a significant difference between the two groups in terms of OHL ($P \leq 0.05$). In addition, no significant correlation was found between OHL and COVID-19 anxiety ($P > 0.05$).

Conclusion: Notwithstanding the risk of Corona virus transmission in offices/clinics, higher levels of OHL caused more desire to use dentistry services in the public.

Keywords: Anxiety; COVID-19; Dentistry; Oral health, Literacy

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Introduction

At the outbreak of COVID-19 and its pandemic, on January 11, 2020, the World Health Organization (WHO) issued a statement declaring that the outbreak of the new coronavirus was the sixth leading cause of public health emergency worldwide (Tavakoli, Vahdat, & Keshavarz, 2020).

COVID-19 pandemic has had serious impact upon different aspects of our life including the state of mental health with increased fear, anxiety, depression, anger, etc. (Shigemura, Ursano, Morganstein, Kurosawa, & Benedek, 2020).

Fear of COVID-19 infection can make people anxious, and thus, increase anxiety among the general population (Shafran, Rachman, Whittal, Radomsky, & Coughtrey, 2021). This fear is likely due to the ambiguity and uncertainties about the nature of this novel virus. Lack of information and misinformation commonly intensified by media headlines have been shown to fuel health related concerns and phobias (Taylor & Asmundson, 2004). Moreover, teaching and promoting oral health literacy (OHL) among patients takes up more of dental professionals' time (Tseng et al., 2021).

According to a study on 10,754 Iranians, a higher level of anxiety was observed among people who followed the news on COVID-19 or had at least one person infected with the disease in their family (Moghanibashi-Mansourieh, 2020). Moreover, media news and social media generated various alarming contents about the virus infection among the public which might lead to misperception of social distancing (Bridgman & Merkley, 2020). The more anxiety people experience, the lower quality of life (QOL) they will have (Demirbas & Kutlu, 2022).

In a systematic review study on social isolation effects conducted in different countries, including Iranian (Moghanibashi-Mansourieh, 2020), higher levels of anxiety were observed during social isolation, especially among adults aged 21-40 years (Dos Santos, Silva de Paula, Tardieux, Costa-E-Silva VN, & Leite, 2021).

Therefore, there is a strong correlation between how people feel about COVID-19 outbreak and how often they tend to visit dental clinics (Peloso et al., 2020). As presented in previous studies, the willingness of people to receive dental services is negatively associated with their higher level of anxiety (Nazir et al., 2021).

The level of people's knowledge and awareness significantly influences their healthcare behavior. The relation between public fear and protective behaviors can be explained by Janis's (1967) fear drive model (Janis, 1967) that describes the relationship between motivation and fear as an inverted U-shaped curve. This model demonstrated that a moderate level of fear motivates individuals to adopt protective behaviors such as using healthcare services even during the pandemic of such an infectious disease. However, low or high levels of stress may inversely affect people's behavior toward such services.

Fear of infection prevents people from being in crowded and high-risk places such as dentistry clinics. Due to exposure to saliva, blood, and aerosol/droplet generated during dental treatments, dentistry offices are higher-risk environments for COVID-19 infection during its outbreak (Peng, Xu, Li, Cheng, Zhou, & Ren, 2020). Hence, dental appointments have decreased over this period of the pandemic, which is challenging for both patients and dentists (Ibrahim, Alibrahim, Al, Alamri, Bamashmous, & Tounsi, 2021). The average number of these appointments is much less in countries with higher rates of COVID-19 (Kranz, Chen, Gahlon, & Stein, 2021).

Increasing knowledge of COVID-19 and health literacy can protect people from the fear of being infected with the virus (Nguyen et al., 2020). Oral health is an important sector of overall health, and the level of OHL among the general

population could be an important issue for dental patients.

OHL is the result of several factors such as education level, socioeconomic status, and ethnicity. There is a relation between OHL levels and dental and periodontal health of patients. In addition, literacy can improve self-management skills and patient-dentist communication, thus providing more fruitful dental appointments and oral health outcomes (Baskaradoss, 2018).

Due to the importance of factors affecting dental visits in the Iranian population, it was hypothesized that the level of anxiety and OHL could be influential in motivating people to receive dental services. This study was conducted with the aim to compare COVID-19 induced anxiety and OHL between two groups of the general population who have or have not had dental visits during the COVID-19 pandemic.

Methods

Study setting

Data were obtained from an original cross-sectional survey that explored the extent and relation between OHL, COVID-19 anxiety, and receiving dental services in adults of over 18 years of age during the Coronavirus pandemic in Tehran city, Iran. The online link of the questionnaire was sent to 350 participants, from among which 307 respondents (244 women and 63 men) completed the forms. The informed consent form of participation in the study was included in the first page of the questionnaire and clicking on the next button was considered as its signature. Participants voluntarily entered the study and completed the questionnaire. Except for the two questions about gender and age, they did not have to answer any of the questions and could move on to the next question. After obtaining the code of ethics (TUMS.DENTISTRY.REC.1400.152), the online questionnaire was provided to the target group via Telegram messenger, WhatsApp chat, and Email.

The survey was conducted from 23 October 2021 to 22 November 2021, in Tehran. Due to limitations in presenting questionnaires to individuals such as social distancing and isolation policies, data were gathered using an online convenient sampling method. The study inclusion criteria were signing a written consent, being residents of Tehran and over 18 years of age, and having Persian language literacy. These factors were asked in the first part of the questionnaire. The link was sent to women and men of different ages from all socioeconomic levels in WhatsApp and Telegram groups (It has been sent to groups of the general population excluding groups of dental students, general dentists, or specialists).

To measure the research variables, a questionnaire was used consisting of four parts:

The Oral Health Literacy Questionnaire (OHLQ) is an instrument for the functional assessment of OHL in both community and population based studies, which was developed by Naghibi Sistani (2013) and distributed among an Iranian population for the first time. It consists of two parts. The first part includes a self-reported oral health measure that describes the oral health status such as brushing behavior, use of snacks, and dental visits. The second part includes three sections of reading comprehension, numeracy, and decision-making styles, each with several questions. The psychometric properties of this questionnaire were confirmed in previous research. The total score of the OHLQ is categorized as inadequate (0-9), marginal (10-11), and adequate (12-17) OHL (Naghibi Sistani, Montazeri, Yazdani, & Murtomaa, 2014).

The COVID-19 Induced Anxiety Scale (CIAS) with 6 items was used to measure anxiety (Riad, Huang, Zheng, & Elavsky, 2021). Each item of the CIAS is scored on a 5-point Likert scale. The items of this validated scale measure concerns regarding

being infected by COVID-19. Higher scores on this scale are associated with higher levels of Coronavirus anxiety. The internal consistency of the CIAS in the original study was α = 0.78 (Riad et al., 2021). In the present study, a good level of internal consistency was obtained for the CIAS (α = 0.84).

A Demographic Characteristics Form was used to collect information on participants' age, gender, level of education (pre-diploma, diploma, bachelor's degree, master's degree, and higher), employment status, history of COVID-19, and receiving/not receiving vaccine.

The fourth part consists of questions related to the reasons for dentistry referral/ non-referral during the COVID-19 pandemic: This part consists of questions on whether participants have visited dentists or received dental services during the COVID-19 pandemic. If they responded with yes, they were asked to provide the reason, such as pain and emergency, periodic checkups, continuing a treatment process, scaling and root planning, or receiving esthetic services. Those who responded with no were asked whether the reason was fear of the high risk of virus contagion in dentistry clinics/offices or economic problems.

The content validity ratio (CVR) and the content validity index (CVI) were used to quantitatively validate this part of the questionnaire. To calculate CVR, 5 dental professors of different specialties were asked to classify each question as "essential", "useful but unnecessary", or "unnecessary". The scores were then obtained based on the CVR formula. To calculate CVI, the 3 criteria of simplicity, relevance, and clarity were examined by 5 individual experts and scored on a 4-part Likert scale (unrelated, somewhat related, related, and completely related). The CVI scores were finally calculated by aggregating the scores for each item divided by the total number of specialists. If the CVI score of each item was greater than 0.78, the item was approved. The content validity of this part of the questionnaire was approved in the present study.

Statistical analysis

The collected data were statistically analyzed using SPSS software (version 26; IBM Corp., Armonk, NY, USA). First, descriptive analysis of the data was performed. ANOVA was performed to compare OHL and COVID-19 induced anxiety variables between the two groups of with and without dentistry appointments during the pandemic. Then, the Pearson correlation coefficient was calculated to clarify the relationship between OHL and COVID-19 induced anxiety.

Results

The assessment of the sources of receiving oral and dental information through multi-choice questions revealed that 61.8% of participants (190 people) were informed through the internet, 58.6% by dentists (180 people), and 15.3% via television (47 people). Moreover, 19 individuals gained dental knowledge from books (6%), 7 from the radio (2.2%), and only 2 from newspapers. These results showed the importance of internet and dentist descriptions, respectively, as sources of dental knowledge for the public.

Descriptive analysis was carried out to summarize data from demographic questions. The study results on the level of OHL and the extent of COVID-19 induced anxiety in the general population are presented in table 1.

It is observed that 62.6% of participants have had their appointments and received dental services during the pandemic.

Table 1. Demographic characteristics of 307 respondents

Variable	Value
Gender [n (%)]	
Men	63 (20.5)
Women	244 (79.5)
Age (year) [n (%)]	
18-24	120 (39.3)
25-30	40 (13.1)
31-40	45 (14.8)
41-50	52 (17.0)
51-60	35 (11.5)
> 60	13 (4.3)
History of corona disease [n (%)]	
Never	162 (52.8)
Once	137(44.6)
Twice or more	8 (2.6)
Economic problems [n (%)]	
No	83 (27.2)
Yes	31 (10.2)
Did not respond	119 (62.6)
Vaccination [n (%)]	
Yes	285 (92.8)
No	22 (7.2)

Due to the lack of response to the question of economic problems in both groups, we were not able to omit the effect of this variable from the effect of the other mentioned variables.

The answers of 191 respondents to questions about the different reasons for dentistry routine appointments during the pandemic were analyzed and the results showed that 51.3% of people had dentistry visits due to emergency problems, 14.7% had esthetic dentistry, 58.1% of the total respondents had checkup and scaling root planning visits, and 46.6% of people continued their previous treatment. These results revealed that the lowest level of importance in visiting/receiving dental services belonged to esthetic dentistry for patients during the pandemic in Tehran city.

The level of OHL and COVID-19 anxiety in the groups of individuals that had and had not had routine dental visits are demonstrated in table 2.

ANOVA was performed to compare COVID-19 induced anxiety and OHL between the two groups who did and did not receive dental services. The results are summarized in table 3.

These results revealed that there is no difference between the two groups in terms of COVID-19 induced anxiety, and thus, this factor has no effect on the willingness of patients to have dental appointments. However, there is a significant difference between the two groups in terms of their level of OHL and this factor seems more influential on dental visits of the public during the pandemic.

In the last part, we investigated the correlation of OHL and COVID-19 induced anxiety in the total sample. The result showed that there was no significant correlation between the two constructs ($P > 0.05$). This means that increasing OHL did not diminish COVID-19 induced anxiety of the public for dentistry appointments and vice versa.

Table 2. OHL and COVID-19 anxiety in two groups

Variable	Yes	No
Dental visits during the pandemic [n (%)]	191 (62.6)	114 (37.4)
Oral health literacy (mean ± SD)	13.60 ± 2.69	11.99 ± 2.85
Corona anxiety (mean ± SD)	10.16 ± 4.83	10.51 ± 4.65

OHL: Oral health literacy; SD: Standard deviation

Table 3. ANOVA in comparison of the two groups

Variable		SS	df	MS	F	P.
Corona anxiety	Between groups	8.427	1	8.427	0.371	0.543
	Within groups	6844.841	301	22.740		
	Total	6853.267	302			
Oral health literacy	Between groups	186.456	1	186.456	24.622	< 0.001
	Within groups	2294.541	303	7.573		
	Total	2480.997	304			

SS: Sum of Squares; df: Degree of freedom; MS: Mean square

Discussion

The aim of this study was to assess the level of anxiety and OHL in the public and clarifying if these variables could be influential in motivating people to receive dental services during the COVID-19 outbreak in Iran. The results revealed that OHL is an effective factor in receiving dental services, but fear of virus contamination was not influential.

Comparing the two groups in terms of their level of OHL, we found that those with higher levels of OHL had their routine appointments during the outbreak. Therefore, the higher the level of OHL was in the public, the higher their willingness to continue treatments and receive dental services was. This result was consistent with that of previous studies by Baskaradoss (2016 & 2018), and Nazir et al. (2021).

Due to the importance of oral/dental information in the internet resources for the public, as reported in this study, dentists are recommended to use the internet to enhance patients' OHL knowledge.

In addition the two constructs of COVID-19 anxiety and OHL seem to be unrelated. The unpleasant fear of being contaminated by the COVID-19 virus could affect many aspects of people's lives including their willingness to use healthcare services. Our findings illustrated that COVID-19 induced anxiety did not differ between the two groups and this variable had no effect on the perceived need of people to visit dentists/receive dental services. This result could be another confirmation of the diminishing level of public concerns about virus contamination in dentistry clinics. These results were incompatible with previous studies which reported that a higher level of anxiety might reduce dental appointments (Ibrahim et al., 2021; Nazir et al., 2021; Peloso et al., 2020).

It seems that at the time of conducting this survey, nearly two years into the pandemic, as a result of decreasing public uncertainty about the virus and increasing number of vaccinations, the high levels of fear and COVID-19 induced anxiety had diminished and willingness to have dental appointments had increased in society.

The present study had some limitations. The participants in this study were Iranian and most of them were women. As this questionnaire was made in the form of an electronic questionnaire, only people who had access to the Internet could fill it out and participate in this study.

Cultural differences and the extent of previous education in the field of health literacy remained unclear. Factors that could affect patients' willingness to have dentistry visits such as the number of dentistry clinics and dental facilities in different sections of Tehran city were not controlled in this study.

Conclusion

These findings suggest that despite the outbreak of a contagious disease, and fear of infection in dentistry clinics, dentists can prevent the reduction of dental visits by improving the level of OHL and dental health literacy in the general population.

Conflict of Interests

Authors have no conflict of interests.

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The ethical clearance committee of the Dentistry Department of Tehran University of Medical Sciences, Tehran, Iran (TUMS.DENTISTRY.REC.1400.152), approved this study. In addition, this study was conducted in accordance with the Declaration of Helsinki.

References

Baskaradoss, J. K. (2016). The association between oral health literacy and missed dental appointments. *J Am.Dent Assoc*, *147*(11), 867-874. doi:S0002-8177(16)30505-0 [pii];10.1016/j.adaj.2016.05.011 [doi]. Retrieved from PM:27497866

Baskaradoss, J. K. (2018). Relationship between oral health literacy and oral health status. *BMC Oral.Health*, *18*(1), 172. doi:10.1186/s12903-018-0640-1 [pii];640 [pii];10.1186/s12903-018-0640-1 [doi]. Retrieved from PM:30355347

Bridgman, A., & Merkley, E. (2020). Replication Data for: The causes and consequences of COVID-19 misperceptions. Harvard Dataverse. doi: 10.7910/DVN/5QS2XP [doi].

Demirbas, N., & Kutlu, R. (2022). Effects of COVID-19 Fear on Society's Quality of Life. *Int J Ment Health Addict.*, *20*(5), 2813-2822. doi:550 [pii];10.1007/s11469-021-00550-x [doi]. Retrieved from PM:34539282

Dos Santos, E. R. R., Silva de Paula, J. L., Tardieux, F. M., Costa-E-Silva VN, Lal, A., & Leite, A. F. B. (2021). Association between COVID-19 and anxiety during social isolation: A systematic review. *World J Clin Cases.*, *9*(25), 7433-7444. doi:10.12998/wjcc.v9.i25.7433 [doi]. Retrieved from PM:34616809

Ibrahim, M. S., Alibrahim, H., Al, M. A., Alamri, A., Bamashmous, M., & Tounsi, A. (2021). Fear Factor in Seeking Dental Care among Saudis during COVID-19 Pandemic. *Int J Environ.Res Public Health*, *18*(20). doi:ijerph182010589 [pii];ijerph-18-10589 [pii];10.3390/ijerph182010589 [doi]. Retrieved from PM:34682335

Janis, I. L. (1967). Effects of fear arousal on attitude change: Recent developments in theory and experimental research. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (3 ed., pp. 166-224). New York, NY: Academic Press.

Kranz, A. M., Chen, A., Gahlon, G., & Stein, B. D. (2021). 2020 trends in dental office visits during the COVID-19 pandemic. *J Am.Dent Assoc*, *152*(7), 535-541. doi:S0002-8177(21)00138-0 [pii];10.1016/j.adaj.2021.02.016 [doi]. Retrieved from PM:34023093

Moghanibashi-Mansourieh, A. (2020). Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian J Psychiatr.*, *51*, 102076. doi:S1876-2018(20)30187-8 [pii];102076 [pii];10.1016/j.ajp.2020.102076 [doi]. Retrieved from PM:32334409

Naghibi Sistani, M. M., Montazeri, A., Yazdani, R., & Murtomaa, H. (2014). New oral health literacy instrument for public health: development and pilot testing. *J Investig.Clin Dent*, *5*(4), 313-321. doi:10.1111/jicd.12042 [doi]. Retrieved from PM:23559571

Nazir, M., Almulhim, K. S., AlDaamah, Z., Bubshait, S., Sallout, M., AlGhamdi, S. et al. (2021). Dental Fear and Patient Preference for Emergency Dental Treatment Among Adults in COVID-19 Quarantine Centers in Dammam, Saudi Arabia. *Patient.Prefer.Adherence.*, *15*, 1707-1715. doi:319193 [pii];10.2147/PPA.S319193 [doi]. Retrieved from PM:34354346

Nguyen, H. T., Do, B. N., Pham, K. M., Kim, G. B., Dam, H. T. B., Nguyen, T. T. et al. (2020). Fear of COVID-19 Scale-Associations of Its Scores with Health Literacy and Health-Related Behaviors among Medical Students. *Int J Environ.Res Public Health, 17*(11). doi:ijerph17114164 [pii];ijerph-17-04164 [pii];10.3390/ijerph17114164 [doi]. Retrieved from PM:32545240

Peloso, R. M., Pini, N. I. P., Sundfeld, N. D., Mori, A. A., Oliveira, R. C. G., Valarelli, F. P. et al. (2020). How does the quarantine resulting from COVID-19 impact dental appointments and patient anxiety levels? *Braz.Oral.Res, 34*, e84. doi:S1806-83242020000100253 [pii];10.1590/1807-3107bor-2020.vol34.0084 [doi]. Retrieved from PM:32609145

Peng, X., Xu, X., Li, Y., Cheng, L., Zhou, X., & Ren, B. (2020). Transmission routes of 2019-nCoV and controls in dental practice. *Int J Oral.Sci, 12*(1), 9. doi:10.1038/s41368-020-0075-9 [pii];75 [pii];10.1038/s41368-020-0075-9 [doi]. Retrieved from PM:32127517

Riad, A., Huang, Y., Zheng, L., & Elavsky, S. (2021). The Associations of COVID-19 Induced Anxiety, Related Knowledge and Protective Behavior. *Health Psychol Res, 9*(1), 24768. doi:24768 [pii];10.52965/001c.24768 [doi]. Retrieved from PM:34746486

Shafran, R., Rachman, S., Whittal, M., Radomsky, A., & Coughtrey, A. (2021). Fear and Anxiety in COVID-19: Preexisting Anxiety Disorders. *Cogn Behav Pract., 28*(4), 459-467. doi:S1077-7229(21)00048-1 [pii];10.1016/j.cbpra.2021.03.003 [doi]. Retrieved from PM:33897249

Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry Clin Neurosci, 74*(4), 281-282. doi:PCN12988 [pii];10.1111/pcn.12988 [doi]. Retrieved from PM:32034840

Tavakoli, A., Vahdat, K., & Keshavarz, M. (2020). Novel Coronavirus Disease 2019 (COVID-19): An Emerging Infectious Disease in the 21st Century. *ISMJ, 22*(6), 432-450. doi: 10.29252/ismj.22.6.432 [doi]. Retrieved from http://ismj.bpums.ac.ir/article-1-1222-en.html

Taylor, S., & Asmundson, G. J. G. (2004). *Treating Health Anxiety: A Cognitive-behavioral Approach*. New York, NY: Guilford Press.

Tseng, W., Pleasants, E., Ivey, S. L., Sokal-Gutierrez, K., Kumar, J., Hoeft, K. S. et al. (2020). Barriers and Facilitators to Promoting Oral Health Literacy and Patient Communication among Dental Providers in California. *Int J Environ.Res Public Health, 18*(1). doi:ijerph18010216 [pii];ijerph-18-00216 [pii];10.3390/ijerph18010216 [doi]. Retrieved from PM:33396682