

The Correlation between the Fear Level and Oral Health Knowledge Related to Dental Treatment During the COVID-19 Pandemic Outbreak

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Abstract

Several reports have been released on how COVID-19 infection could be transmitted through dental services. This has caused fear in the community to seek treatment at a dentist. The increase in public fear is a change in emotions due to the overwhelming amount of news or reports about the spread of the COVID-19 infection through print, social, and electronic media around the world. A cross-sectional study was conducted using online survey from 10 June to 20 October 2020. This well-constructed questionnaire was designated using the free access Google form application and the link to the online survey was sent to participants through WhatsApp. A total of 1040 participants from 10 provinces in Indonesia participated in this study. Statistical analysis was performed using SPSS version 24. The correlation between fear and oral health knowledge related to dental treatment were tested using the Chi-square and Spearman correlation test. Of the 1040 participants, 87.02% and 12.98% individuals experienced mild and moderate fear, respectively. A good level of oral health knowledge was found in 53.7% and the average level was 46.3% of participants. The bivariate correlation showed that less fear level was correlated with good oral health knowledge ($r=-0.126$, $p<0.05$). The greatest fear comes from the possibility of transmission of the COVID-19 infection from dentists and seeing dentist with one of COVID-19 infection symptoms. The changing the habit of washing hands before undergoing dental treatment shows a fear of contracting a COVID-19 infection. People with a good level of knowledge have less fear than average level.

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Introduction

Today, almost all over the world's population is experiencing a respiratory tract disease pandemic outbreak which was first identified in Wuhan, Hubei province, China, in December 2019.¹ This atypical acute respiratory tract infection disease is caused by coronavirus-2 (SARS-CoV-2) which is very similar to the SARS-CoV, namely acute respiratory disease syndrome which also had a high mortality rate in Hongkong

during 2002-2003.² China reported 87% of confirmed cases of Corona Virus Disease (COVID-19) infection are between the ages of 30 up to 79 years old while the morbidity rate prevalence in Italy and the United Kingdom was higher that is above 73 years old.³ The United States showed the majority of cases of COVID-19 infection most widely attack aged patients 65 years old and above with an 80% mortality rate. Currently, in the world, positive sufferers of COVID-19 infection cover 68.1 M cases with a death rate of 1.56 M, while in Indonesia as of December 8th, 2020 reported that COVID-19 sufferers have reached 586,842 patients with 18,000 deaths.⁴

The mortality rate is quite high which has caused several countries to put forward a policy of imposing a lockdown state to prevent the spread of the coronavirus. Indonesia itself chose to implement a Large-Scale Social Restriction

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(LSSR), especially in Jakarta as the nation's capital policy to suppress the spread of the virus. The LSSR guideline is a limitation of all activities that might cause the crowd in common places such as school, workplace, market, socio-cultural and religious location and public transportation for a few months, and still ongoing up to now but currently without total restriction. The dentist, nurse, and *dental hygienist* are the professional jobs that have a high risk of cross-infection due to the density of virus that can survive in the air especially under conditions of low temperature and high humidity or those originating from high viral loads in the upper respiratory tract including the oral cavity.⁵ The prevalence of COVID-19 infection in health workers varies widely. The United States reports from 9,000 cases in health workers, 55% of infections occurred as a result of contact with the equipment in the health service center.⁶ This situation certainly causes the feeling of fear of the patients that might delay their visit to the dentist.

According to APA dictionary of psychology, fear is a basic, intense emotion aroused by the detection of an imminent threat, involving an immediate alarm reaction that mobilizes the organism by triggering a set of physiological changes. These include rapid heartbeat, redirection of blood flow away from the periphery toward the gut, tensing of the muscles, and a general mobilization of the organism to take action. Fear differs from anxiety. Anxiety comes from the *Latin* which means constriction or strangulation.⁷ Anxiety has future-oriented, the focus is not too specific, and long-term response focused on the diffuse threat, whereas fear usually has a response to an appropriate short-term response to a present and an identifiable specific threat that is happening at this time.⁷

Fear of dental treatment is a term to describe fear, anxiety, or stress that occurs in the practice room which is usually triggered by fear of needles, drill sound, or the atmosphere in the practice room that seems terrible.⁸ However, at present, the fear that has caused the delay in dental treatment has largely shifted to a different direction, namely the state of fear of the COVID-19 transmission that is suspected to occur in the practice room and waiting for the dental clinic.⁹ The increase in public fear is a change in emotions due to the overwhelming amount of news or reports about the spread of the COVID-19 infection through print, social, and electronic

media around the world. Unfortunately, of the many people who share information about viruses and how to protect themselves from virus infection, not all of them have the truth. Misinformation or lack of information can lead to paranoia and excessive anxiety, especially in the dentist's work situation and this can harm the dentist's professional identity and income. Several studies and systematic reviews have been conducted to show the level of fear associated with the COVID-19 pandemic, however, most of these studies show the variation level of fear among patients and health workers during the COVID-19 pandemic.¹⁰⁻¹³ Our study aims to investigate the level of public fear about oral and dental treatment and their relationship with oral health knowledge related to dental treatment in the new normal era during the COVID-19 pandemic.

Materials and methods

Study Design

The research design was a cross-sectional study by distributing an online survey questionnaire which was conducted from 10 June to 20 October 2020. Ethics committee approval number 197/KE/FKG/2020 was approved by the Dentistry Faculty of Syiah Kuala University. This survey was created using the free access Google form application and the link to the online survey was sent to participants through WhatsApp. The total cases that occurred in the research center area, namely in Aceh until the end of the study were 1697 cases, with the number of deaths of 68 people.

Participants

The research subjects were determined by consecutive sampling, that is, all subjects who met the inclusion and exclusion criteria within a certain period according to the study were included as samples. The inclusion criteria included adult men and women who were willing to participate in the study. The exclusion criteria were dentists and dental assistants. Participants must complete informed consent before taking part in the survey. The target sample size of participants was determined using the Slovin formula, $n = N / [1 + (N \times e^2)]$, with margin error 5% or 0.05. A total of 1040 participants from 10 provinces in Indonesia participated in this study. The participants were assured that the information collected would remain anonymous.

Outcomes and Covariates

This study designed an open structured questionnaire which was divided into three parts. The first section contains demographic data. The second part consists of 11 questions that describe people's fear of the possibility of being infected with COVID-19 when they get dental care during the pandemic, with possible answers including yes, no, and uncertain. The third part consists of 11 questions about people's knowledge of the types of dental treatment that are safe for the dentists, the readiness of dental practice during the pandemic era, the understanding of the risk of transmission between dentists and patients, and knowledge of covid-19 with possible answer true, false, and don't know.

Statistical Analysis

The relationship and correlation between fear and oral health knowledge related to dental treatment were tested using the Chi-square and Spearman correlation test. The significance level was set at $p < 0.05$, and all tests were 2-tailed. The validity test was carried out using a correlation test technique (significance < 0.05) and a reliability test using Cronbach's α (Cronbach $\alpha = 0.736$). For the data analysis for fear level, the answer to "Yes" has a value of 3, "maybe/uncertain" has a value of 2, while "no" has a value of 1. The fear classification is divided into 4 levels, namely no fear (0), low fear (1-11), medium fear (12-23), and high fear (24-33). The answer options for public knowledge on dental treatment are divided into 3, namely, true (1), false (0), and don't know (0). The assessment is Good knowledge (6-11) and Average knowledge (1-5). We use the SPSS program (version 24; SPSS Inc., Chicago, IL, USA).

Results

Demographic characteristics

This study showed that the majority of participants were women, with the largest age range being 17-25 years. Most participants have undergraduate-level education (43.8%) followed by high school graduates (41.5%). Students and school pupils are the largest participants followed by civil servants at 39.2% and 19.6% respectively. This study was centered in Aceh so that the largest number of participants came from this province (66.2%). Most of the complaints in

the oral cavity were cavities (31.5%). The description of these characteristics is shown in **Table 1**.

Characteristics		Number (%)
Sex	Male	300 (28.8)
	Female	740 (71.2)
Age, y	17 to 25	544 (52.3)
	26 to 35	136 (13.1)
	36 to 45	152 (14.6)
	46 to 55	168 (16.2)
	Above 55	40 (3.8)
Education level	High school graduate	432 (41.5)
	Undergraduate	456 (43.8)
	Graduate	128 (12.3)
	Postgraduate	24 (2.3)
Profession	Civil Service Employee	204 (19.6)
	Private work	172 (16.5)
	High school/College student	408 (39.2)
	Housewife	116 (11.2)
	Others	140 (13.5)
Province	Aceh	688 (66.2)
	North Sumatera	72 (6.9)
	West Sumatera	8 (0.8)
	South Sumatera	4 (0.4)
	Riau	12 (1.2)
	Lampung	24 (2.3)
	Jakarta	128 (12.3)
	West Jawa	68 (6.5)
	Yogyakarta	28 (2.7)
East Jawa	8 (0.8)	
Main complaints in the oral cavity	Toothache	68 (6.5)
	Tooth cavity	328 (31.5)
	Calculus	244 (23.5)
	Missing teeth	32 (3.1)
	Oral ulcer	96 (9.2)
	None	272 (26.2)

Table 1. Demographic characteristics of the 1040 participants.

Fear description of dental treatment

This study revealed a fear description of dental treatment based on a questionnaire compiled by the research team. The questionnaire contains questions about the fear of the possibility of COVID-19 virus infection from a dentist, fear of seeing a dentist cough, fear of dental instrument sterility, fear of seeing Personal Protective Equipment (PPE) used by a dentist, interest in treating teeth during a pandemic, information about patients dying of COVID-19 virus infection, fear of the rising cost of dental treatment, hand washing habits, fear of chatting with other patients, fear of looking at a dentist using PPE, and worrying when body

temperatures were measured. This study found that most of the participants were afraid of transmitting the COVID-19 infection from dentists (55.4%), moreover, the fear would increase when they saw a cough operator. Changing the habit of washing hands before undergoing dental treatment shows a fear of contracting a COVID-19 infection. Most patients also fear that the dentist may not sterilize the equipment. With the presence of dentists using PPE, although it was felt unfamiliar to use it at the beginning of the pandemic, it turned out that the participants did not mind with this new equipment (71.5%). Another thing that is interesting from the results of this study is that 82.3% of participants never heard any information about the death due to infection from the dentist. All of these pieces of information are shown in **Table 2**.

	Yes n (%)	No n (%)	Uncertain n (%)
Are you afraid of having the COVID-19 infection from a dentist/dental nurse when they are doing dental work?	576 (55.4)	144 (13.8)	320 (30.8)
Are you afraid of facing a dentist who is coughing that he/she might be infected with a COVID-19 infection?	756 (72.7)	48 (4.6)	236 (22.7)
Are you afraid of the possibility that your dentist does not sterilize the equipment properly?	444 (42.7)	296 (28.5)	300 (28.8)
Do you feel anxious/offended when you see a dentist wearing a complete Personal Protective Equipment (PPE) when doing your dental treatment?	160 (15.4)	744 (71.5)	136 (13.1)
Are you interested in doing dental care during the COVID -19 pandemic outbreak?	300 (28.8)	440 (42.3)	300 (28.8)
Have you ever heard the news about a patient who died from contracting COVID -19 from a dentist?	124 (11.9)	856 (82.3)	60 (5.8)
Are you worried about the additional dental costs charged to patients during the COVID-19 pandemic outbreak?	584 (56.2)	244 (23.5)	212 (20.4)
Do you wash your hands/use hand sanitizer before getting dental treatment?	980 (94.2)	12 (1.2)	48 (4.6)
Are you afraid to chat with other patients in the dentist's waiting room?	460 (44.2)	296 (28.5)	284 (27.3)
Are you afraid to receive dental treatment if the dentist does not use PPE?	676 (65.0)	104 (10.0)	260 (25.0)
Do you feel anxious if your temperature is checked before dental treatment?	84 (8.1)	892 (85.8)	64 (6.2)

Table 2. A description of fear in dental treatment in the public community during the COVID-19 outbreak.

Oral health knowledge related to dental treatment

The oral health knowledge of the participants showed that most of the participants had known the information about COVID-19 infection that as many as 6 items from the 11 questionnaire items have correct answers above 80%. This can be seen in the item the pattern of the COVID-19 virus transmission (85%), awareness of washing hands reduces the spread of the virus by 96.9%, coughing as a marker of COVID-19 infection (91.9%), the importance of implementing physical distancing in the waiting

room to prevent spread (97.7%), emergency cases are services that can be done during a pandemic (82.3%), and swelling gums due to abscess is one of the emergency cases (81.2%). However, even though the participants knew the pattern of virus transmission, most of the participants did not know or deny that the virus could spread from patient to dentist or vice versa (31.2%). The description of oral health knowledge is shown in **Table 3**.

	True n (%)	False n (%)	Don't know n (%)
The spread of the COVID-19 virus infection in the dental clinic area can be transmitted from the splash of the patient's saliva, contact with skin, blood, and sweat.	884 (85.0)	48 (4.6)	108 (10.4)
An autoclave is the best sterilizer for dental equipment.	560 (53.8)	8 (0.8)	472 (45.4)
The best mask that provides maximum protection is the N95 type.	792 (76.2)	12 (1.2)	236 (22.7)
Washing your hands with soap in 6 steps for 20 seconds can reduce the risk of spreading the COVID-19 virus infection.	1008 (96.9)	4 (0.4)	28 (2.7)
Body temperature measurements are carried out to detect the presence or absence of the COVID-19 virus infection.	688 (66.2)	304 (29.2)	48 (4.6)
One of the safest dental care during the COVID-19 pandemic is filling without the use of a bur.	312 (30.0)	136 (13.1)	592 (56.9)
Patients who have symptoms of cough and shortness of breath but want to have their tart cleaned should delay their visit to the dentist.	956 (91.9)	12 (1.2)	72 (6.9)
The waiting room at the dental clinic must apply a physical distancing pattern by providing a distance for each waiting chair.	1016 (97.7)	4 (0.4)	20 (1.9)
A dental practice should be open during the large-scale social restriction but only accept emergency cases.	856 (82.3)	64 (6.2)	120 (11.5)
The emergency case is swelling of the gums due to tooth abscess.	844 (81.2)	36 (3.5)	160 (15.4)
The transmission of COVID-19 infection can be originated from contamination by dentists and patients.	324 (31.2)	300 (28.8)	416 (40.0)

Table 3. Oral health knowledge related to dental treatment and COVID-19 infection.

The correlation between fear and oral health knowledge to dental treatment

This study showed that 87.02% of participants experienced mild fear, 12.98% moderate fear, while no severe fear. Furthermore, a good level of oral health knowledge was found in 53.7% and the average level was 46.3% of participants. Chi-square analysis showed a p-value <0.05, meaning that there was a relationship between fear and oral health knowledge related to dental treatment. The correlation between these two variables was analyzed through the Spearman test which showed a correlation value of -0.126 indicating that the direction of the correlation was negative with very weak correlation strength.

Discussion

This study was a cross-sectional study

that analyzed the perspective of fear felt by the public regarding oral health knowledge related to dental treatment in 1040 participants. This study also aims to determine whether there is a correlation between the fear level and oral health knowledge that is owned by the public community. The study showed that almost all participants have a mild fear of visiting a dentist. This means that participants do not consider COVID-19 infection to be a big barrier to undergoing dental treatment. Fear is the primary emotion of negative feelings. Fear begins with a stressful stimulus received by the sensory organs (ears, eyes, or skin), and ends with the release of chemicals that result in increased heart rate, shortness of breath, activation of body muscles during response flight or fight.¹⁴ Fear in this study is not identified with afraid feeling or fearful behavior such as running and screaming. Fear is called the center of the capital city because it can cause conscious experience and generate fear behavior in several situations. Fear relates stimuli to patterns of behavior.¹⁵ In this study, the stimuli of fear in the questionnaire is the patient's fear of being infected with COVID-19 virus infection from the dental treatment process, while fear behaviors decide to delay dental treatment, increase awareness of hand hygiene, physical distancing, wearing a mask, eating healthy food, and doing exercises.

Several questions in the questionnaire chose the words fear and anxiety. The concept of Fear describes a temporary adaptive phasic condition that arises as a result of the confrontation of a stimulus that is perceived as a threat, while anxiety is more indicative of a tonic state related to prediction and readiness.¹⁴ Fear is more of an emotional state regulated by the central nucleus of the amygdala whereas anxiety is related to a person's mood and is governed by the nearby bed nucleus of the stria terminalis.¹⁵ However, the dense interconnectivity of these two structures makes it difficult to uniquely assign either of them to participate in only one of these processes.¹⁶ The main function of fear and anxiety is the response to danger signals, threats, and conflicts that involve motivation and trigger adaptive responses. Some authors state that fear and anxiety cannot be precisely distinguished, but other authors believe that they show different phenomena.¹⁵ The fear referred to in this study is not related to motor response but is limited to the perspective of fear on dental

treatment. The feeling of low fear here only shows a sense of fear of activity but does not cause panic. Whereas medium fear is an increase in greater fear. The perspective of high fear here is fear accompanied by panic. This study analyzes the existence of four main factors that affect the perspective of fear, namely gender, education level, profession, and demographic location (province of origin). Previous research stated that a person's age, sex, occupation, socioeconomic status, educational degree, and mental health were the main factors in influencing a person's fear.¹⁷

The low fear of dental treatment in this study is influenced by gender differences. Women show a feeling of discomfort or anxiety which is quite small compared to men. This study is not in line with previous studies which found that there was a greater increase in fear or emotional distress in women than in men.^{18, 19} Our analysis of this difference was related to the various fear level measurement used by the previous researchers. We modified the questions specifically on fear associated with dental visits. About 80% of women in this study are of reproductive age. Most of the participants are college students and civil service employees who have high-school and undergraduate education levels. These findings indicate that a high level of education and a good job can determine a person's courage in coping with fear. Several studies have been conducted to measure fear of COVID-19 virus infection using different scales.²⁰ Previous investigation showed that pandemic conditions have caused mental disorders in society, especially an increase in fear, anxiety, and stress.²¹ Most of the participants came from Aceh province. This province is an area that has a small covid-19 mortality rate compared to other areas such as Jakarta and North Sumatra. This study shows that most of the population has a low fear of the spread of COVID-19 infection which can be transmitted by dentists to patients or vice versa.

At this time, there is no real evidence that demonstrates the relationship between dental treatment and the possibility of transmission of COVID-19 between patients to dentists and vice versa. However, what is clear is that there is considerable potential for transmission due to contamination from saliva, aerosols that spread when the dentist is drilling the teeth or cleaning the tartar, skin contact

between the dentist and the patient, or contamination that is from the instrument or the surface of the dental unit.²² In Indonesia, since the pandemic began in March 2020, all dentist activities have followed the infection control guidelines to prevent the spread of infection and supplementing standard precautions with droplet (transmission-based) precautions, especially in big cities such as Jakarta and Medan. Dentists and assistants use PPE which consists of face masks, health care respirators (mostly N95 types), gloves, face shields or goggles, dental disposable gowns, and surgical shoes. Currently, a rapid test is a mandatory procedure for patients before receiving dental treatment at several private hospitals in Jakarta. Besides, dental health workers have swab tests every 2 weeks to ensure the health of these workers. Several other health facilities do not require a rapid or swab test but must complete a history of COVID-19 infection which contains a history of free interaction with patients with COVID -19 infection, does not have symptoms of infection such as fever, fatigue, dry cough, shortness of breath, and loss of taste or decreased appetite and no travel to areas affected by the COVID -19 pandemic for the past 14 days. All of these procedures are structured to prevent the spread of covid-19 between patients and dental health workers. Although this procedure does not go through an ideal process such as not doing a swab test on the patient, it is hoped that it can reduce the spread of further infection.

Regarding the news about the death of dentists due to COVID-19 virus infection from patients after dental treatment, it was reported by The National Disaster Mitigation Agency in Indonesia, that the number of confirmed cases of COVID-19 has continued to increase, but only a small proportion of dentists have died. This report also states that not all work at the forefront of the fight against COVID-19 so that accurate data cannot be ascertained about dentist or patient deaths due to COVID-19. Currently, coverage of pandemic cases in Indonesia is mostly spread based on social media such as Facebook, Instagram, Twitter and followed by television. This study shows that almost all participants did not get news of a dentist who died as a result of contracting COVID-19 from a patient. This is in line with other studies in Spain and China that showed a small number of dentists who died and no reports of transmission at the dental office.²³

Dentist work is classified as a high-risk occupation of infection, especially because the virus is airborne. This situation is far more dangerous than the spread of disease through blood or skin contact. In our opinion, the low mortality rate due to covid-19 transmission among dentists is due to the swiftness of dentists who carry out the right SOP and policymakers to protect the dentist profession by issuing accurate protection regulations to save many dentist's lives. A large number of dentists around the world are becoming more vigilant about implementing protocol changes.²³ Even though when the pandemic increased several months ago, many dentists closed their clinics, most of them were very concerned about their professional future and hoped that the economic improvement would be able to restore the normal activities of dentist practice as a whole.²⁴

This study found a significant relationship between fear and dental treatment. The higher the knowledge of oral health knowledge related to dental treatment, the lower the fear felt by the patient. This is in line with previous research, namely the level of knowledge that will affect a person's attitude.^{25, 26} Knowledge plays an important causal role in the emergence of attitude-behavior consistency. The role of knowledge here is assumed to increase confidence so that it can cover other behaviors such as anxiety and fear. Thus, knowledge-behavior matching effects could be one mechanism by which knowledge influences attitude-behavior consistency.²⁷

Limitation

This study has several limitations, including that even though the sample size is quite large, the distribution of the sample is not evenly distributed between islands in Indonesia so that it cannot represent the entire population of Indonesia. Most respondents originated from one province which incidentally is included in the low COVID-19 infection zone. Different results might be achieved if the survey was conducted in a red zone such as Jakarta.

Another limitation is the survey with self-reported measures can cause a fairly large potential bias, including misunderstanding of proper measurement and social desirability bias; where the respondent wants to "look brave or smart" in the survey. Also, because this survey uses Google Form which requires a fairly good internet network and good ability to use gadgets,

the distribution of the survey is less evenly distributed due to the unresponsiveness of elderly, patients who do not have cellphones and do not know how to fill in Google Forms.

Conclusions

Although the increase in COVID-19 cases is still increasing in Indonesia, most of the participants have a mild fear of dental treatment. The greatest fear comes from the possibility of transmission of the COVID-19 infection from dentists and seeing dentist with one of COVID-19 infection symptoms. The changing the habit of washing hands before undergoing dental treatment shows a fear of contracting a COVID-19 infection. People with a good level of knowledge have less fear than average level.

Declaration of Interest

The authors report no conflict of interest.

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