

Original article

# The correlation between the knowledge level related to practice protocols and dentists' anxiety levels in practice during the COVID-19 pandemic

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## ABSTRACT

**Background:** The global epidemic of COVID-19 has reached an emergency status in the health system, including dentistry. The dentist profession is inseparable from the possibility of direct or indirect contact with microorganisms in the patient's blood or saliva. National and international dental associations, such as Persatuan Dokter Gigi Indonesia and the American Dental Association, have published practice protocols that must be applied by dentists who choose to continue practicing during the COVID-19 pandemic. Dentists' knowledge of practice protocols in the current situation is very important, as it enables dentists to take infection control measures against virus transmission in the dental practice environment. Strong knowledge can have a positive impact on the psychological state of dentists, such as by reducing the anxiety level of dentists when treating patients during the pandemic. **Purpose:** To determine the correlation between the level of knowledge of dentists regarding practice protocols and the level of anxiety that they face regarding practicing during the COVID-19 pandemic in Indonesia. **Methods:** The research design is a correlation analysis, namely research with a cross-sectional approach and purposive sampling, with a total sample of 170 respondents. Data were collected through Google form and univariate analysis was carried out then bivariate analysis with Kendall's Tau correlation test. **Results:** This study found that as many as 166 respondents (97.6%) had a good level of knowledge and as many as 87 respondents (51.2%) had a minimum level of anxiety. The results of the analysis were obtained and found to be 0.031, which means  $p < 0.05$  so that it shows a relationship between the two variables. **Conclusion:** There is a correlation between the level of knowledge and the level of anxiety of dentists in practice during the COVID-19 pandemic.

**Keywords:** anxiety; COVID-19; dentist; knowledge

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## INTRODUCTION

At the beginning of the new decade, on 30 January 2020, the World Health Organization (WHO) declared a global public health emergency against the coronavirus disease outbreak, which is known as Corona Virus Disease 2019 (COVID-19).<sup>1</sup> It started with the discovery of a new pathogen that spread across China to Europe<sup>2</sup> and has since rapidly reached pandemic status.<sup>1</sup> COVID-19 has created a state of emergency in the health system, including dentistry.<sup>2</sup> Health professionals, especially dentists, are at a higher risk of exposure to infection due to having close contact with infected patients.<sup>3</sup> Transmission of COVID-

19 during dental procedures can occur through droplet or aerosol inhalation from an infected patient or direct contact with oral fluids, mucous membranes and contaminated instruments and surfaces.<sup>2</sup> Knowledge plays an important role in human life because it reflects how an individual understands the situation in the surrounding world, which can later determine how a person acts.<sup>4</sup> Factors that influence disease prevention include a person's knowledge, attitude and actions towards the disease. Someone who is knowledgeable about something tends to make more appropriate decisions regarding the problem.<sup>5</sup> Meanwhile, anxiety is an unpleasant emotional state that is experienced by individuals when thinking about something unpleasant

that will happen and can cause feelings of fear, caution and vigilance. Anxiety is an unpleasant fear or a sign that something bad will happen.<sup>6</sup> Especially in the current COVID-19 pandemic situation, fear increases symptoms of anxiety and stress in healthy people.<sup>7</sup> Therefore, anxiety is used as an indicator in research. Anxiety causes a mixture of emotions that are felt by an individual, where fear is the dominant emotion. Anxiety is more appropriate to describe a person's emotional condition during the current COVID-19 pandemic because the outbreak of this virus can cause a person to worry about the unexpected that might happen in the future.<sup>8</sup>

In the current era of the COVID-19 pandemic, dentists are vulnerable to anxiety when dealing with patients because effective drugs against COVID-19 are still in the research and development process. Moreover, vaccinations have been used all over the world. As stated by the WHO, the virus is transmissible through droplets, and this poses a risk to dentists when performing dental procedures. Anxiety and fear are strong emotions that may be related to the over-reporting of the pandemic being disseminated through social media, electronic or print, not all of which contain scientific evidence and well-structured knowledge about COVID-19. This is because screening and diagnostics take time, and there is inadequate Personal Protective Equipment (PPE) and unclear treatment and immunisations.<sup>7</sup> The level of anxiety that is experienced in a COVID-19 pandemic situation can affect dentists' performance and decision-making.<sup>9</sup>

In their research, Lai et al.<sup>10</sup> conducted a survey on health workers who were working in hospitals in Wuhan and Hubei. Most of the respondents had symptoms of insomnia (34%), anxiety (44.6%), depression (50.4%) and distress (71.5%).<sup>10</sup> Kinariwala et al.<sup>11</sup> conducted a survey on dentists in India. In the survey, 45.9% of 403 respondents were worried about the risk of contracting COVID-19 through patients.<sup>11</sup> An anonymous online survey was sent to dentists who were practicing in Modena and Reggio Emilia, which are some of the regions in Italy that were most affected by COVID-19. It found that almost 85% of dentists reported that they were worried about exposure to infection during clinical activities. The results of general anxiety disorder-7 (GAD-7) showed that 9% of respondents reported experiencing severe anxiety. In conclusion, the COVID-19 emergency had a negative impact on the activities of dentists who were practicing in the Modena and Reggio Emilia areas. This negative impact perception is accompanied by feelings of fear (42.4%), anxiety (46.4%) and worry (70.2%).<sup>2</sup>

National and international dental associations, such as *Persatuan Dokter Gigi Indonesia* (PDGI)<sup>12</sup> and the American Dental Association (ADA), have published practice protocols that must be applied by dentists who choose to continue practicing during the COVID-19 pandemic. Although the ADA has published prevention guidelines, most dentists are reluctant and afraid to perform treatment during the COVID-19 pandemic. Because Indonesia is the fourth most populous country in

the world, it is likely to suffer greatly over a longer period compared with countries with a small population. This will affect various aspects of society, such as work, health and psychological factors, and clinical dentists, who will be more susceptible to transmission from COVID-19. In this study, the researchers wanted to investigate the correlation between the level of knowledge of dentists regarding practice protocols and the level of anxiety that they face regarding practicing during the COVID-19 pandemic in Indonesia.

## MATERIALS AND METHODS

This research has been approved by the Health Research Ethics Commission of the Health Polytechnic of Malang, with protocol number 965/KEPK-POLKESMA/2020. This study is a cross-sectional study that was conducted on both general dentists and specialists in Indonesia, who practiced during the COVID-19 pandemic. The sampling method was purposive sampling because the researchers wanted to provide a more representative value regarding the knowledge and anxiety levels of dentists who actively practiced in this situation from several provinces in Indonesia, such as East Java, Central Java, West Java, DKI Jakarta, North Sumatra, Riau, East Nusa Tenggara, Bali, East Kalimantan, and South Sulawesi. The participants had to have WhatsApp social media and be willing to participate in this research. The sample size estimation was carried out by referring to the number of dentists in several provinces of Indonesia who had different transmission risks. The type I error ( $\alpha$ ) was set at 5%, which is a common range in health or social research. The minimum sample size that was calculated was 164.

The type of research used is correlation analysis to determine the correlation between two groups of variables in a situation or group of subjects. The variables that were measured were the level of knowledge related to practice protocol and the level of anxiety of the dentist, and measured using a research instrument in the form of a closed questionnaire. The questionnaire was created and packaged using a Google form that can be accessed for free, and links to online surveys were sent via WhatsApp social media. The knowledge questionnaire in this study focused on assessing respondents' understanding of the practice protocol when dealing with patients during the COVID-19 pandemic. The anxiety questionnaire consisted of question items that were related to anxiety symptoms, such as fear, worry and anxiety, which affect the respondent's psychology regarding the future of their practice. To avoid research bias, the researcher studied the research on several previous surveys to investigate the question items that were relevant to the research. Therefore, the question items in this study have been adapted from English-language surveys in Modena and Reggio Emilia<sup>2</sup> which were then translated into valid and appropriate Indonesian, as well as practice guidelines issued by PDGI. In addition, to assess

the psychological impact on dentists when practicing in the current situation, such as fear, anxiety, worry, sadness and anger, an anxiety-measuring instrument in the form of the GAD-7 scale was used to determine the presence or absence of anxiety dysfunction in the respondents.<sup>13</sup>

The primary data was obtained directly from respondents and analysed using Statistical Product and Service Solution (SPSS) Statistics 21. Researchers carried out content and face validity by identifying 22 questions from knowledge and anxiety questions. The reliability test was carried out by testing the questionnaire on 14 general dentists and specialist dentists, who were spread across the cities of Malang and Blitar, twice with an interval of 7–14 days. It was analysed using Cronbach's alpha ( $\alpha$ ) with a value of 0.787 for the variable knowledge and 0.889 for the anxiety variable so that the items in this questionnaire would be reliable. After that, the questionnaire was distributed to the research sample. Data collection was carried out from 15 November 2020 to 27 April 2021, with a total sample of 170 respondents. The respondent data that was collected was then analysed using univariate and bivariate analyses. In the bivariate analysis, Kendall's Tau correlation test was used to measure the correlation between the level of knowledge and the anxiety level of the dentist. Data on the characteristics of the respondents and the categorisation of each variable, namely the level of knowledge related to practice protocol and the level of anxiety in the respondents, was described.

**Table 1.** Demographic information of dental practitioners (n=170)

| Characteristic                  | Frequency | Percentage (%) |
|---------------------------------|-----------|----------------|
| Gender                          |           |                |
| Female                          | 137       | 80.6           |
| Male                            | 33        | 19.4           |
| Age (years)                     |           |                |
| Less than 35                    | 82        | 48.2           |
| 35–55                           | 74        | 43.5           |
| Above 55                        | 14        | 8.2            |
| Last education                  |           |                |
| General dentist                 | 150       | 88.2           |
| Specialist dentist              | 20        | 11.8           |
| Dental practice                 |           |                |
| Public health centre            | 39        | 22.9           |
| Hospital                        | 31        | 18.2           |
| Clinic                          | 45        | 26.5           |
| Private                         | 55        | 32.4           |
| Province                        |           |                |
| East Java                       | 100       | 58.8           |
| Central Java                    | 16        | 9.4            |
| West Java                       | 5         | 2.9            |
| DKI Jakarta                     | 3         | 1.8            |
| Bali                            | 13        | 7.6            |
| North Sumatera                  | 4         | 2.4            |
| Riau                            | 12        | 7.1            |
| East Nusa Tenggara              | 6         | 3.5            |
| East Kalimantan                 | 7         | 4.1            |
| South Sulawesi                  | 4         | 2.4            |
| Professional experience (years) |           |                |
| Less than 5                     | 73        | 42.9           |
| 5 – 10                          | 31        | 18.2           |
| 10 – 15                         | 23        | 13.5           |
| Above 15                        | 43        | 25.3           |

## RESULTS

A total of 170 dentists completed the questionnaire in full. Of the respondents, 19.4% were men, and 80.6% were women. Most of the respondents were general dentists (150, 88.2%) and aged under 35 years (48.2%). Therefore, most had practiced for less than five years (42.9%). A total of 55 (32.4%) participating dentists reported that they worked in private practices, while 22.9% worked in public health centres, 18.2% in hospitals and 26.5% in clinics. Moreover, 100 (58.8%) of the respondents came from the East Java province, as illustrated in Table 1.

Approximately 97.6% of respondents had a good level of knowledge, as they understood the practice guidelines that were issued by PDGI. Almost all dentists (161, 94.7%) feared being infected with COVID-19 by both their patients and co-workers, and 91.8% of them felt anxious when treating patients who showed symptoms of a cough or were suspected of being infected with COVID-19. Approximately 51.8% of dentists wanted to close their practice until the number of confirmed cases started to decline (Table 2). Regarding COVID-19, only 34.7% reported experiencing anxiety, approximately 17.2% experienced fear, 7.1% felt sad and most (41.2%) felt concerned about the COVID-19 situation. The average GAD-7 score was 5.211, which indicates an overall mild generalised anxiety level. More precisely, 51.2% of respondents showed minimal anxiety (score 0–4), 35.3% showed mild anxiety (score 5–9), 8.8%

**Table 2.** Assessment of dentists' fear and anxiety when practicing during the COVID-19 pandemic (n = 170)

| Questions   | Yes<br>n (%)  | No<br>n (%) |
|---|---------------|-------------|
| Are you afraid of getting infected with COVID-19 from a patient and co-worker?                            | 161<br>(94.7) | 9 (5.3)     |
| Do you feel anxious when providing treatment to a patient who is coughing or showing suspicious symptoms? | 158<br>(91.8) | 12 (8.2)    |
| Do you want to close your dental practice until the number of COVID-19 cases starts declining?            | 88 (51.8)     | 82 (48.2)   |

**Table 3.** Respondents' concerns about the future of practice

| Questions:  | Frequency<br>(n=170) | Percentage<br>(%) |
|---|----------------------|-------------------|
| How worried are you about your professional future? |                      |                   |
| Extremely   | 6                    | 3.5               |
| A lot   | 12                   | 7.1               |
| Quite   | 56                   | 32.9              |
| A little  | 70                   | 41.2              |
| Not at all  | 26                   | 15.3              |
| Total   | 170                  | 100               |

showed moderate anxiety (score 10–14) and 4.7% showed severe anxiety (score 15–21).

To the question, “How worried are you about the future of your practice?”, most respondents (41.2%) felt slightly worried, as illustrated in Table 3. For the last question, “What worries you the most?”, several answers could be selected by the respondent. Most of the respondents in this study stated that “they do not know when this emergency situation will end”, and 142 respondents (83.5%) and the second highest percentage answered that “new procedures and new devices are needed for safety and infection prevention” namely 60% of respondents. The percentage with a lower preference on this question resulted in respondents’ answers, as follows the “difficult situation in dental practice will get worse” (29.4%), “patients will have less money to spend” (18.2%) and the “opportunity to lose their job or have to lay off employees” received the smallest indicated preference (11.8%).

Based on the analysis of this study, it was found that Kendall’s Tau correlation was 0.031, which means  $p < 0.05$ , with a correlation coefficient ( $r$ ) of 0.158. This means that there is a significant correlation between the level of knowledge and the level of anxiety of dentists when practicing during the COVID-19 pandemic, with a weak correlation strength. This shows that the research hypothesis is rejected and that the level of knowledge that is possessed by dentists affects their level of anxiety when practicing.

## DISCUSSION

In a pandemic situation, the levels of stress, fear and anxiety increase. Correspondingly, the level of difficulty that is experienced among healthcare staff is higher than that experienced by the general population, as they have a higher risk of infection.<sup>7</sup> Since the SARS-CoV-2 pandemic, other surveys have been proposed by other international agencies, with the purpose of measuring the impact of this epidemic in the dentists’ environment.<sup>2</sup> The older group of dentists were less likely to develop anxiety than younger dentists, which has also been observed among the public during the COVID-19 outbreak. In addition, personal protective measures can reduce anxiety among dentists, as these measures have the potential to reduce the fear of COVID-19.<sup>14</sup> This survey was conducted by taking samples from several provinces in Indonesia with different levels of risk representing the COVID-19 situation in Indonesia so that various data were obtained. This survey reached 170 respondents, who comprised general and specialist dentists in Indonesia.

Many female respondents who participated in this study showed that female dentists were more dominant in the field of dentistry. This is related to data obtained from the Central Statistics Agency of Malang City, which of the 72 number of dentists in Malang City spread across several health centers and hospitals in 2019 it was found that 58

of them were female, and the remaining 14 were male. The results of this study also showed that respondents who were aged under 35 years comprised the majority (82 respondents, 48.2%). According to the data reported by the ADA, among 201,117 dentists working in the United States in 2020, 17% were under 35 years old, 24% were 35–44 years old, 21.6% were 45–54 years old, 21.1% were aged 55–64 years and 16% were aged 65 years and over. This shows that most dentists actively practice in adulthood, which is under 35 years of age. Most of the respondents were general dentists, namely 150 respondents (88.2%) which from the PB PDGI statistics in 2021 also showed that of the number of dentists in Indonesia as many as 40,380 people, 35,979 of them were general dentists, and the rest were divided into several specialties. Based on the results of the research above, most of the respondents have a private practice (55 respondents, 32.4%). This is followed by respondents who work in clinics (45 respondents, 26.5%) and health centres (39 respondents, 22.9%), and the rest work in hospitals (31 people, 18.2%). Most respondents came from East Java because the researchers optimised the distribution of questionnaires to dentists who were working in the East Java area. Respondents who had practiced for <5 years (73 respondents, 42.9%) were the majority in this study. This correlates with the data held by the Indonesian Medical Council, which shows that the number of dentist graduates is 1,000–1,500 per year. This means that the population of dentists in the field is currently dominated by new dentist graduates with practical experience of less than five years.

The knowledge of dentists in this study was seen from their understanding of practice guidelines that must be applied during the COVID-19 pandemic. As with other infectious infections, this practice guideline covers personal protective equipment, hand washing, detailed patient evaluation, isolation using a rubber dam, anti-retraction handpieces, mouth rinses before dental procedures and clinical disinfection.<sup>2</sup> Based on relevant practice and research guidelines, dentists should implement strict personal protective measures and avoid or minimise operations that can generate aerosols or droplets.<sup>2</sup> The results that were obtained in this study were very similar to the findings in previous studies, in that most of the respondents (97.6%) had a high level of knowledge.<sup>3</sup> In previous studies, the researchers believed that dental professionals can play an important role in suppressing the transmission of COVID-19. The infection control guidelines that are adopted in dentistry were last provided during the Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) pandemic, and similar guidelines may have prevented the spread of the epidemic of Severe Acute Respiratory Syndrome (SARS) which is a viral respiratory disease caused by the SARS-associated coronavirus in 2003 in dentistry.<sup>15</sup> This is not in accordance with the situation in Indonesia at the time of the initial outbreak of the COVID-19 outbreak, transmission rates were found in several dental practices,

although they only represented 4% of the total population of dentists in Indonesia.

The GAD-7 scale assessment found that 51.2% of respondents had a minimum level of anxiety. The anxiety-measuring instrument only assessed the frequency of respondents' anxiety and concerns among dentists about the inability to prevent the end of the pandemic, followed by the need for new procedures and devices to prevent the spread of SARS-CoV-2 in dental practice. In similar studies that were conducted previously, symptoms of anxiety, such as fear, worry, sadness and anger, showed almost similar results among dentists regarding the COVID-19 pandemic.<sup>3,14</sup>

The correlation results that were obtained in this study are not in line with the research by Koçak et al.<sup>16</sup> entitled "Knowledge and Anxiety Levels of Dentists about the COVID-19 Pandemic", which found no significant correlation. The differences in the variables that were studied also influenced the results in this study. The results of the study by Koçak et al.<sup>16</sup> showed that most respondents experienced somatic symptoms, such as discomfort, fatigue and sleep disturbances, while in this study, no data was collected regarding the somatic symptoms of anxiety.<sup>16</sup>

The research data was obtained over a short period, as there will always be changes or impacts from the COVID-19 pandemic on the psychological condition of dentists, which will always be balanced by increasing the application of infection control guidelines during the COVID-19 pandemic. Therefore, the knowledge and mental conditions of dentists, especially anxiety, can change according to how the pandemic develops.

Zhao et al.'s<sup>14</sup> research stated that there are several factors that could potentially be related to the anxiety state of workers in the dental practice environment, including the following: i) number of working hours per day; ii) number of working days per week; iii) number of working hours between breaks; iv) whether aerosolisation procedures are performed frequently; v) whether they have ever treated confirmed or suspected cases of COVID-19; and vi) whether their skin or wounds were exposed to saliva, blood or other materials from the patient's body fluids. However, in this study, these were not analysed. As the data collection was related to these potential factors, it became a limitation in the assessment of the respondent's level of anxiety.

In addition, the respondents who participated in this study did not cover the entire population of dentists in Indonesia. Therefore, generalisation of the study needed to be done. There is a possibility that the results that were obtained will be more varied, as the general conditions of each province in Indonesia have a different risk of transmission. This affected the sample size in the study, as it was small. Another problem in this study is the selection bias and sampling limitations because this research is an online survey, and the respondents were only obtained using social media in the form of WhatsApp.

This study shows that during the COVID-19 pandemic, most dentists in Indonesia could overcome

their psychological state when deciding whether to continue practicing. Researchers found that the anxiety status of dentists in Indonesia was at a minimal level. This is because most dentists have a good knowledge of the practice guidelines that were issued by the local dentist association, namely PDGI, for cross-infection control during the COVID-19 pandemic. Therefore, it can be concluded that having a good level of knowledge correlates with anxiety management among dentists when practicing during the COVID-19 pandemic.

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