

## Qualitative Study of Perception of COVID-19 Prevention among Dental Healthcare Personnel using the Health Belief Model

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### Abstract

Dentists, together with dental and oral health therapists are at high-risk of COVID-19 infection due to their exposure to saliva, blood, as well as aerosol and droplet production during most dental procedures. Numerous preventive measures have been carried out, including mass education and implementation of infection control precautions. However, personal perception is essential for preventing disease transmission.

Aim of this study was to analyse perception of COVID-19 prevention among dental healthcare personnel (DHCP) in the Executive Clinic of Oral and Dental Hospital Faculty of Dentistry Universitas Trisakti, Indonesia, using the Health Belief Model.

This study used a qualitative case study approach. Information was collected from the dentists, dental and oral health therapists, as well as the hospital director via in-depth interviews.

Most informants perceived that they were at greatly increased risk of being exposed to COVID-19, and that the SARS-CoV-2 was extremely dangerous towards their safety. The prevention of COVID-19 provided exceptional benefit despite several barriers to its implementation, such as limited infrastructure as well as other people's behaviour. Nevertheless, the presence of regulations and experience of other people who have been exposed to COVID-19 encouraged informants to maintain the preventive behaviour. The informants had strong self-confidence that they were able to take precautions against COVID-19. Based on the owned perception, it is very possible for the informants to be able to maintain preventive behaviours from COVID-19 inside and outside the hospital area.

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### Introduction

On December 2019, Coronavirus Disease 2019 (COVID-19) caused by SARS-CoV-2 infection, emerged initially in Wuhan City, Hubei Province of China. Since then, the disease has then spread to numerous countries across the globe.<sup>1</sup> The pandemic began to reach Indonesia in early March 2020 and has shown no signs of ending until present. On January 2021, the cumulative number of confirmed COVID-19 cases is 1,012,350 across all 34 provinces. Jakarta, the capital city, recorded the highest number of cases, accounting for 25.1% of all

COVID-19 cases in Indonesia.<sup>2</sup>

The disease spreads primarily through virus-containing respiratory droplets or aerosols exhaled by an infected person.<sup>3</sup> Healthcare personnel are at the frontlines in the fight against COVID-19 pandemic, making them at higher risk of being infected with SARS-CoV-2.<sup>4</sup> A number of Indonesian healthcare personnel have lost their lives to the coronavirus. As per January 2021, The Indonesian Doctor Association stated that 237 medical doctors, 15 dentists, and 146 nurses have died after being infected with SARS-CoV-2.<sup>5,6</sup> Due to the characteristics of dental practice settings, the risk of cross infection between dentists and patients can be very high. Thus, a strict and effective infection control measures is indispensable in the dental clinics and hospitals in areas with high COVID-19 transmission.<sup>7</sup>

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(Usakti) provides limited patient services during COVID-19 pandemic. The risk of COVID-19 exposure, to dentists as well as dental and oral health therapists in particular, urged the hospital management to take multiple prevention efforts, which began with the implementation of health protocols to physically modifying the hospital facility. Even so, individual behaviour, which is influenced by personal belief, value, and habit, remains the most important factor for preventing the spread of disease as well as maintaining one's health. The Health Belief Model (HBM) is an approach that could be used to predict the behaviour based on the individual perception.<sup>8</sup> This approach emphasizes that to achieve a healthy behaviour, individuals need to perceive their susceptibility to disease, and to understand that the benefits of behavioural change outweigh the potential barriers of the recommended actions.<sup>9</sup>

The main goal of this study was to analyse perception of COVID-19 prevention among dental healthcare personnel (DHCP) in the Executive Clinic of Oral and Dental Hospital Faculty of Dentistry Usakti. Specifically, the study also aimed to describe the COVID-19 prevention behaviours and the healthcare personnel's perception using the HBM. The outcome of this study might be used as a guidance for improving healthcare personnel's behaviour in order to prevent COVID-19 transmission both inside and outside the hospital area.

### Materials and methods

A qualitative case study was used to explore in-depth the perception of COVID-19 prevention among dental healthcare personnel. The study was carried out on December 2020. Due to the ongoing pandemic, data was collected via online in-depth interviews using Zoom Meeting (Version 5.4.7). Eight informants were interviewed: two general dental practitioners, two specialist dentists in dental conservation, one oral medicine specialist, one periodontist, two dental and oral health therapists, and the hospital director. All informants were practicing healthcare personnel in Executive Clinic of Oral and Dental Hospital Faculty of Dentistry Usakti provided limited patient services during the pandemic. Triangulation method was used to validate data collected from the dentists and therapists with information obtained from the hospital director.

Ethical approval for this study was obtained from Health Research Ethic Commission, Faculty of Dentistry Usakti (num. 434/S3/KEPK/FKG/12/2020). Informant's written consent was gained prior to each interview, after receiving an explanation on the benefit and aim of the study. Interview results were transcribed and coded. Answers were thematically grouped and plotted into a matrix. A content analysis was performed to the transcripts.

### Results

All informants were female. The mean age of dentists was 43.6 years, ranging from 36 to 51 years old. The mean length of employment was 11.2 years, ranging from 6 to 17 years. Meanwhile, the mean age of therapists was 35 years, ranging from 27 to 43 years, and the length of employment was between 3 to 10 years. Results from in-depth interviews include the following: COVID-19 preventive behaviour, the perceived susceptibility and perceived severity towards COVID-19, as well as perceived benefits, perceived barriers, cues to action, and self-efficacy on COVID-19 prevention.

**COVID-19 Preventive Behaviour:** All informants stated that they have carried out the preventive behaviours both inside and outside the hospital, such as maintaining the standard 3M health protocols to always wash hands with soap and water or hand sanitizer, to wear face masks, and to keep a distance. One dentist, who was a COVID-19 survivor, mentioned that she kept maintaining physical distance, especially from the elderly parents at home, although she has been declared negative from COVID-19. She considered herself to still have the potential to spread the disease since she worked in the hospital environment. The hospital director confirmed that in the moment, both the dentists and dental therapists in the executive clinic have properly implemented the preventive behaviour, unlike in the early days of the pandemic, where many of the healthcare personnel did not keep a safe distance from others. When a dental therapist was found positive with COVID-19, it became the turning point for all healthcare personnel in the hospital to implement the COVID-19 prevention protocol. Specifically, in terms of maintaining physical distance, as stated by several informants:

*"Now, everyone is compliant to the protocols."*

*At the beginning of the pandemic, it was a bit lacking, indeed. It's just so hard to keep your distance." (14)*

*"Although we're not wearing masks at home, we keep a physical distance. In fact, we are standing two meters away when we're talking." (17)*

**Perceived Susceptibility towards COVID-19:** Most of the informants perceived that they were highly susceptible to COVID-19 exposure due to the nature of their work. It requires them to be in direct contact with patients, making them easily exposed to aerosols generated during dental procedures. At the beginning of the pandemic, the clinic has not been equipped with HEPA filters, UV lights, or High Volume Evacuator (HVE). The latest is necessary to reduce the number of aerosols. Moreover, healthcare personnel have not fully complied with health protocols of COVID-19. However, one dentist perceived that she was only fairly susceptible to COVID-19 since she has been wearing adequate Personal Protective Equipment (PPE). Some of their statements are:

*"I think this is highly risky. At the beginning of the pandemic, we had no adequate facility and equipment to manage procedures that generate aerosols." (14)*

*"It's fairly risky, but I always wear my PPE well during my clinical duty." (17)*

**Perceived Severity of COVID-19:** Many of the informants perceived that SARS-CoV-2 was very dangerous, especially to those with impaired immunity. However, some of the dentists perceived that the virus was not that harmful considering they were young adults, healthy, have no comorbidities, and that COVID-19 was only harmful to the elderly people. Below are their statements:

*"It's very dangerous. If we have low immunity, perhaps the coronavirus can infect easily." (15)*

*"It's harmful to elderly people and those with comorbidities. But for young adults, yes, we can get infected, but it is not necessarily harmful." (13)*

**Perceived Benefits of COVID-19 Prevention:** Most of the informants perceived that preventive measures, such as maintaining 3M protocols, wearing level 3 PPE (head cap, goggle or face shield, N95 mask, surgical scrub, cover all, two layers of hand gloves, shoes and shoe covers, and also rubber boots), were beneficial to reduce the risk of COVID-19 exposure. Another benefit was providing self-

protection and sense of security for the dentists, dental therapists, and patients. A dentist, who was also a COVID-19 survivor, perceived that preventive measures were useful to reduce the amount of virus in the body, so that the viral load would not be too high. Another dentist perceived that the benefit was to stop the COVID-19 transmission. These are the informants' statements:

*"By implementing 3M protocols, we can be free from COVID-19, even though it is not a hundred percent. But at least, it is enough to reduce the risk of infection." (16)*

*"There is a clear benefit for me, as a COVID-19 survivor. By taking preventive measures to COVID-19, the number of virus infecting my body would be less than other survivors." (17)*

**Perceived Barriers towards COVID-19 Prevention:** The informants perceived no internal barriers hindering them from maintaining COVID-19 preventive measures within the hospital area. However, barriers came from external factors such as noncompliant behaviour of other health personnel towards the standard operating procedure (SOP) of COVID-19 prevention. Many health personnel wore masks improperly with nose exposed or be worn below the chin. Moreover, some health personnel did not practise physical distancing during breaks or lunch time. Barriers were found more at the beginning of the pandemic, such as shortage of cover all PPE and disinfectant agents. However, these problems were gradually resolved when supplies were able to meet the surge of demand. Another barrier mentioned by a dental therapist was the limited number of portable foot-operated hand washing station outside the clinic. Also, inadequacy of the available dining room due to its proximity to the hospital "red zone" and was not wide enough to be used together while having to practice physical distancing during breaks or lunch time. Below are several of the informants' statements:

*"Not everyone has the same level of awareness, except for the dentists. Some staff are still wearing masks below the nose." (13)*

*"We are lacking hand washing facilities... Our dining hall is also located inside the executive room, which is not that safe, since it is within the red zone." (16)*

The difficulty of maintaining physical distance was also the barrier experienced by all informants when practising preventive measures

outside the hospital. Although they made their best efforts, it was extremely difficult to maintain physical distance in public spaces. Especially for the dental therapists, who used public transportation to get to work. The large number of passengers at a time made it an evident barrier of keeping a safe distance from one another. Additionally, one dentist addressed a barrier regarding false perception within the society. Some people were mistakenly believed that the virus causing COVID-19 did not exist and all of this was the government's conspiracy. Some of their statements are:

*"We tried to keep our distances but other people keep come in close, especially when we are visiting the shopping centres." (16)*

*"I still use public transport. One day the driver mentioned that he did not believe that Corona existed, he said that it was the government's conspiracy." (12)*

#### **Cues to Action of COVID-19**

**Prevention:** Several factors encouraged the informants to continue practising COVID-19 preventive measures inside the hospital. Such as, knowing that some of their colleagues were infected with COVID-19 despite no direct contact with patients, as well as establishment of regulations and health protocols in the hospital: the 3M protocols, the regulation to wear level 3 PPE for health personnel working inside the dental treatment room, the PPE donning-doffing regulation, etc. Reminder from co-workers about non-compliant behaviour also encouraged health personnel to better comply with the COVID-19 prevention protocols. Below are their statements:

*"Several personnel were tested positive, and they were not those who worked in direct contact with patients." (11)*

*"Since COVID-19 has been declared a pandemic, the hospital has established health protocols that is in line with the Health Ministry recommendation." (14)*

*"In the hospital, sometimes we improperly wore the PPE or not following the SOP. Whenever a doctor or colleague saw that, we would surely get a reminder." (16)*

Outside the hospital, majority of informants were encouraged to practise COVID-19 preventive measures due to the presence of high-risk family members, such as the elderly parents with comorbidities. One dentist stated that what motivated her was the unpleasant experience of her relative after recovering from

the disease, such as limited physical activity and the high cost of treatment. Another dentist, a COVID-19 survivor, stated that the experience of a period of self-isolation encouraged her to take more stringent preventive behaviours. In addition, she perceived that she still had the risk of being reinfected and spreading the disease to her family members since she worked in the hospital environment every day. Some of their statements are as follows:

*"One of my parent-in-law has comorbidities, so I am afraid that I'll become the carrier." (11)*

*"From the stories of those who had been infected, the amount of money spent was extraordinary, the cost was really expensive. Also, the experienced discomfort." (12)*

#### **Self-Efficacy towards COVID-19**

**Prevention:** Almost all informants stated that they were highly confident of being able to properly implement COVID-19 preventive measures. A similar statement was addressed by the hospital director, for numerous educational sessions have been carried out for both medical and non-medical personnel working at the hospital. However, one dentist was less confident since she believed that there was still a possibility of being negligent to COVID-19 prevention protocols. Their statements are as follows:

*"I am very confident that the healthcare personnel at the hospital are able to prevent COVID-19, since we have done numerous educational sessions." (14)*

*"I cannot be too sure about this. For example, it is impossible for us not to eat (at the hospital) and we take off the mask when eating ... we missed lots of things too." (13)*

#### **Discussions**

During the COVID-19 pandemic, the Executive Clinic of Oral and Dental Hospital Faculty of Dentistry Usakti continues to provide limited patient services. Various COVID-19 preventive measures and protocols have been implemented in the hospital environment considering the risk of SARS-CoV-2 transmission among patients, dentists, or dental therapist during dental treatment.<sup>10</sup>

A number of Indonesian dentists have become the victims of COVID-19. Some of them caught it from patients, others from family members, colleagues, and unrelated people,

outside of their activities as dentists.

All informants stated that they maintained practising the COVID-19 preventive behaviours inside and outside of the hospital area. A similar study in Jordan also showed that most dentists (96.2%) maintained their hand hygiene practise using hand rub or soap and water as one of COVID-19 preventive measures.<sup>11</sup>

Many of the informants perceived that they were at high risk of exposure to COVID-19 because their work involving frequent exposure to patients' saliva and blood during dental treatment.<sup>12</sup> This perception was reinforced by the fact that some dentists contracted COVID-19 from patients they were treating. Several dental procedures could potentially generate aerosols, such as polishes and the use of handpiece, ultrasonic scaler, as well as three-way syringe.<sup>13</sup> Aerosols and droplets from patients infected with SARS-CoV-2 have the potential to contaminate all surfaces in the dental treatment room. This certainly has the potential to be inhaled by dentists and dental therapists while treating the patients.<sup>10</sup>

Most of the informants perceived the SARS-CoV-2 virus to be harmful, but one informant perceived the virus to be less harmful to those without comorbidities. The perception was built upon the fact that their young and healthy colleagues were quickly recovered from COVID-19. On the other hand, those who were elderly or with comorbidities experienced rapid deterioration and even death. Comorbidities may occur with increasing age and this could lead to more severe condition of COVID-19, prolonged recovery, and less favourable outcomes.<sup>14</sup> Almost all informants perceived that they were being susceptible to COVID-19. This is important since the more a person perceives of being susceptible to a disease or health problem, the higher the possibility of that person to perform the desired behaviour.<sup>15</sup>

All informants perceived that COVID-19 prevention provided benefits toward themselves and the surrounding community. Preventive behaviours, such as the 3M protocols, are proven measures that can prevent COVID-19 as well as reduce the incidence of other viral infections and pneumonia.<sup>16</sup> The dentists and dental therapists were also recommended to wear level 3 PPE when providing patient care inside the dental treatment room.<sup>13</sup> The use of level 3 PPE generates sense of safety for the dentists and

dental therapists since they are protected from droplets and aerosols produced during dental procedures.

One intrahospital barrier experienced by the informants was the noncompliant behaviour of their colleagues to the prevention protocols, such as improperly wearing a face mask. Ideally, the mask should cover the mouth and nose, secure it under the chin, and fit snugly against the sides of the face.<sup>17</sup> Furthermore, lack of PPE and disinfectants due to shortage of supply at the beginning of the pandemic also become a barrier to carry out the desired preventive behaviour.<sup>8</sup> The informants also recounted the barrier of maintaining physical distance in public areas. It was considered as the most difficult health protocol to maintain, as it requires a high level of individual discipline.<sup>18</sup> The challenge to maintain physical distance was prominently experienced by the informants who commuted by public transportation. Since the outbreak of COVID-19, commuting by crowded public transports like bus or train causes significant inconvenience as numerous people are being in a confined space with limited ventilation. This would surely increase the risk of transmission among the passengers.<sup>19</sup>

Most informants stated that the presence of high-risk family members encouraged them to take preventive measures, especially with the fact that healthcare personnel working in hospitals, including dentists and dental therapists, are highly susceptible to COVID-19 infection. Thus, could potentially transmit the disease to others particularly family members.<sup>20</sup> Knowing that some of their colleagues, friends or families have been infected, their personal experience throughout the treatment, and outcomes of COVID-19, greatly motivated informants to take optimal precautions. The experiences of colleagues or relatives who were seriously ill or died from COVID-19 also play an important role in maintaining preventive measures.<sup>8</sup>

In terms of self-efficacy, most of the informants felt confident that they could maintain the COVID-19 preventive measures inside and outside the hospital area. Their adequate knowledge and information enable them to do as much as possible to prevent the disease.<sup>21</sup> In the Health Belief Model, the self-efficacy component is essential. When a person strongly believes in one's own capability, the higher the possibility of that person to overcome barriers and adopt the

expected health behaviour.<sup>8</sup>

## Conclusions

Most informants perceived that they were highly susceptible to COVID-19 and that the SARS-CoV-2 was extremely harmful for them. The COVID-19 preventive measures were perceived as being able to provide protection and sense of safety for the dentists, dental therapists, and patients. No internal barrier was identified from the informants but external factors such as colleagues' and other people's improper preventive behaviour as well as limited facilities and equipment, were perceived as barriers in COVID-19 prevention. For the informants, the most encouraging factors were the establishment of regulations and health protocols in the hospital, personal or other people's experience with the illness, and the presence of high-risk family members. Despite several barriers, most informants were very confident that they were able to maintain the COVID-19 preventive behaviour inside and outside the hospital area.

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## Declaration of Interest

The authors report no conflict of interest.

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