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SARS-CoV-2 transmission among healthcare workers and related potential stigma during COVID-19 pandemic

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ABSTRACT

A limited number of studies are available on COVID-19 patients by disease cluster. We aimed to evaluate the healthcare cluster and stigmatization during the COVID-19 outbreak in Batam, Indonesia. A qualitative study using an empirical phenomenological approach and in-depth interviews with content and thematic analysis was conducted. The informants admitted that they were infected with the severe acute respiratory syndrome coronavirus 2 (SAR-CoV-2) virus due to non-compliance to COVID-19 protocols, such as removing masks and talking face to face during breaks in meetings held in poor-ventilated rooms. A social stigma was experienced by these healthcare workers because people tended to keep their distance and ostracized them because they were afraid of COVID-19. Healthcare workers tend to be stigmatized and ostracized by the community. A clinical guideline and public health policy should be established by involving community leaders to minimize the psychological pressure experienced by healthcare workers. The results of this study can help policy makers to improve risk management standards in controlling the spread of the SARS-CoV-2 virus in health center to create publich health trust in eliminating COVID-19.

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1. INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is currently a well novel coronavirus that still remains a global public health issue. Since declared as a pandemic by the World Health Organization (WHO), it has become a public health emergency of international concern, spreading from China to the countries around the world, including Indonesia. Since October 30, 404,048 cases have been reported di Indonesia. In addition, as of September 23, 2020, 1,146 clusters of COVID-19 have been reported in Indonesia by the Ministry of Health Republic Indonesia. Early studies also have revealed that asymptomatic persons can become a carrier of SARS-CoV-2 infection to other people [1], [2] triggering and prolong the spread of COVID-19 all over the world, including in Indonesia. Fifty-five disease clusters have been reported in Batam, Indonesia, up to September 9, 2020. There are three types of disease clusters of COVID-19 identified in this region: religious activity, worker, and healthcare worker clusters. As presented by a previous study in China, the virus SARS-COV-2 transmission occurs person-to-person and spread in all settings, including homes and hospitals [3]. Additionally, several previous studies have reported various routes of COVID-19 transmission, such as through household contact [4], religious community [5]–[7],

gathering [8]–[10], transportation (aeroplane, taxi, bus, and ship) [11], [12], shopping mall [13], industry worker [14], officer [5], tourism [15]–[17], and health workers [14].

Healthcare workers (HCWs) as who work at the frontline of the pandemic include midwives, medical doctors, laboratory assistants, nurses, health cadres, and surveillance officers. All of them have a high risk of exposure to the SARS-CoV-2 virus. This is due to their nature of work, which brings them to direct close contact with COVID-19 patients. Also, health-care professionals are the primary resource in fighting the pandemic around the globe. Caring patients during pandemic and controlling outbreaks trigger a high risk for infection, especially when it is accompanied by stigmatization, depression, and stress [18]. The emergence of COVID-19 cluster among HCWs is triggered by the interactions between the HCWs and patients when providing services or caring for COVID-19 patients; interactions with co-worker; or infected asymptomatic COVID-19 from an external which makes these workers the carriers of COVID-19. Some studies revealed that asymptomatic and pre-asymptomatic carriers are the ones that make the majority of people infected with this virus [19]–[21].

Moreover, the period of pandemics or outbreaks raises fear and concern in the community due to the nature of this unknown emerging disease with fatal impacts on human life that requires quarantine and isolation measures to protect the community. During the COVID-19 pandemic, stigma has arisen at the individual and community levels towards travelers and health workers [22]. Social stigma has an impact on individual life, such as shame. Social stigma can also arise due to health problems that are being seen as dangerous by a group of people [23]. During a pandemic, vulnerable people receive stigma from the surrounding community because of inaccurate perceptions of the disease that occur during the pandemic. This often occurs in situations where infectious diseases are developed [24].

Understanding the outbreak dynamic of COVID-19 pandemic is necessary for public health authorities that are involved in supporting the community to implement strategies to prevent the further spread of SARS-CoV-2 worldwide, specifically in Indonesia. The strategies also include minimizing negative stigma in the community. Stigmatization, discrimination, and stereotyping towards people diagnosed with COVID-19, including the HCWs and the patient's family, will hinder the preventive efforts and cause psychological impacts on the persons being stigmatized. Negative stigma in the community also makes people hide their disease and relevant information during tracing. With the reality that the HCWs working in the frontline of this battle against the pandemic has a high risk to be infected by COVID-19, there may be assumptions among the community that these workers are not clean and can potentially spread diseases to others. This will create psychological risks to the HCWs [25], [26].

Moreover, as the largest archipelago and vastly populated country, Indonesia definitely has a challenge in dealing with people who live on its 17,000 islands with different ethnicities. This is worsen by the fact that most Indonesian may have inadequate knowledge about how they can infect others and, for asymptomatic people, unaware that they can infect others [27]. COVID-19 also changes everything, not only does it change human behaviors but also the community traditions that has become the local wisdom, such as the way people shake hands and other greeting gestures. In several countries, including Indonesia, prohibiting handshaking, congregational worship, and other social activities to reduce disease transmission have been challenging. The impact of misconceptions related to the signs and symptoms of COVID-19, prevention methods, and treatment of COVID-19 creates stigma and discrimination in the community [22], [28]. In addition, the implementation of the new normal policy, in which the majority of previously conducted online activities are now conducted online in accordance with health protocols, has an effect on lifestyle changes in the new normal era. This affects how one views the spread of SARS-CoV-2. After the creation of a new normal behavior pattern, the possibility for stigmatization of infectious illness epidemics by the community often arises. Therefore, this study aimed to evaluate HCWs cluster of 31 cases of 2019-nCoV and identify the stigma faced by the HCWs during the pandemic in Batam, Indonesia

2. RESEARCH METHOD

2.1. Study design and participants

We did a qualitative study through in-depth interviews conducted in September 2021 in Batam, Indonesia. An empirical phenomenological approach was employed to obtain detailed descriptions of the experiences of the HCWs who were infected by SARS-CoV-2 during caring for COVID-19 patients in Batam, Indonesia. The focus of this phenomenological study was to describe the HCWs activities before being diagnosed as positive for COVID-19.

Participants were recruited through purposive sampling and snowball sampling. COVID-19 infected HCWs were recruited from a primary healthcare center located in Tiban, Batam, or known as *Puskesmas* Tiban. The sample size was determined by data saturation, meaning that recruitment was terminated when there was no more new theme stated by the informants. Six informants participated and completed the in-

depth interviews in this study. Then, we also contacted one outpatient for confirmation and provided a more comprehensive picture of the finding research.

The study protocol was reviewed by the institutional review board at Universitas Jenderal Achmad Yani Yogyakarta and approved under the ethical clearance number Skep/041/KEPK/VI/2020. A written informed consent form was obtained from all informants prior to their participation in this study. Confidentiality was assured by using pseudonyms and removing identifying information from the transcripts.

2.2. Data collection

Six open-ended questions, in-depth interviews were performed to collect data. All data represented the experience of the HCWs infected by COVID-19 in a healthcare worker cluster. All data were explored, including the sociodemographic of participants, illness process, initial detection of COVID-19, use of personal protective equipment (PPE) during their daily and social activities, social distancing behavior, and stigmatization. The sociodemographic information included age, religion, marital status, and occupation. The health data sheet represented symptoms of COVID-19 (fever, coryza, odynophagia, myalgia, diarrhea, meningoencephalitis, myocarditis, respiratory failure, and others), symptom onset date, and duration of hospitalization. Also, in-depth interviews were also conducted with the outpatients of the primary healthcare to explore the spreading of COVID-19 infection in the community and confirmed the incorporation of different information on all research subjects.

2.3. Trustworthiness

Trustworthiness in this research has been done by triangulation method. Triangulation has been done by checking research data from various ways, including source triangulation, technical triangulation, and time triangulation. In this study, triangulation of data and time was used, where the researcher interviewed informants from other units in the public health centre, the community and at different times [29].

2.4. Data analysis

All participants in this study were identified and managed by the researchers. There were several steps to data analysis: i) audio-recorded interviews were transcribed in verbatim into textual context and participants' descriptions were reviewed several times; ii) each significant statements were extracted and formulated into key points; iii) organized and integrated the formulated meanings into themes and topics regarding the phenomenon under study [30], [31].

3. RESULTS AND DISCUSSION

3.1. Results

Six HCWs (age=34±7.70 years) completed qualitative study. Seven subjects represented the primary informants in this study with the majority were HCWs from *Puskesmas Tiban,* Batam, Indonesia. One informant, who was the COVID-19 outpatient in *Puskesmas Tiban,* was selected to do an in-depth interview for triangulation purpose. The demographic characteristics of the informant are presented in Table 1.

Table 1. Demographic characteristics of informants

No	Informant (pseudonym)	Age	Marital status	Length of hospitalization	Occupation
1.	Andromeda	47	Married	14 days	Medical doctor
2.	Sagittarius	27	Married	14 days	Nurse
3.	Scorpius	37	Married	14 days	Nurse
4.	Leo	36	Married	14 days	Nurse
5.	Orion	24	Single	14 days	Nurse
6.	Pisces	33	Married	14 days	Nurse
7	Draco*	30	Married	14 days	Outpatient

*for triangulation purpose

Four theme categories emerged from analysis of the interviews: illness process, use of PPE during daily and social activities, social distancing behavior, and stigmatization. Based on the in-depth interviews conducted to key informants, it was discovered that most informants did not know where they contracted COVID-19. As a note, SAR-CoV-2 virus is invisible to the naked eye, so everyone can contract COVID-19. This is described in the following interview excerpts:

> *"... until now, because we can't see the germs, we don't know where they come from, which means we're all at risk, right? They could be from the patients or from the family since it's impossible to see where the germs are."* (Andromeda, 47 years old)

Upon being diagnosed as one of the HCWs infected with COVID-19 at *Puskesmas Tiban*, the informant revealed that, at first, she was worried about contracting COVID-19 after she lost her smell and taste. Then the informant underwent an independent swab test and tested positive for COVID-19. Here is the statement from the doctor when she first discovered that she was diagnosed with COVID-19, which was followed by contact tracing to other health workers in the *Puskesmas Tiban*.

> *"... In late July, I felt my senses were not working, then I went to the hospital, the swab results were positive, then contact tracing was conducted. During the pandemic, I only commuted from my house to the public health center. I also didn't travel outside the region. I only carried out activities outside the public health center to conduct epidemiological investigations for COVID-19 patients in the work area of the public health center."* (Andromeda, 47 years old)

Contact tracing resulted in the identification of the spread of SARS-CoV-2 virus to other HCWs who were close to or had activities together with the first case of COVID-19 in the *Puskesmas Tiban*. This virus has infected 31 HCWs at *Puskesmas Tiban.* These HCWs stated that they did not show any initial symptoms. There was no fever, no coughing, and the taste and smell were also normal, as described in the following interview excerpt:

> "*Mrs. Andromeda after the PCR test… the result showed that she was diagnosed with* COVID-19*. That's when it was detected. I also didn't have symptoms like fever and cough or felt any abnormalities in my senses of smell or taste; all is well... However, my PCR results showed that I was diagnosed with* COVID-19*..... So that's the first time (1st wave diagnosed with COVID-19) I knew it. Well, it became known at that moment ..."* (Scorpius, 37 years old)

Contact tracing of HCWs, with confirmed positive results for COVID-19 in many HCWs, was followed by tracing of patients or visitors of *Puskesmas Tiban*. Based on the outpatient informant' description, she also did not show any symptoms but was confirmed positive for COVID-19.

> *"I was surprised why I suddenly had to do a swab test and two days later, I was told by a health worker that I was diagnosed with COVID-19 and asked to do self-isolation. I didn't have any symptoms, either fever or cough."* (Draco, 30 years old)

Most of the informants already know that they have a high risk of contracting COVID-19 from patients as one of the occupational risks they face as HCWs. When providing services at the *Puskesmas Tiban*, such as conducting epidemiological investigations and monitoring of patients in the community who underwent self-isolation at home, HCWs had been equipped with standardized PPE and were required to take a shower immediately to get rid of SARS-CoV-2 virus after providing care to each COVID-19 patient.

> *"... when we went to do what's needed from us. tracing (read: PE went directly to the house of* COVID-19 *sufferers), we were wearing PPE level 3 he he he he (laughing)... wearing Hazmat suit (hazardous material suit) clothes, then we went home because we had to take a shower…."* (Leo, 36 years old)

> *... while conducting epidemiological surveillance and investigations to the houses of patients in self-isolation, I already wore a hazmat suit, face shields, gloves according to standards, then I went around to* COVID-19 *patients' house.* (Andromeda, 47 years old)

Informants also suspected that the first time they contracted SARS-CoV-2 virus was from the sweat produced during patient care. This is because Hazmat suit or PPE for SARS-COV-2 virus was very hot and uncomfortable.

> *... while wearing the personal protective equipment, especially hazmat suit, sweat was pouring off me and I immediately took a shower. I think I contracted (this disease) because of the sweat.* (Pisces, 33 years old)

Another point presented in this study is the absence of a particular room for workers to change their hazmat suits after treating COVID-19 patients. During the pandemic, *Puskesmas Tiban* assigned a storage area for hazmat suits and, at the same time, used the same room for the administrative office during the

pandemic. This room was equipped with a handwashing place; however, the room did not have different entrance and exit access for workers after and before handling COVID-19 patients.

> *"There is no separate dedicated room that restricts the entrance and exit access of workers before and after handling COVID-19 patients. The room used to store and wear our hazmat suit is the health promotion room. Indeed, this room has been used as the place to store equipment and as the activity center during the handling of* COVID-19 *patients, starting from storing the necessities (hazmat suit, gloves, gowns, face shields) and the writing on COVID-19 reports."* (Sagittarius, 27 years old)

> "*Near the public health center waste collection point, we take off and change into hazmat suit at the back of the public health center and take it off in an open space, not in the room. It's because, after that the hazmat suit will immediately be put in the trash bin to be destroyed."* (Orion, 24 years old)

The majority of informants said that SARS-CoV-2 transmission was possible because they did not apply social distancing during breaks and had lunch together, for example during meetings. According to interview excerpts with informants, they removed their masks and talked face to face during breaks at meetings in a poorly ventilated room. The informants were also aware that this behavior carried a risk of transmitting the virus to family members of health workers.

> *"... maybe during lunch. When we ate, we removed the mask, then talked (to each other) in a room. Maybe that's when the virus was transmitted. During the pandemic, we always had a face-to-face meeting and in an air-conditioned and enclosed room. During the breaks at the meeting, we ate while chatting, well... there the virus was spread to everyone participating in the meeting."* (Andromeda, 47 years old)

> *"…Then we went home and met our family. So, we unconsciously bring the virus home, because we are among the people who have a high risk of contracting SARS-CoV-2 virus. It's possible that we transmit this virus to our family as well..."* (Leo, 36 years old)

COVID-19 patients, including the HCWs who were confirmed to be positive for SARS-CoV-2, faced social exclusion in the community by being ostracized from their home environment. This finding is supported by the following statement from one of the informants:

> *"... they consider COVID-19 like scary diseases such as ghosts. Those who are positive COVID-19 are usually ostracized by the community in their (home) environment, considered as a source of disaster.... As a healthcare worker, I'm often avoided during home visits to provide care or to monitor patients who are undergoing self-isolation. People refuse to help me or refuse to meet me, even though I need their data for tracing if any of their family members are diagnosed positive for COVID-19." (*Sagittarius, 27 years old)

The outpatient informant from the work area of *Puskesmas Tiban* strengthened this statement about fear of HCWs.

> *"I'm also afraid to meet healthcare workers who visit my neighborhood. Considering there is no cure yet for COVID-19 patients and the healthcare workers often care for positive patients, of course we are afraid of contracting COVID-19 by them."* (Draco, 30 years old)

3.2. Discussion

COVID-19 that has persisted and spread during the last year was first detected in Wuhan, China on December 1, 2019. It has infected more than 96 million population and caused over two million deaths globally. Asymptomatic COVID-19 carriers are one of the causes of the widespread of SARS-CoV-2 virus, which gives rise to the healthcare worker cluster besides family cluster, in addition to the worker cluster and religious cluster [4], [5], [14]. The proportion of asymptomatic patients is only 17%, but they are able to trigger disease transmission which is difficult to control [32]. Social rejection related to infectious diseases from COVID-19 has also been identified since the beginning of its spread [33], [34]. As a new disease, the fear of contracting the disease has emerged and a low understanding of how to prevent SARS-CoV-2 virus has caused social stigma and discrimination related to COVID-19. Individual or collective beliefs and behaviors surrounding COVID-19 diagnosis result in all kinds of social discrimination, preventing people

from seeking treatment as early as possible or even prevent them from seeking help at all. The present study found that healthcare worker clusters were identified with asymptomatic patients and they were excluded in the community.

Asymptomatic COVID-19 cases are a potential source of substantial spread in the community. To make matters worse, there is little information regarding the number of cases of this asymptomatic disease which has led to a cluster of HCWs in *Puskesmas Tiban*. The statements of the informants in this study showed that the possible source of COVID-19 transmission in *Puskesmas Tiban* cluster due to eating and drinking habits together without applying social distancing during breaks. In line with our finding in this study, most institutions have weaknesses in implementing infection control measures during the pandemic and many healthcare-related outbreaks of COVID-19 have been reported [35]–[37]. When eating and drinking, masks are removed, and health protocols related to COVID-19 pandemic are ignored. Thus, carrier's droplets can be transmitted to other HCWs who are chatting with the carrier at a distance of less than one meter [38].

In addition, the majority of informants in this study stated that they already understood that the origin of COVID-19 transmission is from a very small virus, which is invisible to the eye. Coronavirus 2 (SARS-CoV-2) is transmitted through respiratory droplets and aerosols. These breathing droplets are described as larger entities (>5 μm) that rapidly fall to the ground by gravitational forces, usually within 3 to 6 feet (feet) of the source person. Aerosols are smaller particles (≤ 5 μm) that rapidly evaporate in the air, leaving the droplet nuclei small enough and light enough to remain floating in the air for hours [39]. The strict application of health protocols is necessary to prevent transmission. Coronavirus is transmitted through droplets exposed to a person or object through coughing and sneezing. Fortunately, the transmission of this virus can be prevented by implementing a clean and healthy lifestyle, wearing the recommended mask, and applying social distancing anytime and anywhere [40]. In addition, it is important to require the use of masks in open/public spaces and to educate the public on how to break the chain of COVID-19 transmission [41].

The death toll due to the Coronavirus infection is still increasing, including in the healthcare worker population. As of November 10, 2020, it is reported that a total of 168 doctors and 114 nurses in Indonesia died due to COVID-19. This shows that HCWs are among the professions that are very vulnerable to COVID-19 virus exposure. Adherence and discipline are required from the HCWs to implement the COVID-19 prevention protocol as the most important effort to protect these HCWs from the disease [41]. They should not be negligent and careless at any time, even when chatting and taking a break. They must obey the protocols without exception. Taking a break and eating activities should be done in a solitary manner. It is prohibited to gather while eating, let alone ignoring the safe distance. In Indonesia, reports of COVID-19 healthcare worker clusters do not only come from Batam, but also from other areas such as in hospitals in Jepara, Bali, Wonogiri, and Wonosobo. This has received serious attention because it really affects the health care service provision. Some health facilities are temporarily closed when the COVID-19 cluster is detected. Efforts made to prevent the recurrence of clusters among HCWs is that HCWs must be more careful when dealing with patients by wearing standardized PPE to prevent potential transmission and by complying to protocols, even when doing trivial activities such as eating or chatting with colleagues. The results of a study in China showed that medical personnel experienced increased stress during the COVID-19 pandemic. Factors that encourage medical staff to always be willing to work during this pandemic are the recognition by hospital management and the government to healthcare personnel in addition to the availability of good infection control guidelines, equipment, and special facilities for COVID-19 infection management for medical personnel [42].

COVID-19 sufferers in this study received negative stigma associated with the disease. As a new disease, the community understanding related to this disease is not really good. The stigma occurs because people tend to be afraid of contracting it. The fear is due to fact that HCWs are always in close contact when treating COVID-19 patients. This creates a social stigma against certain ethnicities and people who have direct contact or who treat patients with this virus [43]. Negative stigma will worsen the psychological condition of the affected people and also the spread of the disease itself [44]. Several previous studies showed that some HCWs experienced mental disorders due to fatigue while treating COVID-19 patients, sleep deprivation, excessive workload, and fear of stigma and discrimination from the community [44]–[46]. In addition, medical workers who manage COVID-19 patients also experienced mistreatments from the community, such as being kicked out of their rented house, not have their needs met, and being shunned. Stigmatization greatly impacts the immunity of someone suffering from COVID-19 and will affect the healing process of COVID-19 patients. COVID-19 sufferers are not people doing something disgraceful, so there is no need to ostracize them, let alone shun them. Negative stigma towards COVID-19 sufferers should be addressed through improving health literacy of various parties [47]. This study in line with some previous studies revealed that health education related to COVID-19 is significantly related to knowledge

improvement and attitude improvement towards COVID-19 patients, which will eventually reduce stigma and discrimination against COVID-19 patients [48], [49].

The limitations have been acknowledged in this study. The sampling may reflect certain characteristics of HCWs based on the available facilities for preventing COVID-19, which may be different between places, especially between rural and urban areas. Therefore, conducting a further study in other primary health care facilities in urban areas will provide a better understanding and will be more representative in giving an overview on COVID-19 prevention in the community.

4. CONCLUSION

A healthcare worker cluster of COVID-19 was identified by most of them asymptomatic in Indonesia. Ostracization from the community was reported by the informants in this study. A better understanding of SARS-CoV-2 infection prevention during the COVID-19 pandemic among all components of community and the involvement of related health offices to build trust in adequate health services and facilities are highly prioritized.

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