Midwives' Risk Perception of and Preventive Behavioural Responses to COVID-19

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Abstract

As the novel Coronavirus disease (COVID-19) is highly contagious, application of preventive practices, such as personal protective equipment (PPE) usage and hand-washing, are crucial to prevent its spread. Evidence suggests that preventive behavioural responses to COVID-19 might be affected by risk perception. The present study aimed to assess risk perception and preventive behavioural responses among midwives and the association between them. In September 2020, a descriptive cross-sectional study was conducted in Indonesia among 421 midwives. Spearman's correlation coefficient or Spearman's rho (ρ) was used to identify the factors associated with risk perception and preventive behavioural responses as well as the correlation between risk perception and preventive practices. Generally, the midwives had a high-risk perception of COVID-19 infection. However, approximately 27% of the midwives did not always use PPE, and around 56% did not often wash their hands. Midwives who

worked at health facilities had a higher level of risk perception of COVID-19 infection as well as adherence to preventive practices than those who worked at universities. A significant association was found between perception of risk severity and preventive practices ($p < 0.05$). The healthier the midwives, the higher their level of adherence to PPE and hand-washing. Older midwives tended to use PPE at any time, while those who had a chronic disease were more likely to wash their hands for at least 20 seconds more frequently. Although the midwives had a high-risk perception of the COVID-19, it is necessary to improve their preventive practices, particularly hand hygiene.

Keywords: COVID-19; hand-washing; personal preventive equipment; risk perception; behavioural responses

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the cause of the Coronavirus disease 2019 (COVID-19) pandemic, was firstly found in Wuhan, China (Atekoja et al. 2020). This disease spread quickly worldwide, contributing to constantly increasing confirmed cases (Bao et al. 2020). By August 2021, more than 2.9 billion people globally were receiving the COVID-19 vaccine; however, the World Health Organization (WHO 2021b) estimated that more than 183 million confirmed cases of COVID-19 had been recorded with more than 3.9 million deaths. In Indonesia, the number of confirmed COVID-19 cases continued to increase daily. As of July 2021, Indonesia became the country with the highest number of confirmed COVID-19 cases daily in the world, which constituted a total of 2.6 million confirmed cases with more than 54 000 cases per day and 62 000 deaths (SATGASCOVID-19 2021).

As COVID-19 is rapidly transmitted from human to human, taking preventive actions is essential. The WHO (2020) advised people to take certain preventive actions, such as mask wearing, hand-washing, and social distancing. Furthermore, the Centres for Disease Control Prevention (CDC 2020) recommended washing hands regularly using soap and water or sanitizer for at least 20 seconds or applying hand sanitizer with at least 60% alcohol where soap and water were unavailable. Moreover, the CDC (2021) suggested that washing hands with soap and water not only eliminates COVID-19 but also removes other dangerous viruses. Another preventive action is wearing a mask. Evidence from numerous studies has shown the effectiveness of wearing masks appropriately in protecting people from the transmission of COVID-19 (Brooks and Butler 2021; Doung-ngern et al. 2020). A systematic review and meta-analysis revealed that wearing masks can reduce the transmission of the influenza virus, SARS and SARS-CoV-2 (Liang et al. 2020).

Individuals' willingness and motivation to take preventive actions are affected by some factors, including risk perception (Brewer et al. 2007; Sjöberg 2000). Moreover, another study revealed that the higher the risk perception, the higher the probability of taking preventive actions, and vice versa (Adefuye et al. 2009; Brug et al. 2004). Although

many studies have examined the risk perception of COVID-19 among the general public, only a few studies have explored the risk perception of COVID-19 among midwives. A study among Korean students during the Middle East respiratory outbreak reported various factors affecting risk perception, including trust of the media, and overreaction by the public (Yang and Cho 2017). Currently, no study has been conducted on risk perception of COVID-19 infection among midwives in Indonesia. The latest study among health care providers found that midwives had a high level of risk perception of COVID-19 as well as the preventive practices involved (Deressa et al. 2021). However, their study was limited to specific contexts, namely, local hospitals in Addis Ababa. Moreover, the focus of the study was health care providers in general, not specifically midwives.

The present study included midwives from various backgrounds in Indonesia. Midwives have a great impact on maternal and new-born health, especially during an outbreak such as the COVID-19 pandemic (ICM 2020). A study conducted among midwives in Indonesia revealed gaps in their compliance with standard precautions during COVID-19 (Gayatri et al. 2021). However, understanding their risk perceptions and preventive behavioural responses will help in designing appropriate intervention strategies which can improve their compliance with standard precautions. This is imperative since a mortality of 67 midwives was recorded due to COVID-19 in March 2021 (LaporCovid-19 2021). Investing in midwifery care in Indonesia might help to decrease the maternal mortality rate in the country, which was 305 per 100 000 live births in 2015 (MoH 2020a). In addition, various studies have suggested that hand-washing is an effective and affordable preventive practice for infection management in hospitals (Anargh et al. 2013; Loftus et al. 2019). Therefore, it was deemed necessary to pay particular attention to the risk perception of COVID-19 among midwives in Indonesia.

In order to evaluate the risk perception of COVID-19 among the respondents and explore factors associated with the perception, we conducted an online survey among midwives from 30 provinces in September 2020, during the COVID-19 pandemic. It is hoped that the study will also have implications for future pandemic control in other countries.

Methods

Study Design and Setting

A descriptive cross-sectional study was carried out among Indonesian midwives through an online structured survey on 26 September 2020 during the COVID-19 pandemic. Indonesia has 34 provinces and had a population of 270.2 million residents in 2021 (Central Bureau of Statistics Indonesia 2021). The maternal mortality ratio (MMR) remains a challenge in the country (MoH 2018). It was reported in 2015 that the MMR was 305 per 100 000 live births, which was still far behind the international target of the Sustainable Development Goals in 2030, that is, 70 per 100 000 live births (MoH 2020a; WHO 2021a).

Population and Methods

A convenience sample of 421 midwives was recruited for the study from 30 provinces in Indonesia. The criteria for inclusion were midwives registered and licensed by the Midwifery Council of Indonesia and who were working in universities and health facilities like community health centres ("puskesmas" in Indonesian), clinics and hospitals. The exclusion criteria included those who refused to participate in the study.

Data and Sampling

Due to the prevailing situation of the COVID-19 lockdown when the study was conducted, the participants were recruited from an online seminar on 26 September 2020 through a convenience sampling technique. The theme of this online public seminar was "Maternal Health during Adapting to New Habits' Era", which was organised by the Department of Midwifery, Faculty of Medicine, Universitas Brawijaya, Indonesia. At the end of the seminar, the attendees were invited to participate in the survey, which was administered via Google forms, which is a free survey software developed by Google.

The required sample size for the study was determined using Cochran's (1963) formula to yield a representative sample for proportions in large populations. The following assumptions were applied: the desired level of precision (E) = 0.05, confidence interval (CI) = 95%, Z = 1.96, Q-value = 0.5, population proportion (P) = 0.5, number of midwives in Indonesia = 163 541 (MoH 2018) and 10% attrition or non-response rate to the calculated size. Hence, the calculated sample size was approximately 422 individuals. About 4 200 health care workers attended the online seminar yet only 553 midwives agreed to participate in the survey. Of the 553 participants, only 421 were included in the survey as midwifery students were excluded.

Measures

Demographic Information

The respondents' demographic information was gathered in this section, including: gender (Male, Female); workplace (Health care facility, University); age (Date of birth); highest level of education (High school, Diploma IV, Diploma IV/Bachelor, Master, Doctoral); region of residence; ethnicity (Malay, Batak, Javanese, Dayak, Sundanese, Other); religion (Islam, Christian, Catholic, Hindu, Other); infected by COVID-19 (Yes/No); having a chronic disease such as serious respiratory disease, heart condition, obesity, diabetes (Yes/No); current health status (Excellent, Very good, Good, Fair, Poor).

Perception of Risk

Consistent with previous studies on risk perception in disease outbreaks, two items measured risk judgement as risk susceptibility, with the respondents asked to rate their perceived likelihood of contracting COVID-19 between the time of the study and the end of the year, and risk severity, with the respondents asked to rate their perceived severity of a COVID-19 infection for their own health (Kim and Niederdeppe 2013). These two items were scored: 1 = "Very unlikely" to 5 = "Very likely" for risk susceptibility and 1 = "Not at all serious" to 5 = "Extremely serious" for risk severity. Therefore, the scores ranged from 1 to 5, where a high score indicated a higher level of risk perception.

Preventive Practices

The questions on preventive practices among midwives were based on prior studies (Zhang et al. 2020; 2021). The question regarding PPE usage asked whether the respondents wore PPE such as gloves, used hand sanitizer, and wore masks when going out. The question regarding PPE usage was scored 1 = "Never" to 5 = "Always". The scores ranged from 1 to 5; where a high score showed better PPE usage. The question on hand hygiene practice for at least 20 seconds after touching an object was scored 1 = "Never" to 7 = "Every time". The scores ranged from 1 to 7 in which a high score indicated better hand hygiene performance.

Data Analysis

Data analysis was conducted using descriptive and inferential statistics. The association between demographic variables and compliance with standard precautions was measured using Spearman's rho (ρ) analysis. A statistical significance level of 0.05 was assigned for all statistical analyses. Jeffreys's Amazing Statistics Program (JASP) version 0.14.1 was used for the data analysis.

Ethical Considerations

The present study was approved with ethical code 931/KEPK-POLKESMA/2020 on 25 August 2020 by the State Polytechnic of Health Malang Indonesia. Before completing the questionnaire, all the participants were thoroughly informed of the information about the study, procedures, and objectives of the study, and they were assured of the confidentiality of their data and their right to withdrawal at any time. They were also provided with a consent form to sign before they commenced the survey. Informed consent was obtained from all respondents. The researchers adhered to the principles of conducting ethical research as stated in the Declaration of Helsinki (WMA 2018).

Results

Demographic Information

A total of 421 female midwives were investigated in the study, of whom 298 (71%) worked at health facilities, while 123 (29%) worked at universities. The majority of them (64%) were aged between 21 and 30 years, with the highest level of education being Diploma III or IV, which constituted 203 individuals (48%). Most of the respondents (69%) resided in the Java and Bali region, while the least (0.7%) resided in the Papua region. This was in line with the results of their ethnicity, in which the majority of them (58%) were Javanese. Only three (0.71%) of the respondents had been diagnosed with COVID-19; 25 (5.93%) had one or more chronic diseases; 245 (58.19%) were in good and very good health; while 176 (41.80%) were in poor and fair health.

Risk Perception

Table 1 shows two items on risk perception: 78.18% of the midwives at health facilities responded "Neutral" to "Very likely" for risk susceptibility and 93.28% responded "Neutral" to "Extremely serious" for risk severity; 65.85% of the midwives at health facilities responded "Neutral" to "Very likely" for risk susceptibility and 45.52% responded "Neutral" to "Extremely serious" for risk severity. The independent sample t-test was used to test the level of risk perception between the two categories of midwives. The results showed that $t = 2.106$; $df = 419$; and $p = 0.036$. These findings indicated that the midwives who worked at health facilities had a higher level of risk perception.

Table 1: Frequency distribution of perception of risk

	Perception of risk	Frequency	Percent (%)
Midwives at health facilities	*Risk susceptibility*		
	Very unlikely	24	8.054
	Unlikely	41	13.758
	Neutral	91	30.537
	Likely	66	22.148
	Very likely	76	25.503
	Risk severity		
	Not at all serious	6	2.013
	Not serious	14	4.698
	Neutral	45	15.101
	Serious	77	25.839
	Extremely serious	156	52.349
Midwives at universities	*Risk susceptibility*		
	Very unlikely	15	12.195
	Unlikely	27	21.951
	Neutral	45	36.585
	Likely	16	13.008
	Very likely	20	16.260
	Risk severity		
	Not at all serious	27	21.951
	Not serious	26	21.138
	Neutral	26	21.138
	Serious	14	11.382
	Extremely serious	16	13.008

Table 2 reveals a correlation between the midwives' selected sociodemographic variables and risk perception of COVID-19. The higher their level of education and the worse their current health status, the higher their level of COVID-19 risk perception. Moreover, the midwives who had a history of chronic disease, or previous COVID-19 infection, were more likely to have a higher level of COVID-19 perception. In addition, their workplace was associated with their risk perception of COVID-19.

Table 2: Spearman's rho association between demographic characteristics and risk perception

Variable		Value	Remark
1. Highest level of education	Spearman's rho	0.174	Significant
	p-value	< .001	
2. Age	Spearman's rho	0.064	Not significant
	p-value	0.191	

3. Current health status	Spearman's rho	0.109	Significant
	p-value	0.025	
4. Having history of chronic disease/s	Spearman's rho	-0.129	Significant
	p-value	0.008	
5. Having prior COVID-19	Spearman's rho	0.020	Not Significant
	p-value	0.679	
6. Workplace	Spearman's rho	-0.102	Significant
	p-value	0.036	
7. Residence	Spearman's rho	0.056	Not significant
	p-value	0.184	
8. Race	Spearman's rho	-0.004	Not significant
	p-value	0.932	

Preventive Practices

Generally, 306 (72.68%) of the respondents always used PPE and 182 (43.23%) washed their hands for at least 20 seconds at any time after they went outside or touched an object; 27% of midwives used PPE less often; and 56% washed their hands less often. These results indicated that, in general, the midwives had a high level of PPE usage yet a low level of hand-washing; 76% of the midwives who worked at health facilities and 63% of the midwives who worked at universities always wore PPE. In addition, only 49% of the midwives at health facilities and 28% of the midwives at universities washed their hands at any time. In addition, an independent sample t-test comparing PPE usage and hand-washing practice between midwives at health facilities and those at universities was administered. The results showed that $t = 2.184$; $df = 419$; and $p = 0.029$ for PPE usage; and $t = 4.444$; $df = 419$; and $p < .001$ for hand-washing. Therefore, the midwives who worked at health facilities had a significantly higher level of adherence to preventive practices.

Tables 3 and 4 reveal that the midwives who had a better health status had a higher level of adherence to either PPE usage or hand-hygiene. The midwives who had a history of chronic disease tended to always wear PPE, while the older midwives were more likely to wash their hands for at least 20 seconds at any time. Finally, the midwives' workplace was also associated with their PPE usage and hand-washing behaviour.

Table 3: Spearman's rho association between demographic characteristics and PPE usage

Variable		Value	Remark
1. Highest level of education	Spearman's rho	0.028	Not significant
	p-value	0.570	
2. Age	Spearman's rho	0.091	Not significant
	p-value	0.063	
3. Current health status	Spearman's rho	0.130	Significant
	p-value	0.008	
4. Having history of chronic disease/s	Spearman's rho	–0.118	Significant
	p-value	0.016	
5. Having prior COVID-19	Spearman's rho	0.071	Not significant
	p-value	0.147	
6. Workplace	Spearman's rho	–0.166	Significant
	p-value	< .001	
7. Residence	Spearman's rho	0.026	Not significant
	p-value	0.600	
8. Race	Spearman's rho	0.008	Not significant
	p-value	0.868	

Table 4: Spearman's rho association between demographic characteristics and hand-washing

Variable		Value	Remark
1. Highest level of education	Spearman's rho	0.087	Not significant
	p-value	0.074	
2. Age	Spearman's rho	0.147	Significant
	p-value	0.002	
3. Current health status	Spearman's rho	–0.116	Significant
	p-value	0.017	
4. Having history of chronic disease/s	Spearman's rho	–0.028	Not significant
	p-value	0.567	
5. Having prior COVID-19	Spearman's rho	–0.053	Not significant
	p-value	0.282	

6. Workplace	Spearman's rho	−0.224	Significant
	p-value	< .001	
7. Residence	Spearman's rho	−0.018	Not significant
	p-value	0.716	
8. Race	Spearman's rho	−0.088	Not significant
	p-value	0.072	

Risk Perception and Preventive Behaviour

Table 5 shows that there was a significant association between perception of risk severity and preventive behaviour ($p < 0.05$), while there was no significant association between risk susceptibility and preventive behaviour.

Table 5: Spearman's rho association between perception of risk and PPE usage

Variable		Value	Remark
PPE usage			
1. Overall risk perception	Spearman's rho	0.072	Not significant
	p-value	0.142	
2. Risk susceptibility	Spearman's rho	−0.006	Not significant
	p-value	0.900	
3. Risk severity	Spearman's rho	0.149	Significant
	p-value	0.002	
Hand hygiene			
1. Overall risk perception	Spearman's rho	0.080	Not significant
	p-value	0.103	
2. Risk susceptibility	Spearman's rho	0.045	Not significant
	p-value	0.356	
3. Risk severity	Spearman's rho	0.101	Significant
	p-value	0.039	

Discussion

To the best of our knowledge, the present study was the first to explore risk perception and preventive behaviours among midwives in Indonesia. It was carried out when there were more than approximately 4 800 new confirmed cases daily among the general population and 105 death cases among healthcare providers because of the COVID-19

pandemic (MoH 2020b; SATGASCOVID-19 2021). The study was conducted just after a lockdown. We studied risk perceptions, preventive practices and socio-demographics factors affecting the behaviours of a sample of midwives from all sectors and various backgrounds in Indonesia.

As current evidence suggests that the spread of COVID-19 from human to human is effective with close contact (Moazzami et al. 2020), PPE and hand-hygiene are crucial in preventing the spread of the virus. Although the midwives in the study had a high level of PPE usage, yet they had a low level of hand-washing practices as only 42.23% of the respondents reported that they washed their hands for at least 20 seconds at any time. This result concurred with a similar study among midwives in Indonesia which reported a high usage of PPE and mask wearing but a low level of hand-washing Gayatri et al. 2021). This suggests that although there was a high level of PPE usage among midwives in Indonesia, there is a need for behavioural change in hand-washing. However, these results were in contrast with the findings from studies among healthcare staff, including midwives in African countries, which found that the staff had a high level of adhering to preventive practices such as hand-hygiene (Ashinyo et al. 2021; Deressa et al. 2021).

The present study showed that the respondents had a high risk perception of COVID-19. Moreover, the study results suggested that the midwives who worked at health care institutions had a higher level of risk perception compared to midwives who worked at universities. This might be related to their work as health care staff are exposed to handling the mother and child before, during and after delivery unlike the lecturers who do not usually conduct hands-on procedures in real clinical situations. The findings from similar studies were consistent with the present study results in that they found health care staff, including midwives, had a high risk perception of COVID-19 (Deressa et al. 2021). Several previous studies reported a high level of perceived risk regarding COVID-19 exposure among health workers in various countries, including Turkey, and the United States (Arslanca et al. 2021; O'Neal et al. 2021). Also, a relationship has been found between perceived high risk of COVID-19 by health workers and increased psychosocial burden, especially among those who offer direct health care to patients (Osório et al. 2021; Saragih et al. 2021).

Although the study results showed a significant association between the respondents' perception of risk severity and PPE usage and hand-hygiene, there was no significant association between their risk perception in general and preventive behavioural response. A similar study found no association between nurses' risk perception and their preventive practices with reference to COVID-19 infection (Lyu et al. 2021). While a study in Italy discovered a significant association between age and risk perception during the COVID-19 pandemic (Savadori and Lauriola 2021), the present study found no significant association between age and risk perception. However, there was a significant association between perception of risk severity and PPE usage, just as a similar study discovered that risk perception significantly predicted precautionary

behaviour (Iorfa et al. 2020). Although most studies have revealed a strong influence of risk perception on preventive behaviours Brewer et al. 2007; Schneider et al. 2021), the present study showed no such relationship with the midwives' hand-washing behaviour. This finding suggests that there could be factors other than risk perception that influenced the midwives' hand-washing behaviour.

Midwifery lecturers had a lower level of preventive practices. This might be related to some demographic factors, such as age, current health status, history of chronic disease, and workplace, which were significantly associated with PPE usage and hand-washing. This was consistent with the findings of a study where age was found to predict increased precautionary behaviour, whereas gender did not. Risk perception significantly predicted precautionary behaviour, agreeing with other previous findings in the same studies (Albaqawi et al. 2020; Iorfa et al. 2020; Lau et al. 2010).

It is worth noting that the present study was conducted among midwives working in health facilities and universities, in which the preventive behaviours were varied. The respondents' perception of risk severity and some demographic factors might affect their preventive behaviours, which are important solutions for stopping the spread of COVID-19. Hence, promoting preventive behaviours among them and educating them, especially midwifery lecturers, is necessary.

Although the study was conducted during a global pandemic when social distancing was in place, we were able to collect data from respondents of various backgrounds through online data collection. However, there could have been a bias in midwives who chose to attend the seminar then participated in the online survey. Furthermore, since the study was based on self-report, this could have been subject to social desirability bias. These factors should be taken into consideration when interpreting the findings. Additionally, as the study was cross-sectional, we were unable to make causal claims about the relationships found in the study.

While the study has given insight into midwives' risk perception of and preventive behavioural responses to the COVID-19 pandemic, a qualitative study that seeks to explore these variables, especially exploring midwives' preventive practices while providing care at health facilities, will provide a richer insight. Furthermore, intervention studies targeted at improving hand-washing practices among midwives are hereby advocated. Given that differences were found between midwives at different institutions, future research could also seek to examine how responses differ among front-line workers compared to others in their profession, such as lecturers and students.

Conclusion

The present study investigated the risk perception of and preventive behavioural responses to COVID-19 among midwives in Indonesia. The study showed a high level of PPE usage practices yet low hand-washing practices among midwives to prevent COVID-19 infection. High levels of risk severity perception might improve midwives'

preventive behavioural responses although preventive practices among them need to become more widespread. This can be addressed through campaigns, awareness, encouragement and other health promotional activities championed by the Indonesian government.

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