

# Midwives' knowledge, risk perceptions, preventive behaviour and adherence to infection control regarding Covid-19: Cross-sectional study in Indonesia

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## ABSTRACT

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Midwives are at the highest risk of getting COVID-19 in maternity wards. This study aimed to assess factors determining the knowledge, attitude and prevention of midwives towards COVID-19 in Indonesia. A cross-sectional online survey was conducted among 478 midwives spreading through whatsapp from December 2020 to January 2021. The factors knowledge, attitude and practice of midwives were estimated using 11, 7 and 7 questions, respectively. A multivariable logistic regression analysis was used on SPSS version 23 to identify factors related to the knowledge, attitude and prevention practice of midwives on COVID-19. Significance was determined at a p value of < 0.05 and association was described by using odds ratio at 95% CI. Among 478 midwives, 92.3% has a good behaviour to protect them from Covid-19, 78.2% have good attitude and 40.2% have poor knowledge. There was no relationship between respondents' socio-demographic characteristics and their knowledge. The availability PPE, disinfectant and IP guidelines significantly influence preventive behaviour of midwives. Training and availability of equipment are recommended to ensure a good knowledge, attitude and practice of midwives.



## 1. Introduction

A pneumonia of unknown cause discovered in Wuhan, China was initially confirmed to China's WHO Country Office on December 31, 2019. On January 30, 2020, the epidemic was declared an international public health emergency (Johnson et al., 2022). WHO revealed a name for new coronavirus disease on 11 February 2020: COVID-19. The number of cases increase every day. As of April 19, 2020, there had been 2,245,872 confirmed cases and 152,707 deaths from 213 countries (Farrell et al., 2020). In Indonesia, at the same date the number rise to 6,575 confirmed cases, 686 recovers and 582 deaths (Health & Welfare, 2020).

The COVID-19 pandemic affects health-care systems around the world. Providers of maternity care will continue their core business of caring for and helping mothers, newborns and their families while also adjusting to a rapidly evolving climate in the health system. Healthcare workers are the most valuable resource in every country, and maternity providers need support to provide women and newborns with the best quality care they can in exceptionally difficult circumstances (Wilson et al., 2020).

Midwives as maternity provider have close contact with mothers and babies and therefore have an increased chance of both being exposed to SARS-CoV-2 as well as contracting it (Mizrak Sahin & Kabakci, 2020). Treatment for pregnant and postnatal women and newborns is therefore an important

service and needs to continue alongside the answer to COVID-19. Maternity programs must change to sustain antenatal and postnatal treatment and explore alternatives methods (Royal College of Obstetricians & Gynaecologists, 2020).

Maternity and newborn care units face specific challenges in addressing space and personnel requirements within the facility to avoid SARS-CoV-2 transmission, while also ensuring vital support for women in the delivery and bonding of mother and newborn after conception. Further preparation and simulations on infection management procedures, the use and handling of PPE and isolation of pregnant COVID-19 confirmed or suspected women (Chen & Yu, 2020).

The risk of infection for all maternity care providers is, of course, necessary for ensuring access to sufficient PPE, effective preparedness training and monitoring of practices (Hirose, 2000; Hjelm et al., 2018). To many this is new ground once again. EPP preparation and encouragement is required not only on how to put them on and take them off, but also on how to provide empathic treatment when wearing them (World Health Organization, 2002).

The objective of this study is to assess midwives' knowledge, risk perceptions, preventive behaviours and adherence to infection control regarding Covid-19 in Indonesia.

## 2. Methods

### 2.1. Study Design and Settings

Due to the country's lockdown for COVID-19 prevention, an online cross-sectional study was conducted between December 2020 and January 2021. Indonesia is an archipelago country with 17,000 islands. Indonesia is divided into 34 provinces. The capital city of the region is Jakarta city. According to Ministry of Health 2019, Indonesia has 228,278 midwives that provide health services to 270,6 million population. The ratio between region is different, one midwife covers between 42 and 756 population.

### 2.2. Sample size determination and sampling procedures

Midwives who work in clinical setting were considered eligible for participation. The sample size of the study participants (478) was determined using a single population proportion formula based on the following assumption: 50% proportion to prevention practice among midwives since no previous study on COVID-19 prevention practice, 95% confidence level, 5% margin of error, and 15% non-response rate by considering high delayed responses and non-respondents since it is an online survey. The study participants were selected using convenient sample method.

### 2.3. Data collection tools and techniques

Data were collected online using a structured questionnaire. The link of the survey was shared to available contacts via WhatsApp, particularly to WhatsApp group that has member who work as a midwife. Responses to the survey were requested for the study from December 2020 to January 2021. The questionnaire was designed using Google Forms (via docs.google.com/forms) by referring to former studies on IP and the WHO IP guidelines. The questionnaire consists of questions related to demographics, information sources, risk assessment, knowledge, attitude and practice towards the COVID-19. Midwives had been informed well about the purpose of the study, data confidentiality and data collection procedures. After they became clear about the study and its procedure, the investigator asked each participant for consent by sending the consent question before questionnaire.

### 2.4. Data quality assurance

Midwives had been informed of detailed information with practice on how to complete and sent the questionnaire. Duplication of responses was controlled by restricting to one response. The incompleteness of responses was reduced by making each “\*required” to submit form.

### 2.5. Data management and analysis

The collected data were checked for completeness and exported to the MS-excel format. The excel data were then exported to SPSS version 23 for editing and analysis. There were 11 knowledge questions with “true = 1” or “false = 0” responses to give values ranging from 0 to 11. A midwife who scored 80% and above was grouped as having “good knowledge” and who scored below 80% was grouped as having “poor knowledge.” Furthermore, there were 7 attitude-related questions responded as “strongly agree = 5” and “strongly disagree = 0” with total values ranging from 0 to 35. A midwife

who scored 80% and above was grouped as having “good attitude” and who scored below 80% was grouped as having “poor attitude.” On the other hand, there were 7 practice-related questions responded as “always = 1” and “never = 0” with total values ranging from 0 to 7. A midwife who scored 75% and above was grouped as “good practitioner” and who scored below 75% was grouped as “poor practitioner.” The reason for using a 75% cut off value for practice was by considering the seriousness of the COVID-19, and the study participants are midwives to whom the prevention practice is mandatory to keep themselves families safe from COVID-19 and be a role model to their patients and the rest of the community.

## 2.6. Ethical considerations

All research was conducted with integrity and in line with generally accepted ethical principles and approved by the Research Ethics Committee of Medical Faculty with the number No. 397/X/2020/Komisi Bioetik, Sultan Agung Islamic University. We performed the survey with the approval of the midwives. All midwives involved in the survey has been kept confidential.

## 3. Results/Findings

### 3.1. Characteristics of participants

A total of 478 midwives were included in the study. The demographic data of midwives are shown in Table 1. More than seventy percent of midwives were less than 35 years old and married. More than half of participants have been working for more than 5 years and graduated diploma 3. The participants were from 25 different provinces in Indonesia, but there were 64.9% from Central Java.

Table 1. Karakteristik responden

Characteristics	Category	Total (%)
Age	< 35 years	371 (77.6)
	> 35 years	107 (22.4)
Marital Status	Single	135 (28.2)
	Married	343 (71.8)
Work Experience Period	Less than 1 year	65 (13.6)
	1 – 2 years	67 (14.0)
	2 – 5 years	91 (19.0)
	5 – 10 years	122 (25.5)
	More than 10 years	133 (27.8)
Tingkat Pendidikan	Diploma 3	272 (56.9)
	Diploma 4/ Bachelor	129 (27.0)
	Profession	4 (0.8)
	S2/Master Degree	72 (15.1)
Province	S3/PhD	1 (0.2)
	Aceh	1 (0.2)
	Bali	1 (0.2)
	Banten	11 (2.3)
	Bengkulu	2 (0.4)
	DI Yogyakarta	23 (4.8)
	DKI Jakarta	18 (3.8)
	Jawa Barat	16 (3.3)
	Jawa Tengah	310 (64.9)
	Jawa Timur	13 (2.7)
	Kalimantan Barat	3 (0.6)
	Kalimantan Selatan	1 (0.2)
	Kalimantan Tengah	2 (0.4)
	Kalimantan Timur	1 (0.2)
	Kalimantan Utara	1 (0.2)
	Kepulauan Bangka Belitung	1 (0.2)
	Lampung	7 (1.5)
	Nusa Tenggara Barat	6 (1.3)
	Papua	18 (3.8)
	Riau	2 (0.4)
	Sulawesi Barat	1 (0.2)
	Sulawesi Selatan	3 (0.6)
	Sulawesi Tengah	26 (5.4)
	Sulawesi Tenggara	1 (0.2)
	Sulawesi Selatan	8 (1.7)
Sulawesi Utara	2 (0.4)	

### 3.2. Source of Information, Facility, Perception

The most popular information source was social media, such as WhatsApp, Facebook, Instagram, Twitter (47.7%). Apart from the social media, government website were also major sources of knowledge (22.6%) (Table 2). Regarding information, availability of facilities, and respondents' perceptions, 69.2% of respondents had received training on infection prevention, 53.4% had attended seminars or online training about Covid, 79.9% received adequate Personal Protective Equipment (PPE) facilities while working, 88.9% received facilities adequate disinfectants at work, 89.1% stated that there were guidelines for Infection Prevention (PI) in the workplace, 69.0% felt that the workload had increased during the pandemic, 52.9% felt comfortable using PPE, so they were less agile at work, 94.8% were disappointed when they saw that many people were leaving the house not for urgent reasons, and 97.7% were disappointed when they saw that many people were still not wearing masks (Table 3).

**Table 2.** Information Source regarding Covid-19

Source	Total (%)
Covid-19 Team	1 (0.2)
International Health Organization (ex: WHO)	15 (3.1)
Website and government information media (ex: Kemenkes RI)	108 (22.6)
Social Media (ex: WhatsApp, Facebook, Instagram, Twitter)	228 (47.7)
Mass Media (ex: TV, Radio, Newspaper)	50 (10.5)
Journal	4 (0.8)
Workplace	72 (15.1)

**Table 3.** Information, Facility, and Perception

Question	Category	Total (%)
I have received training on infection prevention	Yes	331 (69.2)
	No	147 (30.8)
I have attended seminars or online training about Covid	Yes	303 (63.4)
	No	175 (36.6)
I get adequate PPE (Personal Protective Equipment) facilities at work	Yes	382 (79.9)
	No	96 (20.1)
I get adequate disinfectant facilities at work	Yes	425 (88.9)
	No	53 (11.1)
There are Infection Prevention (PI) guidelines where I work	Yes	426 (89.1)
	No	52 (10.9)
My workload has increased during the pandemic	Yes	330 (69.0)
	No	148 (31.0)
I feel uncomfortable using PPE, so I am less agile at work	Yes	225 (47.1)
	No	253 (52.9)
I was disappointed when I saw that there were still many people who left their homes not for urgent reasons	Yes	453 (94.8)
	No	25 (5.2)
I was disappointed when I saw that many people were not wearing masks	Yes	468 (97.9)
	No	10 (2.1)

### 3.3. Knowledge, Risk Perceptions, Preventive Behaviours and Adherence

A total of 441 respondents (92.3%) has a good behaviour to protect them from Covid-19. However, there were 192 (40.2%) have poor knowledge and 104 (21.8%) have poor perception regarding Covid-19 (Table 4).

**Table 4.** Knowledge, Attitude, and Practice to Prevent Covid-19

Variable	Category	Total (%)
Knowledge	Good	286 (59.8)
	Poor	192 (40.2)
Attitude/Perception	Good	374 (78.2)
	Poor	104 (21.8)
Practice	Good	441 (92.3)
	Poor	37 (7.7)

**Table 5.** Knowledge of Midwives in Indonesia during the COVID-19 Outbreak

Question	True	False
COVID-19 is caused by the Middle East Respiratory Syndrome (MERS) virus	193 (40.4)	285 (59.6)
Fever, cough and shortness of breath are common symptoms of COVID-19	466 (97.5)	12 (2.5)
The incubation period for Covid-19 is 7-21 days	149 (31.2)	329 (68.8)
COVID-19 can spread through small droplets from the nose or mouth when coughing or sneezing	466 (97.5)	12 (2.5)
Rapid Test can be used to confirm whether someone is infected with COVID-19	269 (56.3)	209 (43.7)
There is no age limit people can be infected by coronavirus	473 (99.0)	5 (1.0)
Antibiotics are effective in preventing and treating COVID-19	336 (70.3)	142 (29.7)
Wearing a mask can prevent the spread of COVID-19	468 (97.9)	10 (2.1)
A person with COVID-19 cannot transmit the virus if he does not have a fever	456 (95.4)	22 (4.6)
To prevent transmission, you should avoid crowded places	464 (97.1)	14 (2.9)
Only people with Covid-19 are required to wear masks	461 (96.4)	17 (3.6)

**Table 6.** Attitude and Perception of Midwives in Indonesia during the COVID-19 Outbreak

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Using full PPE is only required when dealing with clients who have confirmed Covid-19	135 (28.2)	124 (25.9)	94 (19.7)	81 (16.9)	44 (9.2)
When there are clients with signs pointing to covid-19, I am confident to provide care	94 (19.7)	221 (46.2)	129 (27.0)	27 (5.6)	7 (1.5)
The government has ensured the availability of adequate PPE in health facilities	133 (27.8)	198 (41.4)	115 (24.1)	29 (6.1)	3 (0.6)
Covid 19 patients without experiencing any symptoms, I'm sure they won't transmit the virus	14 (2.9)	19 (4.0)	235 (49.2)	110 (23.0)	100 (20.9)
Wearing a mask can effectively prevent the spread of COVID-19	208 (43.5)	228 (47.7)	30 (6.3)	11 (2.3)	1 (0.2)
The government has worked optimally in controlling this pandemic	105 (22.0)	6237 (49.6)	113 (23.6)	17 (3.6)	6 (1.3)
I am sure the vaccine that will be tested can work effectively and successfully end this pandemic	72 (15.1)	183 (38.3)	204 (42.7)	18 (3.8)	1 (0.2)

**Table 7.** Preventive Behaviours and adherence of Midwives in Indonesia during Pandemic

Question	Always	Sometimes	Never
I wash my hands with the right steps	434 (90.8)	44 (9.2)	0 (0.0)
I use hand sanitizer when there is no soap and water	439 (91.8)	38 (7.9)	1 (0.2)
I use full PPE when I am providing services	346 (72.4)	116 (24.3)	16 (3.3)
I took off the PPE and put it in the right place	423 (88.5)	45 (9.4)	10 (2.1)
I immediately clean myself and change clothes when I get home from work	432 (90.4)	43 (9.0)	3 (0.6)
I go to a recreation area or a restaurant	242 (50.6)	224 (46.9)	12 (2.5)
I wear a mask when I leave the house	464 (97.1)	10 (2.1)	4 (0.8)

### 3.4. Factors influence Knowledge and Behaviour during Covid-19 Outbreak

From data analysis, there is no characteristic, information, facility and perception factors that influence the knowledge of midwives regarding Covid-19 (Tabel 8). However, there were four factors that influence practice among midwives to prevent Covid-19. The availability PPE, disinfectant and IP guidelines significantly influence practice to prevent Covid-19 (P value: 0.000), with Odd Ratio 2.6, 2.1, 3.8 respectively. Overload of midwifery working has also influenced the practice among midwives to prevent Covid-19 (Tabel 9).

**Table 8.** Factors influence Knowledge regarding Covid-19

Variable	Knowledge		P value	OR (95% CI)
	Good	Poor		
Age				
< 35 years	224 (46.9)	147 (30.8)	0.651	1.006 (478-2.116)
> 35 years	62 (13.0)	45 (9.4)		
Marital Status				
Married	213 (44.6)	130 (27.2)	0.107	1.653 (1.057-2.585)
Single	73 (15.3)	62 (13.0)		
Work Experience Period				
> 10 years	77 (16.1)	56 (11.7)	0.592	0.667 (0.327-1.358)
< 10 years	209 (43.7)	136 (28.5)		
Education				
Post Diploma 3	132 (27.6)	74 (15.5)	0.099	1.508 (1.005-2.264)
Diploma 3	154 (32.2)	118 (24.7)		
Infection Prevention Training				
Yes	195 (40.8)	136 (28.5)	0.538	0.825 (0.543-1.253)
No	91 (19.0)	56 (11.7)		
Seminar on Covid-19				
Yes	186 (38.9)	117 (24.5)	0.362	1.273 (852-1.901)
No	100 (20.9)	75 (15.7)		
PPE Facility				
Yes	229 (47.9)	153 (32.0)	0.919	1.315 (0.733-2.357)
No	57 (11.9)	39 (8.2)		
Desinfectant Facility				
Yes	253 (52.9)	172 (36.0)	0.702	0.853 (0.384-1.894)
No	33 (6.9)	20 (4.2)		
Infection Prevention Guidelines				
Yes	253 (52.9)	173 (36.2)	0.572	0.857 (0.421-1.741)
No	33 (6.9)	19 (4.0)		
Over Workload				
Yes	132 (27.6)	93 (19.5)	0.624	1.141 (0.742-1.754)
No	154 (32.2)	99 (20.7)		
Uncomfortable Using PPE				
Yes	198 (41.4)	132 (27.6)	0.911	0.909 (0.619-1.336)
No	88 (18.4)	60 (12.6)		

**Table 9.** Factors influence Practice in Preventing Covid-19

Variable	Practice		P value	OR (95% CI)
	Good	Poor		
Age				
< 35 years	338 (70.7)	33 (6.9)	0.079	0.775 (0.149-4.036)
> 35 years	103 (21.5)	4 (0.8)		
Marital Status				
Married	316 (66.1)	27 (5.6)	0.864	0.684 (0.286-1.637)
Single	125 (26.2)	10 (2.1)		
Work Experience Period				
> 10 years	127 (26.6)	6 (1.3)	0.101	1.552 (0.358-6.727)
< 10 years	314 (65.7)	31 (6.5)		
Education				
Post Diploma 3	187 (39.1)	19 (4.0)	0.291	1.059 (0.461-2.431)
Diploma 3	254 (53.1)	18 (3.8)		
Infection Prevention Training				
Yes	305 (63.8)	26 (5.4)	0.888	0.703 (0.308-1.603)
No	136 (28.5)	11 (2.3)		
Seminar on Covid-19				
Yes	283 (59.2)	20 (4.2)	0.220	1.194 (0.533-2.675)
No	158 (33.1)	17 (3.6)		
PPE Facility				
Yes	365 (76.4)	17 (3.6)	0.000	2.616 (0.982-6.972)
No	76 (15.9)	20 (4.2)		
Desinfectant Facility				
Yes	404 (84.5)	21 (4.4)	0.000	2.057 (0.682-6.201)
No	37 (7.7)	16 (3.3)		
Infection Prevention Guidelines				

Yes	405 (84.7)	21 (4.4)	0.000	3.790 (1.434-10.014)
No	36 (7.5)	16 (3.3)		
Over Workload				
Yes	310 (64.9)	20 (4.2)	0.040	1.062 (0.457-2.466)
No	131 (27.4)	17 (3.6)		
Uncomfortable Using PPE				
Yes	211 (44.1)	14 (2.9)	0.241	1.078 (0.488-2.381)
No	230 (48.1)	23 (4.8)		
Knowledge				
Good	264 (55.2)	22 (4.6)	0.962	0.896 (0.415-1.937)
Poor	177 (37.0)	15 (3.1)		
Attitude				
Good	96 (20.1)	8 (1.7)	0.983	0.690 (0.278-1.715)
Poor	345 (72.2)	29 (6.1)		

#### 4. Discussion

In this study, we found that, during the COVID-19 epidemic, 59.8% of midwives in Indonesia had good knowledge of COVID-19, and that 69.2% of them received relevant training in their workplace. In addition, 78.2% of participants had good attitude and perception, and 92.3% performed good behaviour and adherence to infection control during COVID-19 outbreak. Determinant factors of practice to prevent COVID-19 included the availability PPE, disinfectant and IP guidelines as well as the work overload of midwives.

This study showed that social media and government website were the main source of information regarding COVID-19, followed by workplace, mass media, journal, WHO, and Covid-19 team. Information released through social media (WeChat) was also the main source in China was followed by news and information apps, microblogs, television or radio, family members, friends, or colleagues, websites, SMS, short video apps, community advocacy, and paper-based media (Cui et al., 2020; Huang et al., 2020). This study also highlights the importance of continuing to disseminate information about COVID-19, including the most recent developments in the epidemic, advances in illness treatment, and understanding of daily precautions.

In this study, we found that just over half of the participants had received an infection prevention training. According to prior studies, training for hospitals and related organizations is essential for the prevention of infectious diseases (Singh et al., 2020; Zhong et al., 2020). Besides that, the availability of equipment to prevent disease is also important. This study also showed that equipment was an independent variable linked to a higher good practices and adherence of midwives. As a result, we advise to ensure the availability equipment of infection prevention in health facility (Akseer et al., 2020; Nobari et al., 2021).

For the knowledge section, the right answer rates for definition, incubation period, diagnose test and antibiotic treatment were less than 80%. This may be due to the fact that COVID-19's epidemic period overlaps with that of the common cold, so that people might be difficult to understand the definition, symptom, period and diagnose test. During pandemic, there was panic buying an antibiotic. The government also has announced inconsistent information regarding COVID-19 treatment at home. It is important to give a clear statement and clarification to the public about this (López-Morales et al., 2020; Saccone et al., 2020; Zainiyah & Susanti, 2020).

Most midwives could reduce risk behaviors and take the appropriate precautions for the behavior segment, similar to the findings of earlier studies (Geldsetzer, 2020; Wilson et al., 2020). However, there were a half of midwives who always go to recreation or restaurant during pandemic. A quarter of participants also did not use complete PPE while providing health services. Similar to a study in Yogyakarta, Indonesia, that found 35.9% of their participants have poor obedience to use personal protective equipment. This study also revealed that their poor compliance due to their attitude to disease prevention was poor (Hartuti et al., 2021). This may be due to the lack of equipment, which has direct or indirect negative impacts behaviour and adherence in preventing COVID-19.

The relationship between respondents' socio-demographic characteristics and their knowledge is not found in this study. However, the availability PPE, disinfectant and IP guidelines significantly influence behaviour of midwives.

## 5. Limitation of the study

The study has some potential limitations that need to be acknowledged. The convenient sampling and snowball techniques may have selection bias. All of the domains of the various KAP dimensions used the same question scoring methodology. The self-reported response information used in this study depends on the participants' honesty and remember skills, which could lead to recall bias. We were unable to conduct a statistical analysis of validity and reliability.

## 6. Conclusion

This study raises some significant questions regarding the midwives' knowledge, attitude and behaviour in preventing COVID-19 at the time of the outbreak. Training initiatives are obviously needed to help midwives working in critical care better grasp hazards and prevention tactics. The availability of equipment should be measured in health facility.

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