

## **Analysis Of Infection Control Of Labor Room During Covid-19 Pandemic In Tangerang City Public Health Centres**

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### **Abstract**

Health workers are susceptible to contracting the Coronavirus, and this is due to nosocomial infections. Birth attendants must take good care of infection prevention. This study aims to analyze the infection control of the labor room during the COVID-19 pandemic at Tangerang City Public Health Center. This research is a quantitative analytic study with a cross-sectional approach. The sample is all midwives who work in the delivery room of the Tangerang City Public Health Center with a total of 101 with a total sampling technique. Data were analyzed using descriptive and inferential statistics using the chi-square test. The results showed that 21.8% of midwives experienced covid-19 infection, 82.2% of midwives performed a good handwashing procedure, 76.2% of midwives used Personal Protective Equipment (PPE) properly, 89.1%, midwives performed good equipment decontamination, 93,1% of midwives performed good waste management, and 53.5% of midwives stated that they did not have a delivery chamber. There was a relationship between handwashing procedures ( $p = 0,000$ ), the use of PPE ( $p = 0,000$ ), equipment decontamination ( $p = 0,000$ ) and waste management ( $p = 0.005$ ) with covid-19 infection. There was no relationship between the delivery chamber ( $p = 1,000$ ) and the incidence of COVID-19 infection. Health workers are expected to make good infection prevention and control efforts to prevent infection from the Covid-19 pandemic.

**Keywords:** washing hand procedures, PPE use, equipment decontamination, waste management, delivery chamber, COVID-19 infection.

### **Introduction**

Support the implementation of quality and professional health services, mainly to prevent infection in health care facilities, and comprehensive handling is needed using an infection prevention and control guideline (Kemenkes RI, 2017). If infection prevention is not carried out properly, it will cause nosocomial infection.

Through the Ministry of Health of the Republic of Indonesia, Indonesia has conducted a survey of 10 General Teaching Hospitals, which found a relatively high rate of 6-16% nosocomial infection, with an average of 9.8%. The most common nosocomial infections are surgical site infections (SSI), urinary tract infections (UTI), lower respiratory tract infections, and primary bloodstream infections (IADP) (Achmad, 2017). Banten Province seen from the Tangerang City Hospital in 2017 the incidence of phlebitis was 6.09%, Urinary Tract Infection (UTI) was 0.08%, Hospital Acquired Pneumonia was 0.11%, and Surgical Wound Infection was 0.09%, This number still exceeds the minimum service standard of the Ministry of Health which

states that the standard incidence of nosocomial infections is < 1.5% (RSUD Tangerang, 2017).

The same condition occurs in health workers due to infection prevention, which is not enough for health workers to experience infections such as HIV / AIDS and hepatitis B and C. It is estimated that the annual rate of injury due to sharps medical waste for health care workers and hospital cleaners is proposed by the US. Agency for Toxic Substances and Diseases Register (ASTDR), the highest number of hepatitis B virus infection cases in the United States is experienced by nurses, 56-96 cases, and then 23-91 cases of cleaning personnel (Pertiwi, Joko & Dangiran, 2017).

The CDC (Center for Disease Control) reported that there were 52 cases of health workers infected with HIV (Human Immunodeficiency Virus) due to accidents outside the workplace, while 144 other officers were suspected of being infected at work (Kemenkes RI, 2017). According to the data from the Research and Development Agency Ministry of Health of the Republic of Indonesia, in 2017, 7.000 Indonesian health workers were infected with the Hepatitis B virus, of which 5,000 were infected through waste syringes. It shows that health workers, including nurses, are the profession most prone to injury so that they contract the Hepatitis B virus (Mursy & Mohamed, 2019).

The cause of nosocomial infection is germs, the Coronavirus (Soedarto, 2016). Many health workers were infected while serving patients. Some even died (Tolu, Feyissa, & Jeldu, 2020). According to information from Amnesty International, a report stated that at least 7,000 medical workers worldwide have died from the Coronavirus. Mexico has the highest number of medical worker deaths, consisting of 3353 people (Rodriguez-Bolanos, 2020). Based on data from the Indonesian Doctors Association (IDI) Mitigation Team, from March to December 2020, 342 medical and health workers died due to being infected with Covid-19, consisting of 192 doctors and 14 dentists, and 136 nurses. Banten Province found seven doctors and two nurses who died from COVID-19 (Pusparisa, 2020).

The city of Tangerang is not yet clear about the data on health workers who have COVID-19, but it was found at the Petir Health Center that the number of health workers exposed to COVID-19 in March 2020 - January 2021 was eight respondents, including one ambulance driver 1, 2 midwives, two physicians, one nurse and two cleaning personnel (Petir Health Centre Tangerang City, 2020).

It shows that midwives, as first-line managers of pregnancy, childbirth, and postpartum cases, must be vigilant by wearing complete Personal Protection Equipment (PPE) so that there is no transmission of the virus from patients to midwives (Ashokka et al., 2020; Novelia, Sia & Songwathana, 2017). The Indonesian Association of Gynecological Obstetrics (POGI) issued several recommendations for pregnant women and delivery mothers to prevent infection and transmission of Covid-19 to mothers, babies, and health workers. POGI asks that all deliveries be carried out in health facilities (health facilities), such as health centers, midwives, and hospitals, during the Covid-19 outbreak. The main goal of delivery in health facilities is to reduce the risk of transmission to health workers and prevent maternal morbidity and mortality. Moreover, 13.7% of pregnant women without symptoms could show positive results for COVID-19 by examining Polymerase Chain Reaction (PCR). Therefore, birth attendants must take good care of infection prevention, including washing hands properly, using personal

protective equipment (PPE) at least according to level 2, decontaminating tools, and treating waste correctly and adequately to avoid transmission COVID-19 (Suryandari, 2020).

Prevention of infection is primarily related to education and involves changing the behavior of midwives, not only must they have the correct information regarding risks and know how to avoid them from risks, but also they must demonstrate appropriate risk prevention behavior (Mar'at, 2016; Novelia, Sia & Songwathana, 2017).

A preliminary study on 11 health workers at the Peter Health Centre in November 2020 was obtained when giving birth assistance. Most of them did not wash their hands first before helping with childbirth. Besides that, they rarely wear boots. Even the masks used should be using N-95. The midwives only used surgical masks are due to limited N-95 masks and rarely even used eye protection in the form of google glasses or face shields. Likewise, when washing utensils, health workers did not use household gloves. They used gloves that have been used to help the labor process. In the following process, at the time of the waste disposal, it was found that there were health workers who disposed of waste in the form of paper into the medical trash or disposed of medical masks but in the usual trash. Based on these results, it can be seen that health workers have not fully implemented the Guidelines for Infection Prevention and Control properly. It can be at risk of contracting potentially harmful diseases to patients, visitors, and health workers themselves. This study aimed to analyze the implementation of infection control in the labor room during the Covid-19 pandemic at the Tangerang City Public Health Center.

## **Method**

The research design was quantitative analytic with a cross-sectional approach. The population in this study was all midwives who served in the labor room at the Tangerang City Public Health Center, with 101 people. The sample was the entire population which consisted of 101 midwives who worked at the Public Health Center in Tangerang City. The research was conducted at 15 Public Health Centre Tangerang City. 15 out of 33 Public Health Centres were selected purposively with inclusion criteria; having PONEC (Basic Obstetrics Neonatal Emergency Services). The 15 selected Public Health Centres were Petir Public Health Centres, Cipondoh Public Health Centres, Goris Gaga Lama Public Health Centres, Pondok Bahar Public Health Centres, Cibodasari Public Health Centres, Larangan Utara Public Health Centres, Paninggilan Public Health Centres, Kunciran Public Health Centres, Panunggangan Public Health Centres, Tanah Tinggi Public Health Centres, Karawaci Baru Public Health Centres, Jatiuwung Public Health Centres, Kedaung Wetan Public Health Centres, Gembor Public Health Centres and Periuk Jaya Public Health Centres. The research was conducted in April 2021.

The independent variables in this study were the handwashing procedure, the use of PPE, equipment decontamination, waste management, and the availability of a delivery chamber. The dependent variable in this study was the incidence of COVID-19 infection. The incidence of COVID-19 infection was defined as nosocomial infections experienced by midwives after providing delivery assistance during the COVID-19 pandemic, as evidenced by a positive swab PCR test result.

The researcher used the observation sheet checklist to ensure the standard Operating Procedure (SOP) had been carried out in the Public Health Centre. The checklist includes handwashing, PPE use, equipment decontamination, medical waste management, and the delivery chamber's ability to adjust. Medical record data are used to see whether the respondent has experienced COVID-19 infection. The researcher was assisted by an enumerator, the midwife's head in 15 selected Public Health Centers in Tangerang City, for the observation process. Data were analyzed using descriptive and inferential statistics, the chi-square test. This research has received ethical approval from Komisi Etik Penelitian Kesehatan Fakultas Kedokteran dan Kesehatan Universitas Muhammadiyah Jakarta by the letter No.092/PE/KE/FKK-UMJ/IV/2021 and also approval from the Tangerang City Government through the National Unity and Political Body (Number: 073/152-Bid.Kesbang / 2021).

## Results

### 1. Univariate Analysis

Table 1. Distribution of the frequency of Covid-19 infection, hand washing procedures, use of PPE, equipment decontamination, waste management, and delivery chamber.

Variables	f	Percentage
<b>Covid-19 infections</b>		
Negative	79	78,2
Positive	22	21,8
<b>Washing hands procedures</b>		
Good	83	82,2
Poorly	18	17,8
<b>The use of PPE</b>		
Good	77	76,2
Poorly	24	23,8
<b>Equipment decontamination</b>		
Good	90	89,1
Poorly	11	10,9
<b>Waste management</b>		
Good	94	93,1
Poorly	7	6,9
<b>Delivery chamber</b>		
Available	47	46,5
Not available	54	53,5

Table 1 shows the incidence of COVID-19 infection in midwives in the labor room during the COVID-19 pandemic. Seventy-nine respondents (78.2%) had negative COVID-19. There were 83 respondents (82.2%) who performed reasonable handwashing procedures, 77

respondents (76.2%) performed good use of PPE, 90 respondents (89.1%) performed good equipment decontamination, 94 respondents (93.1%) performed good waste management, and 54 respondents (53,5%) stated that the non-availability of the delivery chamber.

Tabel 2. The relationship between handwashing procedures, the use of PPE, decontamination of tools, waste management, and delivery chambers with the incidence of COVID-19 infection.

Variable	Occurrence of COVID-19				Total	Value p	OR		
	Infection								
	Negative	Positive	N	%					
	N	%	N	%	N	%			
<b>Washing hands procedures</b>									
Good	77	92,8	6	7,2	83	100	.005	102.67	
Poorly	2	11,1	16	88,9	18	100			
<b>The use of PPE</b>									
Good	75	97,4	2	2,6	77	100	.005	187.5	
Poorly	4	16,7	20	83,3	24	100			
<b>Equipment decontamination</b>									
Good	78	86,7	12	13,3	90	100	.005	65	
Poorly	1	9,1	10	90,9	11	100			
<b>Waste management</b>									
Good	77	81,9	17	18,1	94	100	.005	11.32	
Poorly	2	28,6	5	71,4	7	100			
<b>Delivery chamber</b>									
Available	37	78,7	10	21,3	47	100	1.00	1.05	
Not available	42	77,8	12	22,2	54	100			
Total	79	78,2	22	21,8	101	100			

Table 2 shows a significant relationship between handwashing procedures and the incidence of COVID-19 infection in midwives in the delivery room during the COVID-19 pandemic (p= .005). The midwives with poor handwashing procedures were at risk of experiencing 102.667 (OR = 102.667) times the incidence of COVID-19 infection in the delivery room during the COVID-19 pandemic period compared to midwives with reasonable handwashing procedures. There was a significant relationship between PPE use and the incidence of COVID-19 infection in midwives in the delivery room during the COVID-19 pandemic (p = .005). The midwives with poor PPE use were 187.5 (OR 187.5) times the risk of experiencing COVID-19 infection in the delivery room during the COVID-19 pandemic compared to midwives with good PPE use. There was a significant relationship between device decontamination and the incidence of COVID-19 infection in midwives in the delivery room during the COVID-19 pandemic (p= .005). The midwives with poor equipment decontamination were 65 (OR= 65) times more likely to experience COVID-19 infection in the delivery room than

midwives with good equipment decontamination. There was a significant relationship between waste management and the incidence of COVID-19 infection in midwives in the delivery room during the COVID-19 pandemic ( $p = .005$ ). The midwives with poor waste management were at risk of 11.324 times ( $OR = 11.324$ ) having COVID-19 infection in the delivery room during the COVID-19 pandemic compared to midwives with good waste management. There was no significant relationship between the delivery chamber and the incidence of COVID-19 infection in midwives in the delivery room during the COVID-19 pandemic. The midwives who do not have a delivery chamber were at risk 1.057 times ( $OR = 1.507$ ) of experiencing COVID-19 infection in the delivery room during the COVID-19 pandemic compared to midwives who have a delivery chamber.

## **Discussion**

### **Relationship between Washing Procedures and the Incidence of COVID-19 Infection**

The results showed a significant relationship between handwashing procedures and the incidence of COVID-19 infection in midwives in delivery rooms during the COVID-19 pandemic. Previous research has shown that washing hands often were significantly associated with a lower risk of infection (Doung-ngern et al., 2020). Suryandari & Trisnawati (2020) explained that excellent and correct hand washing is one of the preventive efforts in spreading the Coronavirus caused by nosocomial infections. According to Susiati (2018), the purpose of washing hands is to remove microorganisms on the hands, prevent cross-infection, maintain sterile conditions, protect yourself and patients from infection and provide a fresh and clean feeling. In addition, Radhika (2020) found a relationship between the behavior of washing hands with soap and the incidence of diarrhea among toddlers. Washing hands is an action taken to prevent disease. Basuki & Nofita (2017) found a relationship between compliance with six-step hand washing with the incidence of phlebitis, which means that washing hands with six steps using soap with running water is a good and correct way to prevent disease.

Researchers assume that washing hands correctly and adequately can remove microorganisms on the hands to protect midwives and patients from nosocomial infections, one of which is the spread of COVID-19. It can be seen from the majority of midwives with COVID-19 status due to improper and correct handwashing behavior. The reason is habitual factors when practically washing hands and not following procedures. There needs to be an increase in awareness and motivation for health workers to carry out proper handwashing, one of which is by providing supervision and carrying out regular procedures for washing hands before and after dealing with patients to avoid nosocomial infections cause the spread of the Coronavirus.

#### **Relationship between the use of PPE and the incidence of COVID-19 infection**

The results showed a significant relationship between PPE use and the incidence of COVID-19 infection in midwives in the labor room during the COVID-19 pandemic. Frontline HCWs had a significantly increased risk of COVID-19 infection, which was highest among HCWs with inadequate access to PPE who cared for COVID-19 patients (Nguyen et al., 2020).

Husein (2020) explains that midwives, as first-line managers of pregnancy, childbirth, and postpartum cases, must be vigilant by wearing complete Personal Protection Equipment (PPE) to prevent transmission of the virus from patients to midwives. PPE aims to protect health workers from the risk of infection from patient to staff. The risk of infection can be caused by exposure to all types of body fluids (secretions, mucus, blood) and skin from the patient to the health worker or vice versa.

Researchers assume there was a relationship between PPE use with the incidence of COVID-19 infection in midwives. It is because if midwives use PPE ultimately, the transmission or spread of the virus from patient to midwife or midwife to the patient can be restrained so that with the use of complete PPE then health workers can be protected from the risk of infection, one of which is the spread of the Coronavirus, where the process of spreading through contact, droplets, and air. There is a need for supervision in using PPE that is complete following the procedure to increase midwives' compliance in PPE use. Public Health Centre should provide complete PPE for midwives, especially N95 masks and headgear for labor assistance measures because there are still health centers that do not have them or supplies are still limited. The government is expected to pay special attention to PPE availability in health service facilities.

#### **Relationship between Equipment Decontamination and the Incidence of COVID-19 Infection.**

The results showed a significant relationship between device decontamination and the incidence of COVID-19 infection in midwives in the labor room during the COVID-19 pandemic. According to Nurasiah et al. (2014), decontamination is taken to ensure that health workers can safely handle various objects contaminated with blood and fluids. Decontamination is an essential first step to handling contaminated equipment, gloves, and other objects. Decontamination makes items safer for personnel to handle and clean. Wear thick rubber or household gloves made of latex for further protection when handling used or dirty equipment. Immediately after use, put the contaminated items in the 0.5% chlorine solution for 10 minutes. If the tool decontamination process is not under the procedure, the tool is not entirely sterile because it cannot kill germs completely, so that the health worker gets infected due to the decontamination of the equipment that is not following the procedure. Midwives are expected to properly carry out the decontamination process to protect against nosocomial infections.

#### **The Relationship between Waste Management and the Incidence of COVID-19 Infection**

The results showed a significant relationship between waste management and the incidence of COVID-19 infection in midwives in the delivery room during the COVID-19 pandemic. According to the Indonesian Ministry of Health (2017), waste management aims to protect

patients, health workers, visitors, and communities around health care facilities from the spread of infection and injury and dispose of hazardous materials (cytotoxic, radioactive, gas, infectious waste, chemical, and pharmaceutical waste) by secure. According to Darmadi (2018), the process of nosocomial infection can occur through medical service personnel and other sufferers. WHO (2020) explained that proper and correct waste treatment could be avoided from disease transmission, one of which is COVID-19.

Following the research results by Padmadita (2017), waste management results are related to the incidence of infection. Nurses are at most significant risk for infection through injuries caused by contaminated sharp objects (generally syringes). Similar risks are faced by other health workers in the hospital and implementing waste management outside the hospital and scavengers at the final waste disposal site (although this risk is not documented). If the waste management is not following the procedure, the health personnel will be contaminated by blood and fluids that contain lots of viruses and bacteria due to mistakes in the waste management.

Medical and non-medical waste must be appropriately managed under applicable regulations because midwives are at the most significant risk of contracting an infection through injuries caused by contaminated sharp objects. There is a need for proper and correct waste management because the waste is seen as dangerous and causes various types and impacts on health workers, leading to nosocomial infections.

#### **Relationship between the Delivery Chamber and the Incidence of COVID-19 Infection**

The results showed no significant relationship between the delivery chamber and the incidence of COVID-19 infection in midwives in the labor room during the COVID-19 pandemic. The delivery chamber prevents transmission to mothers, babies, and health workers. This third level of PPE is intended for the procedure room and surgery for patients with suspected or confirmed COVID-19. Chen et al. (2020) explained that the facilities for personal protective equipment are inadequate for health workers who work in an acute physical health environment. They are a group that is very vulnerable to being infected with COVID-19 because they are at the forefront of case management; therefore, they must be equipped with complete personal protective equipment according to WHO protocol. Researchers assume there was no relationship between the use of a delivery chamber and the incidence of COVID-19 infection. The Public Health Centre used the delivery chamber and those who did not use both found midwives exposed to the Coronavirus. It indicates that even though the delivery chamber has been used if the PPE is incomplete, it is highly likely that the virus will infect health workers. Conversely, if a delivery chamber is not available at the Public Health Centre, but the midwife uses PPE ultimately, there is a slight chance of being exposed to the Coronavirus caused by nosocomial infections.

#### **Conclusion**

The results show that out of 101 respondents, 21.8% experienced an incidence of COVID-19 infections. It was very crucial considering the duties of midwives in midwifery services. If a



midwife is infected with Covid-19, it is the risk to transmit it to other colleagues, even mothers, and babies. Furthermore, the results showed that the majority of respondents (82.2%) performed reasonable handwashing procedures, 76.2% of respondents performed good use of PPE, 89.1% of respondents performed good equipment decontamination, and 93.1% performed good waste management. The conclusion is that midwives' infection control practice in the delivery room has been implemented quite well. Research shows a significant relationship between handwashing procedures, the use of PPE, equipment decontamination, and waste management with the incidence of COVID-19 infection in midwives in delivery rooms during the COVID-19 pandemic. It is hoped that midwives can make efforts to prevent and control infection in providing delivery assistance during the COVID-19 pandemic by washing hands properly in 6 steps, using complete PPE, decontaminating equipment, and managing waste according to procedures in order to avoid the spread of COVID-19.

The results showed that 53.3% of respondents stated that they did not have a delivery chamber in the delivery room. Following the Ministry of Health's directive that standard delivery can be carried out with special conditions, using a delivery chamber and a team of health workers must use PPE according to level 3. If a delivery chamber is not available, it will significantly increase the occurrence of nosocomial infections. However, this study found no significant relationship between the delivery chamber and the incidence of COVID-19 infection in midwives in the delivery room during the COVID-19 pandemic. The Public Health Centre should provide a delivery chamber in each labor room, complete PPE including N95 masks and headgear for delivery aid measures, because there were still public health centers that did not have them or the supplies were still limited. The government is expected to pay serious attention to personal protective equipment for health workers during the Covid-19 pandemic.

#### **Ethics Approval and Consent to Participate**

This study has gained ethical approval from the Health Research Ethical Committee Faculty of Medicine and Health Universitas Muhammadiyah Jakarta by the letter No.092/PE/KE/FKK-UMJ/IV/2021.

#### **Competing Interest**

There is no competing interest in this research

#### **Availability of Data and Materials**

The data was gained from Health Centre in Tangerang City.

#### **Authors' Contribution**

SN conceptualized, prepared the draft, interpreted the data. VS formulated the study design, and HR collected and interpreted the data.

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