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The Use of Personal Protective Equipment (PPE) in Maternal Care During the COVID-19 Pandemic

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ABSTRACT

Introduction: The COVID-19 pandemic has driven rapid changes in healthcare delivery worldwide, including maternal care. In Indonesia, there has been an increase in maternal and infant mortality during the COVID-19 pandemic. Hospitals and health centers are high-risk locations for the transmission of this disease. Controlling potential hazards in healthcare facilities can be achieved by using Personal Protective Equipment (PPE). However, there has been an increased demand for PPE during the pandemic, leading to a shortage of availability. Nevertheless, PPE is a crucial component for protecting both healthcare staff and patients from COVID-19 transmission. Research related to the evaluation of PPE usage among healthcare workers during the COVID-19 pandemic, especially in maternal healthcare, is limited. Therefore, this study aims to evaluate the use of Personal Protective Equipment (PPE) by healthcare workers when providing maternal care in healthcare facilities in the city of Banjar, West Java. **Methods:** This research is a quantitative study in the form of a descriptive cross-sectional study. The minimum sample size consisted of 96 individuals, including general practitioners, midwives, nurses, and obstetricians who are currently actively providing maternal care services in healthcare facilities in the City of Banjar. Data collection was conducted using the snowball sampling method in February – March 2022, with the El-Sokkary questionnaire from 2021 as the modified instrument distributed online. **Result:** The research results showed that the majority of respondents were female (96,3%), worked as midwives (95,4%), were aged 25-34 years (40,3%), had 6-10 years of work experience (29,3%), and in the past two weeks, the majority worked in primary care settings (40,3%). Exposure to training and guidelines, as well as exposure to COVID-19 patients, were both considered high (grand mean 2,7 and 2,2). Healthcare facility policies indicated that the majority did not impose sanctions (75,2%) if personal protective equipment (PPE) was not used according to guidelines, and the compliance rate ranged from 65-80% (43,1%). The frequency of PPE usage was categorized as high (grand mean 3,6), with only 58,7% feeling that the availability of PPE was sufficient, with N95 masks and similar items experiencing the most shortages (73,3%). Healthcare workers' negligence was relatively low (grand mean 2,9), but the compliance with PPE usage guidelines varied from 0 to 42,8%, depending on the type of service provided. **Conclusion:** The types of personal protective equipment (PPE) frequently used by healthcare professionals (midwives, nurses, general practitioners, and obstetricians) include surgical masks/N95 masks, waterproof surgical gowns, face shields, goggles, headgear, protective shoes, aprons, and gloves. The overall compliance rate for the use of PPE is approximately 65-80% according to local healthcare facility regulations. The evaluation of PPE usage indicates that the compliance with PPE usage among maternal healthcare providers varies depending on the type of service provided, with the highest compliance observed in the case of delivery services for suspected/confirmed COVID-19 patients. The results of this research are expected to be considered by healthcare facilities and relevant stakeholders in documenting and providing the necessary types of PPE required by healthcare professionals in their daily practice.

Keywords: *COVID-19 pandemic, healthcare workers, maternal services, personal protective equipment*

INTRODUCTION

Coronavirus 2019 (COVID-19) is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). This virus spreads through several different ways, typically through the mouth or nose of an infected person in tiny fluid particles when they cough or sneeze. Data from the COVID-19 task force in Indonesia as of October 31, 2021, indicates that more than

4 million people in the community have been infected with the COVID-19 virus, with West Java being the province with the highest weekly case increase I[14].n 2021, there were 7.389 maternal deaths in Indonesia, with the majority of them attributed to COVID-19, accounting for a total of 2.982 cases[15]. This indicates that pregnant women and their fetuses are one of the high-risk populations during this infectious disease outbreak[4].

This situation presents a significant challenge that requires greater attention during the COVID-19 pandemic, as it is feared to increase the morbidity and mortality rates of both mothers and newborns. With the surge in COVID-19 cases, healthcare workers, who play a crucial role in providing care to prevent maternal deaths, have faced shortages of personal protective equipment (PPE), which is a vital component in preventing the spread of this contagious virus. AWHONN (Association of Women's Health, Obstetric and Neonatal Nurses) has recommended that all healthcare providers caring for pregnant women during childbirth should use appropriate personal protective equipment to minimize transmission[13].

The El-Sokkary et al. study in Egypt in 2021 on healthcare workers' compliance with using personal protective equipment (PPE) during the COVID-19 pandemic found a non-compliance rate of 53,2%. Meanwhile, in Indonesia, research on the evaluation of PPE usage among healthcare workers, especially in maternal healthcare services during the COVID-19 pandemic, is still limited. However, it has been noted that the number of COVID-19 cases in Indonesia continues to rise and can lead to an increased risk of maternal and infant mortality and morbidity. Therefore, the aim of this study is to evaluate the use of Personal Protective Equipment (PPE) by healthcare workers in providing maternal care services in healthcare facilities in the city of Banjar, West Java.

METHODS

This research is a quantitative study in the form of a descriptive cross-sectional study using an electronic questionnaire. The respondents in this study consisted of 96 individuals, including general practitioners, midwives, nurses, and obstetricians who are currently actively providing maternal care services in healthcare facilities in Banjar City, West Java. Data collection was conducted in February - March 2022 through a snowball method using a questionnaire instrument that refers to the modified El-Sokkary study from 2021. The recruitment strategy involved sending a SurveyMonkey link through WhatsApp groups, which was facilitated by healthcare representatives in Banjar City. This research has obtained ethical approval through an Ethics Feasibility Certificate from FK-KMK UGM.

RESULT

A. Individual Characteristics

Table 1. Demographic Characteristics of Maternal Healthcare Service Respondents in the City of Banjar (N=109)

Respondent Characteristics	n (%)
Gender	
Male	4 (3,6%)
Female	105 (96,3%)
Age	
25-34 years old	44 (40,3%)
35-44 years old	43 (39,4%)
45-54 years old	18 (16,5%)
55-64 years old	2 (1,8%)
65-74 years old	2 (1,8%)
Work Experience	
0-5 years	12 (11,0%)
6-10 years	32 (29,3%)
11-15 years	28 (25,6%)
16-20 years	11 (10,0%)
>21 years	26 (23,8%)
Workplace	
Primary Healthcare Services (Community Health Centers and Primary Clinics)	44 (40,3%)
Primary Clinic	17 (15,6%)
Independent Private Practice	5 (4,5%)
Regional General Hospital	35 (32,1%)
Private Hospital	8 (7,3%)
Profession	
Midwife	104 (95,4%)
Obstetrician Specialist	3 (2,7%)
Nurse	2 (1,8%)

Table 1 shows that out of a total of 109 respondents, the majority are female (96,3%), working as midwives (95,4%), aged 25-34 years (40,3%), with 6-10 years of work experience (29,3%), and in the last two weeks, the majority have been working in primary care services (40,3%).

B. Exposure to Training and Guidelines

Table 2. Frequency Distribution of Exposure to Training and Guidelines among Maternal Healthcare Providers in the City of Banjar (N=109)

Question	Yes (3)	Hesitant (2)	No (1)	Mean
Attending Personal Protective Equipment (PPE) Usage Training	101 (92,6%)	4 (3,6%)	4 (3,6%)	2,9
Feeling well-informed about the use of PPE (Personal Protective Equipment)	99 (90,8%)	6 (5,5%)	4 (3,6%)	2,9
Understanding the relevant guidelines for the use of Personal Protective Equipment (PPE)	65 (59,6%)	27 (24,7%)	17 (15,6%)	2,4
Grand Mean				**2,7***

* Classification based on interval classes (1-2 low exposure; 2-3 high exposure)

Based on the table above, it is known that the highest average is 2,9, which indicates that the majority of respondents have received training on the use of personal protective equipment (PPE) (92,6%) and feel informed about the use of PPE (90,8%). The lowest average obtained is 2,4, which is in the relevant PPE guidelines knowledge, indicating that only 59,6% of healthcare workers are aware of the relevant PPE usage guidelines. The grand mean value obtained is 2,7, which falls into the high exposure category.

C. Exposure to COVID-19 Patients

Table 3. Frequency Distribution of Healthcare Workers with COVID-19 in Maternal Care Services in the Banjar City (N=109)

Question	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)	Mean
Frequency of direct skin-to-skin contact with COVID-19 patients	0 (0%)	4 (3,6%)	21 (19,2%)	38 (34,8%)	46 (42,2%)	1,8
Frequency of direct contact with the environment of COVID-19 patients	5 (4,5%)	39 (35,7%)	23 (21,1%)	25 (22,9%)	17 (15,6%)	2,9
Frequency is within 1 meter with COVID-19 patients not using PPE	4 (3,6%)	5 (4,5%)	16 (14,6%)	44 (40,3%)	40 (36,7%)	1,9
Grand Mean						**2,2***

* Classification based on interval classes (1-3 low exposure; 3-5 high exposure)

Based on respondents' answers, the majority answered that they had never had direct skin-to-skin contact with COVID-19 patients (42,2%) and were rarely within one meter of a COVID-19 patient when not using PPE (40,3%). But on the other hand, there are respondents who have frequent direct contact with the environment of COVID-19 patients (35,7%). The total grand mean value was obtained at 2,2 which indicated that the respondent had low exposure to COVID-19 patients.

D. Health Facility Policy

Table 4. Banjar City Maternal Health Facility Regulations (N=109)

Health Facility Policy	n (%)
Sanctions are given if using PPE that does not meet standards	
Yes	7 (6,4%)
Hesitant	20 (18,5%)
No	82 (75,2%)
Types of Sanctions (N = 7)*	
Reprimand	4 (57,1%)
Self-isolation	1 (14,3%)
Cleaning the workplace	1 (14,3%)
Fine	1 (14,3%)
The level of compliance of health workers with regulations in local health facilities	
<50%	4 (3,7%)
50-65%	16 (14,7%)
65-80%	47 (43,1%)
80-95%	31 (28,4%)
>95%	11 (10,0%)

The table above shows that the majority (75,2%) were not given sanctions if using non-standard PPE and only 6,4% were given sanctions with the majority of the types of sanctions being warnings (57,1%). According to respondents' assessment, the majority answered that the level of compliance of health workers with regulations at local health facilities was 65-80% (43,1%).

E. Availability of PPE

Table 5. Frequency Distribution of Adequate PPE in Banjar City Health Facilities (N=109)

Question	Yes	Hesitant	No
Adequate availability of masks, face shields, goggles and gloves	84 (77,0%)	6 (5,5%)	19 (17,4%)
Using disposable gowns when treating one patient	41 (37,6%)	3 (2,7%)	65 (59,6%)

The table above shows that the majority of respondents answered that the availability of masks, face shields, goggles and gloves at health facilities was sufficient (77,0%). However, in this case, the majority of respondents also answered that in practice, health workers do not use disposable gowns in treating one patient (59,6%).

Table 6. Frequency Distribution of PPE Use by Health Workers in Banjar City Health Facilities (N=109)

Question	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)	Mean
Frequency of use of disposable gloves for one patient	72 (66,0%)	23 (21,1%)	13 (11,9%)	1 (0,9%)	0 (0%)	4,5
Frequency of using medical/surgical masks	95 (87,1%)	12 (11,0%)	2 (1,8%)	0 (0%)	0 (0%)	4,8
Frequency of use of face shields/protective glasses (goggles)	7 (6,4%)	24 (22,0%)	58 (53,2%)	17 (15,5%)	3 (2,7%)	3,1
Frequency of use of aprons	22 (20,1%)	35 (32,1%)	42 (38,5%)	8 (7,3%)	2 (1,8%)	3,6
Frequency of use of head protection	11 (10,0%)	21 (19,2%)	49 (44,9%)	19 (17,4%)	9 (8,2%)	3,0
Frequency of use of protective shoes	7 (6,4%)	16 (14,6%)	62 (56,8%)	15 (13,7%)	9 (8,2%)	2,9
Grand Mean						**3,6***

The table above shows the highest average with a value of 4,5 found in the use of disposable gloves for one patient with the majority answering always (66,0%). While the lowest average with a value of 2,9 is found in the use of protective shoes with the majority answering sometimes (56,8%). The grand mean value was obtained at 3,6 which indicates that the frequency of using PPE by health workers for maternal services is included in the high category or it can be said that the majority of maternal services always use PPE regularly.

Table 7. Banjar City PPE Availability Component (N=109)

PPE Availability Component	n (%)
Health facilities have sufficient numbers of masks	
Yes	84 (77,0%)
Hesitant	6 (5,5%)
No	19 (17,4%)
Type of masks which is most often used when treating patients	
Surgical mask	83 (76,1%)
KN 95 mask	20 (18,3%)
FFP2 mask	1 (0,9%)
KF94 mask	2 (1,8%)
N95 mask	3 (2,8%)
Health facilities experienced a shortage of PPE during the COVID-19 pandemic	
Yes	27 (24,7%)
Hesitant	18 (16,5%)
No	64 (58,7%)
Types of PPE that experience shortages (N=45)*	
Surgical mask	21 (46,7%)
N 95 and its kind (KN 95, FFP2, P2, and KF 94)	33 (73,3%)
Waterproof surgical gown	22 (48,9%)
Face shield	16 (35,6%)
Goggles	17 (37,8%)
Head protector	11 (24,2%)
Protective shoes	16 (35,6%)
Coverall	18 (40,0%)
Apron	14 (31,1%)
Glove	21 (46,7%)
The use of PPE needs to be extended	
Yes	14 (12,8%)
Hesitant	5 (4,6%)
No	90 (82,6%)
Jenis APD yang perlu diperpanjang (N=19)*	
Surgical mask	2 (10,5%)
N 95 and its kind (KN 95, FFP2, P2, and KF 94)	15 (78,9%)
Waterproof surgical gown	2 (10,5%)
Face shield	8 (42,1%)
Goggles	5 (26,3%)
Head protector	4 (21,0%)
Protective shoes	5(26,3%)
Coverall	2 (10,5%)
Apron	2 (10,5%)
Glove	4 (21,0%)

The table above shows that the majority of respondents answered that the health facilities where they work have a sufficient number of masks (77,0%) and the masks most

frequently used are surgical masks (76,1%). Of the total respondents who answered "yes" and "hesitant" regarding the existence of a shortage of PPE in health facilities, it is known that 45 respondents admitted to experiencing a shortage of PPE in their workplace with the type of PPE most frequently experiencing a shortage of stock being N95 masks and the like (73,3%). The shortage in the number of masks caused some respondents (17,4%) to answer that they needed to extend the use of N95 masks and the like (78,9%).

F. Negligence by Maternal Health Workers

Table 8. Frequency Distribution of Descriptions of Negligence by Maternal Health Workers in Banjar City (N=109)

Question	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)	Mean
Frequency of providing direct care to patients with confirmed COVID-19 while not wearing personal protective equipment (PPE)	1 (0,9%)	1 (0,9%)	12 (11,0%)	30 (27,5%)	65 (59,6%)	1,6
Frequency of washing hands after making direct contact with patients and the environment where COVID-19 patients are located	80 (73,3%)	15 (13,7%)	1 (0,9%)	7 (6,4%)	6 (5,5%)	4,4
Frequency of washing hands after removing PPE	97 (88,9%)	10 (9,1%)	1 (0,9%)	0 (0%)	1 (0,9%)	4,8
Frequency of not wearing PPE when handling body fluids or other specimens from patients	12 (11,0%)	4 (3,6%)	10 (9,1%)	21 (19,2%)	62 (56,8%)	1,9
Frequency of percutaneous exposure to materials potentially contaminated with body fluids, blood, or respiratory secretions of COVID-19 patients	0 (0%)	3 (2,7%)	9 (8,2%)	36 (33,0%)	61 (55,9%)	1,6
Grand mean						**2,9***

* Classification based on interval classes (1-3 not negligent; 3-5 negligent)

It can be seen from the table above that the highest average value is 4,8, which is the frequency of washing hands after removing PPE with the majority answering always (88,9%) and the lowest average value is 1,6 percutaneously exposed. with materials potentially contaminated with body fluids, blood, or respiratory secretions of COVID-19 patients with the majority answering never (55,9%). The grand mean value was obtained at 2,9 which is in the range 1-3, where this value is included in the not negligent category.

G. Conformity of PPE Use with Guidelines

Table 9. Suitability of Using PPE for Each Type of Service

Type of Service	n*	ns**	Percentage***
ANC and PNC	104	11	10,5%
Non-COVID 19 labors	85	15	17,6%
Labor of patients with suspected/confirmed COVID-19	28	12	42,8%
SC labors	7	1	14,2%
Treatment of babies born to mothers with suspected/ probable/confirmed COVID-19 with non-aerosol generated measures	13	0	0%
Treatment of babies born to mothers with suspected/ probable/confirmed COVID-19 using aerosol generated measures	6	1	16,6%

The suitability of using PPE for maternal services in this study was obtained by comparing the results of the questionnaire with the Guidelines for Antenatal, Childbirth, Postpartum and Newborn Services in the Era of Adaptation to New Habits issued by the Indonesian Ministry of Health in 2020.

The table above shows that the highest percentage of PPE use according to the guidelines is in the delivery service setting for patients with suspected/confirmed COVID-19, namely 42,8%. Even so, when viewed from the number of only 12 out of 28 respondents who had used the appropriate PPE for the service. Meanwhile, the lowest percentage was that no respondents used PPE according to the guidelines (0%) in the care setting for babies born to mothers with suspected/probable/confirmed COVID-19 using non-aerosol measures. Overall results show a low percentage of health workers using PPE according to MoH guidelines.

DISCUSSION

A. Individual Characteristics

This research was conducted in all health facilities in the city of Banjar, West Java, which consisted of 3 hospitals, 10 health centers, 15 primary clinics and 8 main clinics in the city of Banjar. The majority of respondents are aged 25-34 years, are female, work as midwives, work in primary care facilities (Puskesmas and Pratama clinics) with the majority having 6-10 years of work experience. This research found that there were very large differences between female and male respondents. This is because the majority of respondents work as midwives, where all midwives in Banjar City are female (Banjar City Health Office, 2019).

B. Exposure to Training and Guidelines

The overall result is that the grand mean value of the variable or the combined average is included in the high category. Based on the data, the respondent's answer that has the lowest average value is in the item "already knows the relevant guidelines for using PPE". Meanwhile, the

highest respondent's answer was in the item "participating in training on the use of PPE", thus the respondent has full awareness to continue to seek information by participating in training in order to achieve the latest knowledge regarding the use of PPE itself. With high knowledge, it will automatically provide a strong impetus in terms of using PPE which then leads to the emergence of compliance in using PPE itself. Research conducted by Zahara, Effendi dan Khairani[20] using the Chi Square test has also proven that there is a significant relationship (p-value = 0.001) between knowledge and compliance with the use of PPE in IPSRS officers at Siti Aisyah Hospital, Lubuklinggau City.

In El-Sokkary's research[6], regression analysis showed that a significant predictive factor for compliance with appropriate PPE use was previous training regarding appropriate use of PPE. Furthermore, Zhang, Zhou and You (2020) stated that knowledge is an important aspect which is a prerequisite for building confidence in preventive actions and forming positive attitudes. With knowledge, in this context knowledge related to the use of PPE, it will directly promote positive behavior and individual attitudes in responding to an illness. Research conducted by Zhang, Zhou and You (2020) also clearly found that knowledge can directly determine the attitudes of health workers. The higher the knowledge of health workers, the more confident and confident they will be in defeating the virus (disease).

C. Exposure to COVID-19 Patients

According to the International Labor Organization (ILO), primary prevention of COVID-19 among health workers should be based on risk assessment and introduction of appropriate measures[8]. According to the 2022 CDC, high-risk exposure generally involves exposing the eyes, nose or mouth of a healthcare professional to material that has the potential to contain SARS-CoV-2, especially if this healthcare professional is in a room for an aerosol-generating procedure.

Based on the results, the majority of respondents in this study had treated COVID-19 patients. However, the results of the variable grand mean value or combined average in the variable exposure to health workers with COVID-19 obtained values that are included in the low exposure classification. Thus, it can be concluded that maternal health care workers have a low frequency of exposure to COVID-19. This is related to the relatively low number of COVID-19 patients in the Banjar City area. In accordance with the COVID-19 task force report which stated that as of February 27 2022, Banjar City was the city with the lowest number of COVID-19 cases in West Java. However, based on Johns Hopkins University CSSE COVID-19 data, the number of confirmed cases of COVID-19 in Indonesia tends to be lower than the actual number of infections. This is due to limitations in conducting COVID-19 screening/testing. Part of the decline in COVID-19 screening/testing is attributed to the saturation of the public and health workers due to the pandemic. Apart from that, public attention that is more focused on vaccines has also driven a decrease in COVID-19 tests[12].

E. Availability of PPE

COVID-19 cases and their spikes have caused a number of countries to experience a shortage of PPE. The World Health Organization (WHO) has warned of disruptions in the global supply of personal protective equipment (PPE) and that shortages of PPE could leave doctors, nurses and other frontline workers woefully unprepared to care for COVID-19 patients[19]. One of the factors that influences the appropriate use of PPE is the availability of the PPE itself [17]. Because according to research conducted by Siburian[16], one of the reasons why nurses do not use PPE is the unavailability of the required PPE facilities.

The research results showed that the majority of respondents answered that they had sufficient supplies of masks, face shields, glasses and gloves. Even though the majority of respondents answered that PPE supplies were sufficient, in practice some health workers did not use disposable gowns when treating one patient. According to the Ministry of Health's 2020 guidelines, types of PPE such as surgical gowns should ideally be used once to minimize virus contamination. However, surgical gowns can be reused by using gowns made from 100% cotton or 100% polyester, or a combination of cotton and polyester. This dress can be worn repeatedly a maximum of 50 times provided it is not damaged[7].

The results of this research showed that in general the frequency of use of PPE by maternal care health workers is in the high category with a grand mean variable value of 3,6, which means that the majority of maternal services always use PPE routinely. Even though the majority of respondents stated that they did not experience a shortage of supplies, there were still several other respondents who answered that the health facilities where they worked experienced a shortage of PPE. The majority of PPE shortages are waterproof surgical gowns (48,8%), gloves (46,6%), N95 masks and similar (73,3%) and surgical masks (46,7%), The use of N95 masks and similar is one of the types of PPE that is most frequently used because this type of mask is the mask most often used by health workers when treating patients.

According to the 2020 RI Ministry of Health guidelines, ideally types of PPE such as surgical gowns, gloves, N95 masks and surgical masks are used only once to minimize virus contamination. If there are no supplies of surgical masks or N95 masks at all, health workers can use cloth masks that are used together with a waterproof face shield that covers below the chin. N95 masks can also be replaced with similar masks such as KN95 masks, FFP2 masks, P2 masks or KF94 masks.

F. Negligence by Maternal Health Workers

Personal negligence of healthcare workers may contribute to inappropriate use of PPE. The results of research conducted by Putra (2012) stated that the attitude of nurses who refuse or comply with using PPE will have an impact on their behavior in using PPE (p=0.004; a=0.005)[11]. This finding is in accordance with attitude theory which states that individual attitudes are the forerunner to the formation

of an individual's actions and behavior[5]. Therefore, good and bad attitudes of health workers will influence the use of PPE and indirectly affect their work safety.

The results of the research also show that maternal health care workers in Banjar City are included in the non-negligent category. PPE for health workers is a key component of infection prevention and control, ensuring that health workers are protected will have an impact on effective care for all parties[2]. During the COVID-19 pandemic, health workers could work long hours with a heavier workload and not enough time to rest. These demands can lead to chronic fatigue, lack of energy, impaired cognition and mood swings which can lead to decreased alertness, decreased coordination and efficiency[8]. This can lead to negligence by medical personnel in the use of PPE. It is also possible that prolonged use of PPE can cause discomfort. The discomfort of using PPE when treating patients can cause health workers to avoid using PPE[1]. Prolonged use of complete PPE (such as gowns, masks, head coverings, overalls) can trap heat and sweat, limit evaporative cooling of the body and can cause heat stress (heat rash), muscle cramps, fainting, fatigue, muscle damage frame, and heat stroke). Using gloves and performing hand hygiene for a long period of time is known to cause or worsen eczema on the hands. Prolonged use of masks, respirators, and glasses can also cause skin damage, such as itching, rashes, acne, contact dermatitis, urticaria, and worsening of pre-existing skin diseases[8].

G. Conformity of PPE Use with Guidelines

The results of this research showed that only a few respondents used PPE in accordance with the 2020 Indonesian Ministry of Health guidelines. There were still respondents who used PPE inappropriately. The same thing was found in the research of Syam et al. (2020) which shows that the use of PPE at RS X Bantul does not meet the standards of the Minister of Health[18]. In a pandemic situation like this, there are several health service sectors that experience an imbalance in the supply of PPE. Since the COVID-19 pandemic, the US health care system has reported experiencing significant shortages of personal protective equipment (PPE), thereby reducing the ability of health care workers to maintain professional safety[10].

Therefore, it is important to ensure that PPE is used properly and not wastefully. Using a different or higher level of PPE than needed can lead to insufficient supplies in the future[3]. From an economic perspective, this will of course lead to inefficient allocation of funds for the provision of PPE. In this case, support from hospital management is needed in terms of providing more active outreach and supervision regarding procedures and processes for proper use of PPE[18].

Strenghts and limitation

The strenghts were novelty of the research topic. This study, researched about the use of personal protective equipment (PPE) during the COVID-19 pandemic in the population of health workers in maternal care settings. And also, the number of respondents was more than the minimum required sample size.

This research was conducted during the peak of the COVID-19 pandemic and while lockdown policies were still in effect in Banjar City. Therefore, the distribution of this questionnaire could only be carried out through online methods, and direct observations regarding the use of PPE in maternal care were not possible. This may introduce potential bias and variations in respondents' perceptions during the questionnaire filling process. Besides that, the sampling method employed in this research is snowball sampling. One of its weaknesses is that the chosen sample may not adequately represent the broader population, and validating the status of healthcare workers who completed the questionnaire is challenging. After that, regarding the knowledge variable, the assessment of respondents' knowledge is determined solely based on their history of participating in PPE training without conducting a direct comprehension test.

CONCLUSION

The types of PPE that are often used by health workers (midwives, nurses, general practitioners and obstetricians) include surgical masks/N95, waterproof surgical gowns, face shields, eye protection (goggles), head protectors, protective shoes, aprons, and gloves with a general level of compliance with the use of PPE of 65 – 80% against regulations in local health facilities. Evaluation of the use of PPE shows that the suitability of the use of PPE for health workers for maternal services varies according to the type of service provided, with the greatest adherence being in the type of delivery service for patients with suspected/confirmed COVID-19. The results of this study are expected to be used as a consideration for health facilities and related stakeholders in recording and providing the types of PPE needed by health workers in daily practice.

As a continuation of this research, further studies are needed with the hope of reaching a broader population or using different methods, such as direct observation, to review and assess the real and objective use of PPE by healthcare workers in the field. Additionally, future research can deepen the investigation by examining the use of PPE not only in the maternal care context but also by comparing its usage in other healthcare settings. Moreover, it is advisable to increase the number of research respondents. For instance, by comparing the use of PPE in Banjar City and other cities, it is hoped that the results obtained will be more diverse and enhance positive competitiveness among healthcare facilities in each city.

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Ethical Approval and Informed Consent

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Availability of Data and Material

Data uses primary data by filling out a questionnaire.

Conflicts of Interest

The authors declare that they have no Conflicts of Interest.

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