



**Original Research Article**

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## **Factors associated with inappropriate use of personal protective equipment among health Workers in labour, medical and surgical wards at Mbarara regional referral hospital**

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### **Abstract**

This research was carried out on “factors associated with inappropriate use of personal protective equipment (PPE) among health workers in labour ward at Mbarara Regional Referral Hospital (MRRH)”. The objectives of the study were to establish the individual and health system related factors associated with inappropriate use PPE among health workers in labour ward at MRRH. Cross sectional descriptive research design was adopted in which the study used quantitative approach of data collection, where information was obtained using questionnaires from a sample size of 36 respondents. The collected information was analysed using SPSS, findings presented in frequency tables and interpreted accordingly. The study findings revealed that the individual factors associated with inappropriate use of PPE among health workers are discomfort of putting on F95 face masks and other PPE, intentional refusal to put on n95 face masks, too many patients in the wards and acquisition of hospital-acquired infection as a result of wearing or using PPE. The study findings also revealed that the health system related factors associated with inappropriate use of PPE among health workers are limited access to PPE, having training on infection prevention and control, lack of PPE and knowledge on when to wash hands. The study concluded that overwhelming number of patients in the wards (individual), limited access to PPE and lack of PPE (health system) are the leading factors associated with inappropriate use PPE among health workers in labour ward at MRRH.

**Keywords:** personal protective equipment, health workers, labour, medical and surgical wards

### **Introduction**

Healthcare professionals (HCPs) are at the frontline workers in health care systems and they play a critical role, not only in the management of patients, but also in ensuring adequate infection prevention and control (IPC) measures in

healthcare settings. As a result, they are at a substantially increased risk of becoming infected with the virus and could potentially contribute to the transmission [1].

Infection prevention and control (IPC) measures such as the use of appropriate PPE, proper

handwashing, and hand hygiene are critical in preventing the transmission and risk of infection of COVID-19 in healthcare settings. The use of appropriate PPE by healthcare workers in particular during the current COVID-19 pandemic is highly recommended and the national and international safety protocols for healthcare workers should be strictly followed [2]. Compliance with UPs protects health worker as well as reduces their risk of infections [3].

Globally, over 521,311 health workers have contract nosocomial infections annually. Worldwide, three million Health Care Workers (HCWs) experience per-cutaneous exposure to blood-borne viruses such as hepatitis B, hepatitis C and HIV per year [4]. Furthermore, the Italian Regional Reference Laboratories reported that healthcare workers accounted for 10% of 162,000 cases of COVID-19 in the country. Similarly, the US Centers for Disease Control and Prevention reported that healthcare workers accounted for about 11% of all confirmed COVID-19 cases in the United States [5]. Since the initial outbreak report of COVID-19 in December 2019, there has been an increasing demand for PPE globally.

On the African Continent, many healthcare settings particularly have limited access to appropriate PPE to protect their health in many healthcare settings [3]. As a result, many healthcare workers remain concerned about the risk of infection from the SARS-COV-2 due to the shortage of appropriate PPE recommended by WHO, and they have become ill-equipped to care for patients with COVID-19 or other causes, due to acute shortage of appropriate PPE [6]. In Sub Sahara Africa, Health Care Practitioners (HCPs) often have challenging decisions about whether to care and provide treatment for COVID-19 patients in the absence of effective PPE. Majority of hospital acquired infections lie in the African continent. About 11% of HCPs retrospectively studied in Africa had hospital acquired infections including COVID-19 [7]. Evidence from countries with the highest mortality rates of COVID-19 indicates that healthcare workers are considerably at greater risk of being infected with coronavirus ranging from 15 to 20% of the infected population

and are therefore at a disproportionate risk to the rest of the population [8].

In East Africa, there are mixed rates over the use of PPEs among health workers. In Kenya for example, Kazungu *et al.* [9] reveal that PPEs in public hospitals are scarce and allege that 70% of healthcare workers are at risk of infection of Covid 19 if the availability of PPE remains scarce. As part of the COVID-19 response. PPE in public hospitals in Tanzania is also scarce and a high proportion of healthcare workers (96.3%) in the country are at risk of occupational exposure to HIV (clinicians (87.1% and 71.4% respectively) and nurses (81.8% and 74.6% respectively) due to limited availability of personal protective equipment according to a study by Mashoto *et al.* [10].

## Methodology

### Study Design and Rationale

A cross-sectional descriptive study design was used since data was collected at one point in time, and that the findings were also presented as they were observed from the field. The study also adopted quantitative data collection techniques. This technique was preferred as findings were presented in numbers and percentages. These designs were suitable for the study since they were cost effective and feasible for the researcher.

### Study Setting

The study was conducted in Mbarara Regional Referral Hospital, Mbarara.

### Study Population

The study targeted health workers on day shift work schedule attached to the labour, medical and surgical wards of Mbarara Regional Referral Hospital (MRRH). According to the duty roster for day shift in the three wards studied (labour, medical and surgical) at MRRH for the month of April when data collection commenced, 16 health workers were on day shift duty in labour ward, 13 on day shift duty in medical ward and 11 on day

shift duty in surgical ward, making a total population of 40 health workers.

### Sample Size Determination

According to Avwokeni (2004), sample size refers to the number of subjects or individual elements chosen from the population under study. As such, the sample size (n) was determined using Taro Yamane (1967) formula of sample size determination which states that;

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size, N is the total population and e is the marginal level of significance at 0.05.

**Table 1: Sample size distribution**

Ward	Population (number of health workers on day shift Duty for April 2022).	Proportion	Sample size
Labour	16	0.4	14
Medical	13	0.325	12
Surgical	11	0.275	10
<b>Total</b>	<b>40</b>	<b>1</b>	<b>36</b>

### Sampling Procedure

Convenience sampling was used. Convenience sampling is a sampling method where data is collected from available members of a target population willing to provide data. It is the most commonly used sampling technique as it's incredibly prompt, uncomplicated, and economical. In many cases, members are readily approachable to be a part of the sample. As such, data was collected from health workers at MRRH who were willing to provide information about factors associated with inappropriate use of personal protective equipment among them.

### Inclusion criteria

) Health workers who wereworking in the labour, medical and surgical wardson day shift were included in the study.

Therefore,

$$n = \frac{40}{1 + 40(0.05^2)}$$

$$n = \frac{40}{1 + 40(0.0025)}$$

$$n = \frac{40}{1 + 0.1}$$

$$n = \frac{40}{1.1}$$

$$n = 36.3$$

The study collected data from 36 health workers.

) Health workers who consented to participate in the study.

### Research Instruments

The researcher developed a semi structured questionnaire including both open and closed ended questions and held an interview schedule with the respondents. The tool was pretested among respondents of similar characteristics outside the study area. The tool was then refined by the researcher with the help of the supervisor for reliability and validity.

## Data Collection Procedures

The researcher obtained an introductory letter from Kampala International University - Nursing department after the approval of the Proposal. The letter was then presented to the chairperson research committee in Mbarara Regional Referral Hospital, to seek for permission, who introduced the researcher to the ward in-charge. With the permission, the purpose of the study was explained to each of the respondents identified. Informed Consent was then obtained and the questionnaire was administered.

## Data Analysis

The data was presented according to themes following the chronology of the research

objectives. SPSS version 23.0 was used to generate tables, charts and graphs, and to interpret and explain the meaning of the findings.

## Ethical Considerations

Informed consent from the respondents was sought. Individual respondents were made to understand that no monetary benefits were paid for taking part in the study, and that they were free to withdraw from the study.

Confidentiality in the treatment of results obtained from respondents was assured as no names or form of identification was required on the research instruments. This ensured that respondents got to know that nothing was going to lead back to them from the information given.

## Results

**Table 2: Demographic characteristics of respondents**

Characteristics	Frequency (n=36)	Percentage (%)
<b>Age</b>		
25-35	17	55.5
36-40	11	30.6
41-49	8	8.3
<b>Highest Level of education</b>		
Certificate	2	5.5
Diploma	7	19.4
Degree	17	47.2
Masters	10	27.7
<b>Cadre</b>		
Nurse	9	25
Midwife	13	36.1
Doctor	11	30.6
Pharmacist	3	8.3
<b>Duration (in years) working in the ward</b>		
<5	7	19.4
5 – 9	19	52.7
10+	10	27.7

Source: Primary data, 2022

Majority of the respondents 17 (55.5%) were aged 25 to 35 years and the least 8 (8.3%) were aged below 41 to 49 years of age. This implies that health workers attached to the labor ward at MRRH are adults.

The highest number of respondents 17 (47.2%) had attained degrees as their highest level of education while the lowest number 2 (5.5%) had attained certificates. This implies that the health workers at MRRH were literate enough to understand the use of PPEs in their health duties.

The highest number of respondents 13 (36.1%) were midwives while the lowest number 3 (8.3%) were pharmacists. This implies that the highest number of respondents 19 (52.7%) had spent 5 to 9 years working in their respective wards while the lowest 7 (19.4%) had spent less than 5 years in the ward. This implies that majority of the health workers who took part in the study had working experience with the hospital (MRRH) and therefore conversant with the hospital's policy or policies regarding PPE use.

**Table 3: Individual factors associated with inappropriate use of PPE among health workers**

Question/statement	Freq (n=36)	Percentage
Do you feel bothered by the discomfort of putting on N95 face masks and other PPE?		
Yes	14	39
No	22	61
Have you ever intentionally refused to put on N95 face masks?		
Yes	7	19
No	29	81
Overwhelming number of patients in the ward affects the efficiency of changing PPE between patients.		
True	25	69
False	11	31
Do you have any limitations to putting on full PPE whenever on duty?		
Yes	23	64
No	13	36
Have you ever suffered from any hospital-acquired infection as a result of wearing or using PPE?		
Yes	5	14
No	31	86
If yes, does this deter you from using PPE when on duty?		
Yes	2	6
No	34	94
Does your level of education affect your appropriate use of PPE?		
Yes	0	0
No	36	100
Do you perceive inappropriate use of PPE is against your professional ethics?		
Yes	0	0
No	36	100

**Source: Primary data, 2022**

From table 3 above, majority respondents 22 (61%) objected or disagreed that they do not feel bothered by the discomfort of putting on N95 face masks and other PPE while 14 (39%) accepted. This implies that largely, discomfort of putting on F95 face masks and other PPE does not affect the use of PPE among health workers in labor ward at MRRH.

From table 3, majority respondents 29 (81%) objected that they that they have ever intentionally refused to put on N95 face masks while the minority 7 (18%) accepted. This implies that largely, intentional refusal to put on n95 face masks has no association with the use of PPE among health workers in labour ward at MRRH.

From table 3, majority respondents 25 (69%) accepted as true that over whelming number of patients in the ward affects the efficiency of changing PPE between patients while the minority 11 (31%) objected. This implies that largely, overcrowding of many patients admitted in the labour ward at MRRH affects the use of PPE among health workers in this health facility.

From table 3, majority respondents 23 (64%) accepted that they face limitations/obstacles to putting on full PPE on duty while 13 (36%) objected. This implies that largely,

limitations/obstacles to putting on full PPE while on duty affects the use of PPE among health workers in the labour ward at MRRH. When further inquired on what the specific limitations are, all the health workers who participated in the study pointed to availability of few PPE and most times total lack of PPE in the ward.

From table 3, majority respondents 31 (86%) objected that they have ever suffered from any hospital-acquired infection as a result of wearing or using PPE while 5 (14%) accepted. This implies that to a very large extent, there is no acquisition of hospital-acquired infection as a result of wearing or using PPE.

When further pressed if acquisition of hospital-acquired infection resulting from the wearing or using of PPE, only 2 (6%) accepted while the majority 34 (94%) objected. This implies that acquisition of hospital-acquired infection hardly affects the wearing or use of PPE among health workers in the labour ward at MRRH.

Further findings revealed the level of education and PPE use being against professional ethics as not affecting at all the use of PPE among health workers in the labour, medical and surgical wards at MRRH as all the study respondents objected to the questions.

**Table 4: Health system related factors associated with inappropriate use of PPE among health workers**

Question/statement	Freq (n=36)	Percentage
Do you have access to enough PPE in the ward?		
Yes	7	19
No	29	81
How many times have you been trained on infection prevention and control?		
Never	0	0
Once	0	0
More than once	36	100
Have you ever lacked PPE for use while on duty in the ward?		
Yes	27	75
No	9	25
Do you know when and how often you are supposed to wash your hands?		
Yes	36	100
No	0	0

Source: Primary data, 2022

From table 4, the study respondents were asked if they have access to enough PPE in the ward and overwhelming majority 29(81%) objected while the minority 7 (19%) accepted. This implies that largely, health workers working in the labour ward at MRRH have no access to enough PPE which makes them not to use them.

From table 4, inquiries were made from the health workers on the number of times they had been trained on infection prevention and control. In response, all the 36 (100%) had been trained more than once on infection prevention and control. This implies that adequate training on infection prevention and control is closely associated with PPE use.

From table 4, the majority of the study respondents 27 (75%) admitted that in their duties, they have ever lacked PPE for use while in the wards while 9 (25%) had never lacked the PPE for use. This implies that largely, the lack of PPE in the wards affects use of PPE among health workers working in the labour ward at Mbarara Regional Referral Hospital.

When pressed further on what they did after lack of PPE to use on ward, most of the health workers told the patients to buy PPE from private health centres outside the hospital, other health workers bought PPE themselves while others dealt with the situation without PPE.

From table 4, the study respondents were asked if they knew when and how often they are supposed to wash their hands. In response, all the 36 health workers (100%) admitted to knowing. When further inquired on when and how often, the health workers pointed to every immediately before and after doing any procedure, before and after contact with every patient. This implies that knowledge among health workers on when and how often to wash hands affects PPE use if PPE is available and accessible in the wards.

## Discussion

The study findings established discomfort of putting on N95 face masks and other PPE as one of the individual factors associated with

inappropriate use of PPE among health workers in labour ward at Mbarara Regional Referral Hospital (MRRH). This was established when majority respondents 22 (61%) objected or disagreed that they do not feel bothered by the discomfort of putting on N95 face masks and other PPE although 14 (39%) accepted. This finding is in agreement with Fan *et al.*[11] whose study assessed the difficulties faced by health care personnel (HCP) in using personal protective equipment (PPE) in clinical practice during the COVID-19 outbreak in Wuhan, China. Observed difficulties included doubts related to the quality and effectiveness of PPE, potential risks during doffing and poor comfort with PPE use.

The study findings further revealed that limitations/obstacles to putting on or using full PPE on duty as another individual factor associated with inappropriate use of PPE among health workers in the labour MRRH. This was established when majority respondents 23 (64%) accepted that they face limitations/obstacles to putting on full PPE on duty while 13 (36%) objected, indication that obstacles to putting on full PPE while on duty affects the use of PPE among health.

The study findings also established that acquisition of hospital-acquired infection as a result of wearing or using PPE is an individual factor associated with inappropriate use of PPE among health workers in the labour MRRH. This was established when majority respondents 31 (86%) objected that they have ever suffered from any hospital-acquired infection as a result of wearing or using PPE while 5 (14%) accepted, indication that to a small extent, there is acquisition of hospital-acquired infection among some health workers as a result of wearing or using PPE. Similarly, Savoia *et al.*[12] studied the factors associated with access and use of PPE among Italian Physicians during COVID-19 and the results of their study revealed that risk perception of health workers towards the possibility of contracting infection from PPEs hindered PPE use.

The study findings also revealed that too many patients (congestion in the ward) as yet another

individual factor associated with inappropriate use of PPE among health workers working in the labour ward at MRRH. This was established when majority respondents 25 (69%) accepted as true that over whelming number of patients in the ward affects the efficiency of changing PPE between patients while the minority 11 (31%) objected. The hospital being the main and largest public hospital from south western region attracts a high number of patients and in most cases, the wards are too congested with admitted patients. At times when health workers are attending to them, they sometimes improperly use PPE.

The study findings found out that limited access to PPE is a health system factor associated with inappropriate use of PPE among health workers in the labour, medical and surgical wards at MRRH. This was discovered when majority of the study respondents 29(81%) objected that they have access to enough PPE in the ward while the minority 7 (19%) accepted, clearing showing limited access to PPE for use while on duty.

The study findings also revealed that lack of PPE is another health system factor associated with inappropriate use of PPE among health workers in the labour ward at MRRH. This was discovered when majority of the study respondents (75%) admitted that in their duties, they have ever lacked PPE for use while in the wards while only 25% had never lacked the PPE for use. This pointed to the fact that largely, the lack of PPE in the wards affects use of PPE among health workers

## Conclusions

Over whelming number of patients in the ward is the most outstanding individual factor factor associated with inappropriate use of PPE among health workers working in the labour ward MRRH. The too many patients simply overwhelm the health workers when it comes to demand for health service attention and this really affects the efficiency of changing PPE such as gloves, face and nose masks between patients since they have to be attended to.

Concerning the health system factors associated with inappropriate use of PPE among health workers working in the labour, medical and

surgical wards at MRRH, the study concludes that limited access to PPE and lack of PPE are the leading factors. The hospital simply lacks enough PPE for the health workers and in instances where PPE is available, its accessibility is limited. This is one of the reasons why patients sometimes are told by health workers to buy PPE such as gloves from private health centers outside the hospital.

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