

# Knowledge, Attitude and Practice Regarding Personal Protective Equipment During COVID-19 Pandemic Among Healthcare Workers in Hetauda

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## ABSTRACT

**Introduction:** Personal protective equipment (PPE) is one of the effective measures to protect health care workers while caring confirmed or suspected patients with COVID-19.

**Objective:** To assess the knowledge, attitude, and practice regarding the use of PPE among health-care workers (HCWs) in Hetauda during COVID-19 pandemic.

**Methods:** A descriptive cross-sectional study was conducted among 138 HCWs from three hospitals in Hetauda: Hetauda Hospital, Makwanpur Sahakari hospital and Hetauda Orthopedic Hospital between December 2020 and January 2021 for two weeks. A validated self-administered questionnaire, Likert scale and Observational checklist were used for data collection. The simple descriptive statistics (percentage, mean) and inferential statistics (Chi-square test) were used for the data analysis.

**Results:** The findings of the study showed that the mean age of the respondents was 26.54 years. Half of the total respondents 70 (50.7%) had adequate knowledge, half 69 (50%) had positive attitude and more than half of the respondents had poor practice 60 (60%) regarding the use of PPE during COVID-19 pandemic. There was significant association of knowledge regarding the use of PPE with training, continue education, profession and attitude at  $p < 0.05$  level of significance.

**Conclusion:** This study concludes that the periodic training program for newly recruited HCWs and refresher training/ continue education for old HCWs to update about the proper use of PPE would enhance the knowledge, attitude and practice of the HCWs. The hospitals should follow the standard PPE guidelines by CDC or WHO while donning and doffing the PPE during the care of Covid patients.

**Keywords:** Attitude; covid-19; knowledge; pandemic; personal protective equipment; practice.

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## INTRODUCTION

COVID-19 is a rapidly expanding global pandemic caused by a novel human corona virus (SARS-COV-2).<sup>1</sup> Health care workers (HCWs) are the frontline workers during pandemic who are at great risk of Covid-19 transmission and death. According to International council of Nurses (ICN), at least 90,000 HCWs were infected by COVID-19 and more than 260 nurses had succumbed to the disease.<sup>2</sup>

Current evidence suggests that the Corona virus is transmitted between people through close contact and

droplets.<sup>3</sup> PPE provides a physical barrier between virus and the HCWs. It is important to reduce risk and make the workplace safe for both the patients and health care workers.<sup>4</sup>

A cross sectional study conducted to assess the knowledge, attitude, and practice regarding PPE among 393 HCWs for the prevention of COVID-19 in Bangladesh

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in Feb, 2021 showed that there was good knowledge, positive attitude and poor practice.<sup>5</sup> Various global studies show that there are significant gaps in the area of practice regarding PPE.<sup>5,20</sup> Since the pandemic hit Nepal, many HCWs were infected while some were succumbed.<sup>6</sup> Therefore, the researcher felt it necessary to assess the knowledge, attitude and practice regarding the use of PPE among the HCWs in Hetauda during COVID-19 pandemic.

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## METHODS

This was a descriptive cross sectional study. This study was conducted at three different hospitals in Hetauda District (i.e. Hetauda hospital, Makwanpur Sahakari Hospital and Hetauda Orthopedic Hospital). Hetauda hospital was working as a referral center for the treatment of COVID-19 patients with the facility of COVID-19 isolation wards. The data collection was started from the last week of December 2020 to the first week of January 2021.

The study population was all the healthcare workers of the three hospitals in Hetauda at the time of data collection. Knowledge and attitude of the health care workers was assessed from all the departments of three hospitals through questionnaires while practice was observed only in the COVID-19 isolation ward of Hetauda hospital. The sample size was 138 and convenient sampling technique was used to select the sample. The areas were selected purposively. A semi-structured questionnaire was applied to collect socio-demographic information and assess the knowledge while Likert scale was used to measure attitude towards the use of PPE. An observational checklist was used to assess practice regarding the use of PPE (donning and doffing PPE) among 10% of healthcare workers working in the COVID-19 isolation ward of Hetauda Hospital.

The tool was prepared through an extensive review of literature, WHO and CDC guideline<sup>7,8</sup> and with the help of research advisor. Validity of the instrument was maintained by calculating the content validity index (CVI) which was obtained (0.9). The research instrument was sent to two professors of nursing department of the same institute for its content validation. A small scale pilot study was conducted by

pre-testing 10% of the study population of similar group at Sancho hospital in Hetauda for feasibility testing, where or and is suitable the number of items related to the knowledge was reduced due to its repetition.

The study comprised question evaluating socio demographic variables, knowledge, attitude and practice regarding the use of PPE. Socio demographic information included age, gender, educational qualification, profession, working hour, working experience, working area, continue education on COVID-19 and training on use of PPE. The knowledge section included twenty five questions including multiple responses. The correct response was provided '1' mark and incorrect '0' mark. The total highest score was 24 out of 25 where mean score was (17.04). The mean knowledge score was used to categorize adequate knowledge (ie. above mean) and inadequate knowledge (ie. below mean).<sup>9</sup>

Similarly, the attitude section consisted eleven items and responses of each item were documented on a 5-point Likert scale as follows: strongly agree (5-point), agree (4-point), undecided (3-point), disagree (2-point), and strongly disagree (1-point). Total highest attitude score was 51 out of 55 where mean score was (40.87). The mean attitude score was used to assess positive attitude (i.e. above mean) and negative attitude (i.e. below mean).<sup>9</sup>

An observation checklist was used to assess the practice (ie Donning and doffing PPE according to WHO guideline).<sup>7</sup> The practice section consisted 20 items and each item comprised two responses: Yes (1-point) and No (0-point). The respondents performing complete donning and doffing PPE were indicated good practice while respondents performing incomplete donning and doffing PPE were indicated poor practice. The practice of donning and doffing PPE was observed by the researcher wearing all the necessary PPE kits at the time of their duty exchange in the morning and evening shift for three days without having them knowing that they were being observed.

The collected data was entered into EPI-Data version 3.1 and analyzed through Statistical Package for Social Sciences (SPSS) version 16.0 software. The data was interpreted based on objectives of the study by using

simple descriptive statistics such as frequency, mean, percentage and presented in the table while the inferential statistics such as Chi-square test was used to find the association between the demographic variables at 95% confidence level (p-value < 0.05)

The ethical approval was obtained from the Institutional Review Committee (IRC) of Nepal Institute of Health Sciences (NIHS), Purbanchal University, Gokarneshwor-5, Jorpati, Kathmandu (Ref No. 01/77). Written permission was taken from all the three hospitals (Hetauda hospital, Makwanpur Sahakari Hospital and Hetauda Orthopedic Hospital).

Informed verbal and written consent was taken from each respondent after explaining the objective of the study before the study commencement. The participation in the study was voluntary. They had the right to ask question and they could withdraw from the study at any time without having to give any reason. The privacy and confidentiality of the data was maintained by using respondent codes to label the data instead of using their names and securing the data by encryption of folders. The information collected was utilized only for this study.

## RESULTS

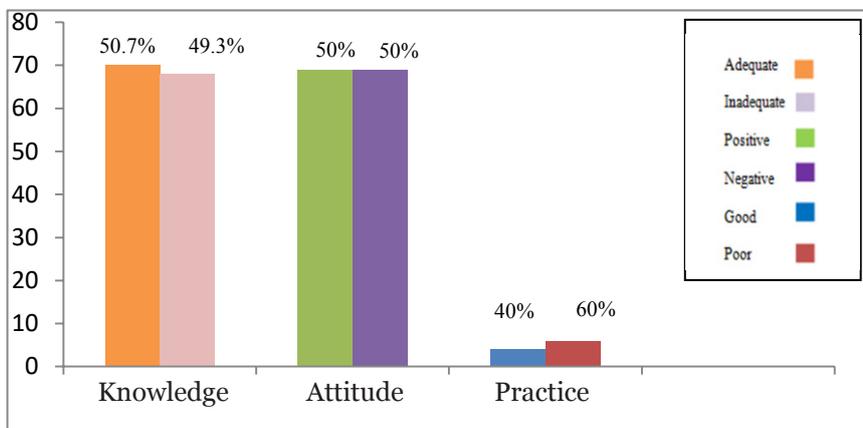
**Table 1: Demographic characteristics of the respondents**

n=138

Variables name with category		Frequency (f)	Percentage (%)
Age(in completed years)	Below 30 years	108	78.3
	Above 30 years	30	21.7
Gender	Male	36	26.1
	Female	102	73.9
Profession	Doctor	12	8.7
	Nurse	69	50
	Health assistant	14	10.1
	Lab technician	17	12.3
	CMA	1	0.7
	ANM	11	8.0
	Radiographer	5	3.6
	Pharmacist	9	6.5
Working Area	Emergency	26	18.8
	General ward (Medical and surgical)	41	29.7
	ICU/CCU	18	29.7
	Operation theater	15	13.0
	Post-operative ward	7	10.9
	Covid isolation ward	10	5.1
	Lab	7	7.2
	Radiology unit	5	5.1
Working hour	6 to 7 hours	120	87
	8 to 9 hours	18	13
Working experience	Less than 1 year	37	26.8
	1 to 5 year	78	56.5
	6 to 10 year	9	6.5
	More than 10year	14	10.2
Educational qualification	Master's degree	8	5.8
	Bachelor degree	42	30.4
	Diploma	75	54.3
	Pre- diploma	13	9.4

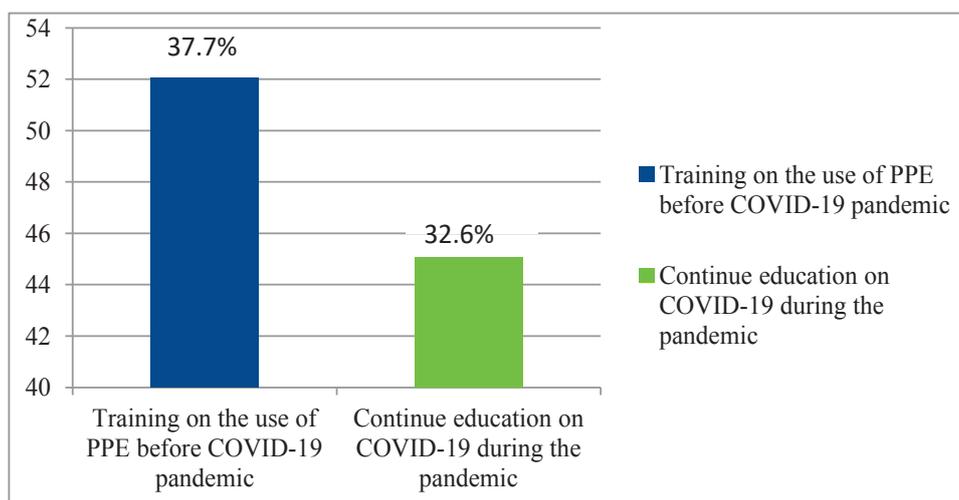
Table 1 shows that the mean age of the respondents was 26.54 years while maximum and minimum age was 56 years and 18 years respectively. Majority of the respondents 102 (73.9%) were female. Similarly, majority of the respondents 69 (50%) were Nurses, 12 (8.7%) were Doctors, 14 (10.1%) were Health Assistant followed by others. Majority of the respondents 41

(29.7%) were working in General ward, 10 (7.2%) in Covid isolation ward. The mean working hour was 6.62 hours. The mean working experience was 4.16 years while the minimum working experience was 0.3 years and maximum 32 years. Similarly, majority of the respondents 75 (54.3%) had Diploma level of educational qualification.



**Figure 1: Distribution of respondents based on knowledge, attitude and practice**

Figure 1 reveals that among total respondents, nearly more than half of the respondents 70 (50.7%) had adequate knowledge meanwhile nearly half 68 (49.3%) had inadequate knowledge regarding the use of PPE during COVID-19 pandemic. Similarly, half of respondents 69 (50%) had positive attitude whereas half 69 (50%) had negative attitude towards the use of PPE during COVID-19 pandemic. Upon observing 10 respondents working in Covid isolation ward, less than half of respondents 4 (40%) had good practice and more than half 6 (60%) had poor practice regarding the use of PPE during COVID-19 pandemic.



**Figure 2: Distribution of respondents based on training/ continue education received**

Figure 2 reveals that among total respondents, less than half of the respondents 52 (37.7%) had received training on the use of PPE before COVID-19 pandemic with the purpose of infection prevention and control measure. Similarly, less than half of the respondents 42 (32.6%) had received in-service education on COVID-19 during COVID-19 pandemic.

**Table 2: Knowledge regarding the use of PPE during covid-19 pandemic**

n=138

Variables	Frequency(f)	Percentage (%)
<b>Definition of PPE</b>		
Physical barriers between wearer and microorganism	54	39.1
Special equipment used to reduce the chance of touching, being exposed to and spreading germs to other HCWs and patients	103	74.6
<b>Purpose of wearing PPE during COVID19 pandemic*</b>		
Prevent the spread of corona virus transmission	113	81.88
Protect healthcare workers from contamination	86	62.31
<b>Device included as PPE during COVID19 pandemic*</b>		
Gloves	138	100.0
Gown	138	100.0
Mask	138	100.0
Goggles and face shield	138	100.0
Boots	138	100.0
<b>Benefit of using PPE during COVID19 pandemic*</b>		
Prevents spread of corona virus	118	37.7
Protect healthcare workers and patients from Covid infection	133	42.1
<b>Disadvantage of using PPE during COVID19 pandemic*</b>		
Irritation / Allergy	72	52.17
Discomfort, suffocation and over heating	121	87.68
Time consuming	59	42.75
Decreases in the field of vision or reductions in manual dexterity	34	24.63
<b>Factors affecting PPE usage in Hospitals *</b>		
Unavailability of PPE	117	84.78
<b>Heard about donning and doffing**</b>		
Yes	95	68.8
<b>Meaning of donning and doffing PPE (n=95)</b>		
Sequence of putting on and taking off/removing PPE	86	90.5
Technique of wearing PPE	6	6.3
Standard technique regarding PPE	3	3.2
<b>Importance of proper donning and doffing PPE*</b>		
To avoid the transmission of corona virus to the HCWs	95	100.0
<b>Correct order of donning PPE</b>		
Perform hand hygiene, Put on gown, Put on face mask, Put on face shield/eye protection, Put on gloves	59	64.8
<b>Correct order for doffing PPE</b>		
Remove gloves, Remove gown, Perform hand hygiene/ hand sanitizer, Remove face shield/ eye protection, Remove mask, Perform hand hygiene, Remove shoe covers	59	62.1
<b>Discarding PPE</b>		
Separate waste container (Biohazard plastic wrapped dustbin)	95	100.0
<b>Effective strategies for sustaining PPE use throughout COVID -19 pandemic* (n = 138)</b>		
Government and hospital should formulate policies and actions	69	50
Assessment and evaluation of the knowledge and performance of HCWs about PPE use	81	58.7
Training programs should be arranged for newly recruited staffs and refresher training for old staffs related to PPE use during COVID - 19 pandemic	121	87.7

[Note: (\*) refers to Multiple Responses, (\*\*) means this item was not included in knowledge]

Table 2 shows that majority of the respondents 103 (74.6%) responded PPE as special equipment used to reduce the chance of touching, being exposed to and spreading germs to other HCWs and patients. Majority of the respondents 113 (81.88%) responded that the purpose of wearing PPE during COVID-19 pandemic was to prevent the spread of corona virus transmission. All the respondents 138 (100%) responded that PPE includes Gloves, Gown, Mask /respirator, Goggles and face shield and Boots. Similarly, majority of the respondents 133 (96.37%) responded that PPE protects healthcare workers and patients from Covid infection. Majority of the respondents 121 (87.68%) responded that wearing PPE for whole duty hour makes them discomfort, suffocation and overheating. Similarly, majority of the respondents 117 (84.78%) responded that unavailability of PPE affects the proper use of the PPE in the hospital.

Similarly, more than half of the respondents 95 (68.8%) had heard about donning and doffing PPE. Hence, out of 95 respondents, majority of them 86

(90.5 %) responded that the meaning of donning and doffing was a sequence of putting on and taking off PPE. All the respondents 95 (100%) responded the importance of proper donning and doffing is to avoid the transmission of corona virus to the HCWs. More than half of the respondents 77 (55.8%) responded that a trained observer or a colleague is needed while donning and doffing PPE in order to prevent from PPE contamination. Less than half of the respondents 59 (62.1%) responded the correct order of donning and doffing PPE while remaining respondents responded the incorrect order of donning and doffing PPE. All the respondents 95 (100%) responded that the PPE should be discarded in a separate waste container. Regarding effective strategies for sustaining PPE use throughout COVID-19 pandemic, majority of the respondents 121 (87.7%) responded that training programs should be arranged for newly recruited staffs and refresher training for old staffs related to PPE use during COVID-19 pandemic while 69 (50%) responded on hospital should follow standard PPE guideline.

**Table 3 Association of knowledge and attitude with selected demographic variables**

Dependent variable	Independent variable	Chi- square ( $\chi^2$ )	Degree of freedom	P value	Association
Knowledge regarding the use of PPE	Continue education on COVID-19	16.472	1	<0.001	Yes
Knowledge regarding the use of PPE	Training on use of PPE	13.933	1	<0.001	Yes
Knowledge regarding the use of PPE	Profession	8.814	1	0.003	Yes
Knowledge regarding the use of PPE	Attitude towards use of PPE	7.422	1	0.006	Yes
Attitude towards use of PPE	Continue education on COVID-19	0.297	1	0.586	No
Attitude towards use of PPE	Training on use of PPE	0.000	1	1.000	No
Attitude towards use of PPE	Profession	0.365	1	0.546	No

Table 3 indicates that there was significant association between knowledge regarding the use of PPE and continue education ( $p = <0.001$ ), training ( $p = <0.001$ ) and profession ( $p = 0.003$ ). Similarly, there was also significant statistical association between knowledge and attitude towards the use of PPE during COVID-19 pandemic ( $p = 0.006$ ). However, there was no significant association of attitude of health care workers with continue education, training and their profession at  $< 0.05$  level of significance.

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## DISCUSSIONS

In this study, it was found that more than half of the respondents 86 (62.3%) had not received training on the use of PPE during or before COVID-19 pandemic while less than half of the respondents 52 (37.7%) had received training on the use of PPE before COVID-19 pandemic with the purpose of infection prevention and control measure. A similar result was found in a cross sectional study conducted among 600 health care workers at El-Demerdash Hospital, a teaching hospital in Cairo, Egypt in august 2020 which showed that most of the healthcare workers 353 (58.8%) did not receive any training on the importance of PPE.<sup>7</sup>

In this study, it was found that half of the respondents 70 (50.7%) had adequate knowledge regarding the use of PPE. A similar result was found in a cross sectional study conducted among 393 healthcare workers from five different districts of Bangladesh revealed that most of the healthcare workers 391 (99.5%) had good knowledge regarding personal protective equipment.<sup>5</sup>

Similarly, in this study, it was found that only half of the respondents 69 (50%) had positive attitude towards the use of PPE among health care workers during COVID-19 pandemic. A similar result was found in a cross sectional study conducted among 393 healthcare workers from 5 different districts of Bangladesh in february 2021 revealed that health care workers 88.8% had a positive attitude regarding PPE.<sup>5</sup>

In this study, among the 10 percent of total 138 respondents (total 10 health care workers from Covid isolation ward) showed that less than half of respondents 4 (40%) had good practice and more than half of respondents 6 (60%) had poor practice regarding the use of PPE (donning and doffing PPE). A contradict result was found in a cross sectional study conducted among Health care among 393 healthcare workers from 5 different districts of Bangladesh in february 2021 which showed that the health care workers (51.7%) had good practice of using PPE.<sup>5</sup>

In this study, it was found that there was significant association between knowledge regarding the use of PPE and training/ continue education ( $p = <0.001$ ),

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## CONCLUSIONS

This study concludes that the periodic training program for newly recruited health care workers and refresher training or continue education for old health care workers to update about the proper use of PPE would enhance the knowledge, attitude and practice of the health care workers. This is an effective strategy to prevent COVID-19 spread among health care workers and patients in the hospital. The study also concludes that the hospitals should follow the standard PPE guidelines by CDC or WHO while donning and doffing the PPE during this COVID-19 pandemic.

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**Conflict of interest:** None

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