



KNOWLEDGE, ATTITUDE AND REPORTED PRACTICE REGARDING DONNING AND DOFFING OF PERSONAL PROTECTIVE EQUIPMENT AMONG THE DOCTOR AND NURSE AGAINST COVID-19 IN OUR HOSPITAL

Community Medicine

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ABSTRACT

Introduction: Personal protective equipment (PPE) is a protective gear designed to safeguard the health of workers by minimizing the exposure to a biological agent. PPE usage is a primary strategy to prevent disease transmission in health-care settings where health-care professionals directly come in contact with infected patients. Kang et al. discovered that health-care personnel contaminated themselves in almost 80% of the PPE simulations. **Aims:** This study was done aiming to assess the knowledge, attitude, and reported practice, and identify the associated factors regarding donning and doffing of PPE among frontline healthcare workers in our institution. **Materials and method:** This was a single center observational, Cross sectional study from tertiary care hospital in Kolkata, India from duration of study: May 2021 – January – 2022. Personal protective equipment was used among the doctor and nurse against covid-19 in our hospital. Doctor and Nurse and Personal protective equipment among the doctor and nurse against covid-19 in our hospital. **Result:** 47(94.0%) doctors had corrected response and 3(6.0%) doctors had incorreccted response about donning and doffing of PPE for frontline healthcare workers. 47(94.0%) nurses had corrected response and 3(6.0%) nurse had incorreccted response about donning and doffing of PPE for frontline healthcare workers. This association was not statistically significant ($P=1.0000$). 33(66.0%) doctors had corrected response and 17(34.0%) doctors had incorreccted response to the following components based on their sequence of appearance during donning of PPE. 12(24.0%) nurse had corrected response and 38(76.0%) nurses had incorreccted response to the following components based on their sequence of appearance during donning of PPE. This association was statistically significant ($P<0.0001$). **Conclusion:** This study demonstrated an overall good knowledge, attitude, and reported practice regarding donning and doffing of PPE among frontline doctors and nurse However, the reported shortcomings like poor knowledge regarding the sequence of donning and doffing.

KEYWORDS

Knowledge, attitude, practice and personal protective equipment

INTRODUCTION

Personal protective equipment (PPE) is a protective gear designed to safeguard the health of workers by minimizing the exposure to a biological agent. PPE usage is a primary strategy to prevent disease transmission in health-care settings where health-care professionals directly come in contact with infected patients. Kang et al. discovered that health-care personnel contaminated themselves in almost 80% of the PPE simulations.¹ A number of organizations have produced guidance on PPE, which is broadly consistent, including the World Health Organization; the European Centre for Disease Control;² and the European Society of Intensive Care Medicine and Society of Critical Care Medicine. A recent study in the UK and the USA estimated that frontline health-care workers had a 3.4fold higher risk than people living in the general community for reporting a positive test.³

All the three aspects of donning and doffing, that is, knowledge, attitude, and practices (KAP), are important to completely understand and analyze the behavior of health-care workers (HCWs). Knowledge shows individual's readiness to perform the behavior, attitude tells about his sincerity toward why he or she thinks that the behavior is important, and finally real-time practice while performing his duties shows how careful is the individual in practicing the desired behavior. Practicing any behavior is not easy if a person does not have correct attitude toward it. Furthermore, attitude toward any practice has no utility if a person is not having correct and actionable knowledge about how to carry out the practice. This is the main compelling reason for conducting this KAP survey on donning and doffing practices of PPE amidst the ongoing COVID-19 pandemic to identify and understand the gaps and develop an intervention strategy to improve the knowledge level, attitude, and behavior of HCWs on donning and doffing practices of PPEs.

The virus spreads primarily via droplets and close contact with infected individuals, with the most common symptoms including fever, dry cough, difficulty breathing, and myalgia.⁴ However, some less common symptoms exist, such as gastrointestinal upsets and loss of smell or taste. The severity of these symptoms varies from person to person, but being elderly and having comorbidities are risk factors for more severe diseases. As of October 2020, treatment is focused on the symptomatic management of patients, with hospitalization required for more severe cases. Additionally, some experimental medications

are being trialed with various efficacies. Once more, as of October 2020, there is no available vaccine for COVID-19; however, multiple candidates are undergoing clinical trials, which might be available by the end of the year⁵. It is recognized that healthcare workers (HCW) worldwide are at a higher risk of contracting the infection⁶. However, infection control measures, such as hand hygiene, social distancing, and proper donning and doffing of personal protective equipment (PPE), have proven to lessen the spread of the infection.

AIMS

This study was done aiming to assess the knowledge, attitude, and reported practice, and identify the associated factors regarding donning and doffing of PPE among frontline healthcare workers in our institution.

MATERIAL AND METHOD

This was a single centre observational, cross sectional study from tertiary care hospital in Kolkata, India.

Duration of study: May 2021 – JANUARY – 2022

Personal protective equipment was used among the doctor and nurse against covid-19 in our hospital.

Inclusion criteria

- Doctor and Nurse
- Personal protective equipment among the doctor and nurse against covid-19 in our hospital.

Exclusion criteria

Other health worker

RESULT AND DISCUSSION

A cross-sectional study was conducted from May 2021 – January – 2022 among 100 frontline healthcare workers in our institution selected randomly from among the contacts of the investigators. A structured self-administered questionnaire prepared in google form was used as a study tool and shared via social media to the participants to obtain information on sociodemographic and workplace characteristics along with their knowledge, attitude, and reported practice regarding donning and doffing of PPE.

In addition to an intricate set of instructions with a wider learning curve

on donning and doffing issued by the central authorities, lack of instructive training or demonstration on standard donning and doffing (only 58% received any training on donning and doffing of PPE in this study) is also to blame for the poor response. Vidanapathirana T et al ⁷ (2020)

In our study Knowledge about received any formal “training or demonstration” regarding donning and doffing of PPE was more response in doctor group [46 (92.0%)] and in nurse group [43 (86.0%)] this was not statistically significant ($P=0.3376$).

Staff Nurses constituted a majority of workforce in COVID-19 ward/ICUs (43.0%) and ward/ICU non-specified (47.6%). In contrast, the majority of frontline healthcare workers working in fever clinics, ERs, OPDs, and other workplace were medical officers (69%). Distribution of profession, provision of PPE in workplace, and designated space for donning and doffing of PPE by workplace is depicted. Jose S et al ⁸ (2021)

We found that Knowledge about the complete procedure of donning and doffing PPE in a healthcare facility was not significantly responded in nurse group [38(76.0%)] and in doctor group [45(90.0%)] but this not statistically significant ($P=0.0623$).

To improve personal safety in the healthcare setting through the appropriate use of PPE, CDC has outlined a set of guidelines for the selection and use of PPE. However, thorough comprehension of those sets of instructions, an implicit attitude towards its effectiveness, and its precise usage in daily practice is crucial to achieving its targeted goal of flattening the workplace infection curve. Garg K et al ⁹ (2020)

It was found that, Knowledge of components based on their sequence of appearance during donning of PPE. 1) Mask or respirator 2) Gowns 3) Gloves 4) Goggles or face shield) was significantly more response in doctor group [33(66.0%)] and in nurse group [12(24.0%)] ($p<0.0001$).

In Knowledge of components of PPE are necessary to wear while drawing venous blood from a COVID-19 patient. 1) Gloves only 2) Gloves and mask 3) Gloves, mask and face shield/goggles 4) Gloves, mask, face shield/goggles, and gown) was both Group had responded [47(94.0%)] in doctor group and [47(94.0%)] in nurse group which was not statistically significant ($p=1.0000$).

Piché-Renaud PP et al ¹⁰ (2021) aimed to capture perspectives of healthcare workers (HCWs) on coronavirus disease 2019 (COVID-19) and infection prevention and control (IPAC) measures implemented during the early phase of the COVID-19 pandemic. Only 86 respondents (50%) identified the correct donning order; only 60 (35%) identified the correct doffing order; but the majority ($n = 113$, 70%) indicated the need to wash their hands immediately prior to removal of their mask and eye protection.

It was found that, Knowledge of personal eyeglasses be used as barrier protection for eyes instead of goggles as a form of PPE while managing COVID-19 patients was not significantly more response in doctor group [45(90.0%)] and in nurse group [38(76.0%)] ($p=0.0623$).

Ng BH et al ¹¹ (2021) observed that knowledge and adequate practice of preventive measures among health care workers (HCWs) are important to reduce the risk of COVID-19 transmission. Although majority had good knowledge and practiced proper preventive measures, there was a poor recall in donning and doffing steps regardless of place of practice. The MOH website is a useful platform for tailored continuous medical education and regular updates on COVID-19. Regular training and retraining on donning and doffing of PPE is needed to bridge this gap.

Our study showed that, Knowledge about Risk of virus dispersion is highest during. 1) Donning of PPE 2) Doffing of PPE 3) It is same in both the procedures was more in doctor group [46(92.0%)] and in nurse group [46(92.0%)] this was not statistically significant ($P=1.0000$).

Pandey S et al ¹² (2021) found that coronavirus Disease 2019 (COVID-19) is a respiratory infection with a high rate of transmission primarily via airborne route and direct contact. This study was done aiming to assess the knowledge, attitude, and reported practice, and

identify the associated factors regarding donning and doffing of PPE among frontline healthcare workers in Nepal. However, the reported shortcomings like poor knowledge regarding the sequence of donning and doffing and corresponding flawed practice behaviors need to be addressed.

In Attitude of Donning and doffing of PPE is a critical process that must be taken seriously by healthcare professionals had Agree in doctor group [2(4.0%)] and strongly agree in nurse group [11(22.0%)] which was statistically significant ($p=0.0074$).

This is best exemplified by contrasting the attitude of the majority of participants where they wanted to use a standard set of PPE at all times with the practice response where less than 60% of healthcare workers practiced donning and doffing for any surgery or airway related procedure irrespective of COVID-19 status. **Albahri AH et al ¹³ (2021)** Our study showed that, Attitude of Healthcare workers are completely protected from COVID-19 transmission if they use standard PPE even if they do not follow the proper method of donning and doffing of PPE Both the procedures was not significantly Strongly agree in Doctor group [6(12.0%)] and Strongly agree in nurse group [6(12.0%)] ($P=0.9103$).

It was found that Attitude of Donning and doffing of PPE is important only while managing patients with COVID-19 and can be ignored while caring for patients with other infectious diseases had Strongly agree by doctors [8(16.0%)] and nurse [6(12.0%)] but this was not statistically significant ($P=0.7642$).

Present study showed that, Attitude of standard donning and doffing practice when my colleagues/other healthcare workers do not follow the proper way of donning and doffing of PPE had strongly Agree by doctors [6(12.0%)] and strongly agree by nurse [5(10.0%)] ($P=0.9055$).

McCarthy R et al ¹⁴ (2020) examined that during the current coronavirus pandemic, significant emphasis has been placed on the importance of mitigating nosocomial spread of coronavirus disease 2019 (COVID-19). Technique regarding donning and doffing of PPE is crucial to the protection of those who don it. The purpose of this technical report is two-fold: first, to describe some important considerations in the manufacturing and design process of face shields to maximize protection for healthcare providers, and second, to describe a simulation scenario that may be used to train healthcare workers in the appropriate donning and doffing of PPE.

It was found that, Practice score of donning and doffing of PPE practices while taking care of suspected COVID-19 patients was significantly high in doctor [44(88.0%)] and nurse [33(66.0%)] ($p=0.0089$).

Our study showed that practice score of donning/doffing in all patients undergoing any surgery or airway-related procedures irrespective of their COVID-19 status was significantly more doctor [44(88.0%)] and nurse [30(60.0%)] ($p=0.0014$).

Present study showed that Practice score of drink enough water to remain hydrated before donning of PPE had Higher doctors [43(86.0%)] compared to nurse [29(65.9%)] and this was statistically significant ($P=0.0216$).

It was found that, Practice score of sanitize my hands before touching any PPE component was significantly more doctors [44(88.0%)] compare to nurses [31(62.0%)] ($p=0.0026$).

The use of PPE, which involves the process of donning (putting on) and doffing (taking off), consists of procedures that not only need to be performed correctly but also in the right sequence to protect healthcare workers from infectious exposures in the workplace. Haloot J et al ¹⁵ (2021)

Our study showed that practice score of donning procedures before entering the patient's room was significantly higher doctors [43(87.8%)] and nurses [34(68.0%)] ($p=0.0180$).

We showed that practice score of perform hand hygiene during donning PPE was significantly more doctors [44(88.0%)] and nurses [31(62.0%)] ($p=0.0026$).

Haloot J et al¹⁵ (2021) showed that due to the ongoing coronavirus disease 2019 (COVID-19) pandemic, a need for precise donning and doffing protocols for personal protective equipment (PPE) among healthcare infrastructures is paramount. Most institutions used N95 masks, shoe covers, at least one head covering, face shield or goggles, two pairs of gloves, and inner and outer gowns. Common steps in temporal priority included cleaning of gloved hands, removal of outer (or only) gown, removal of outer gloves, repeat gloved hand cleaning, removal of facial PPE last, and a final non-gloved hand cleaning. This analysis provides a summary of commonly used practices that may be considered when designing CCL-specific PPE protocols.

Our study showed that practice score of use a respirator or N95 mask followed by eye goggles/face shield during donning of PPE was significantly higher doctors [44(88.0%)] and nurses [33(62.0%)]. ($p=0.0089$).

We showed that practice score of use specified allocated area in my healthcare facility for doffing of PPE was significantly high doctors [43(86.0%)] compared to nurses [28(56.0%)]. ($p=0.0009$).

Phan LT et al¹⁶ (2019) observed that during the doffing of personal protective equipment (PPE), pathogens can be transferred from the PPE to the bodies of healthcare workers (HCWs), putting HCWs and patients at risk of exposure and infection. Overall, 90% of observed doffing was incorrect, with respect to the doffing sequence, doffing technique, or use of appropriate PPE.

Common errors were doffing gown from the front, removing face shield of the mask, and touching potentially contaminated surfaces and PPE during doffing

We showed that practice score of move out from the doffing area after the removal of gloves and the N95 mask during doffing of PPE was significantly high doctors [43(86.0%)] followed to nurses [26(60.5%)]. ($p=0.0050$).

It was showed that practice score of sanitize my hands/gloves before and after each step of the doffing procedure was significantly high doctors [43(86.0%)] followed to nurses [26(60.5%)]. ($p=0.0009$).

CONCLUSION

It was found that, Practice score of gown first before putting on the first pair of gloves during donning of PPE was significantly more doctors compare to nurses.

Our study showed that practice score of use a respirator or N95 mask followed by eye goggles/face shield during donning of PPE was significantly higher doctors and nurses.

Present study showed that Practice score of move out of the patient care area after donning PPE had Lower doctors compared to nurse and this was not statistically significant.

It was showed that Practice score of remove gloves first during the doffing procedure using the glove-in-glove technique without sanitizing the gloves had Higher doctors compared to nurse and this was not statistically significant.

Our study showed that Practice score of remove the gown after removing the inner pair of gloves during doffing of PPE had lowest doctors compared to nurse and this was not statistically significant.

We showed that practice score of move out from the doffing area after the removal of gloves and the N95 mask during doffing of PPE was significantly high doctors followed to nurses.

It was showed that practice score of sanitize my hands/gloves before and after each step of the doffing procedure was significantly high doctors followed to nurses.

Table: Association between Knowledge Q1 (Have you heard about donning and doffing of PPE for frontline healthcare workers?), Attitude Q1(Donning and doffing of PPE is a critical process that must be taken seriously by healthcare professionals.) and Practice score Q1(Do you always follow standard donning and doffing of PPE practices while taking care of suspected COVID-19 patients?): Group

		GROUP			Chi-square value	p-value
		Doctor	Nurse	TOTAL		
Knowledge Q1	Correct response	47	47	94	0.0000	1.0000
	Row %	50.0	50.0	100.0		
	Col %	94.0	94.0	94.0		
	Incorrect response	3	3	6		
	Row %	50.0	50.0	100.0		
	Col %	6.0	6.0	6.0		
	TOTAL	50	50	100		
	Row %	50.0	50.0	100.0		
	Col %	100.0	100.0	100.0		
Attitude Q1	Agree	2	11	13	7.1618	0.0074
	Row %	15.4	84.6	100.0		
	Col %	4.0	22.0	13.0		
	Strongly agree	48	39	87		
	Row %	55.2	44.8	100.0		
	Col %	96.0	78.0	87.0		
	TOTAL	50	50	100		
	Row %	50.0	50.0	100.0		
	Col %	100.0	100.0	100.0		
Practice score Q1	Correct Practice	44	33	77	6.8323	0.0089
	Row %	57.1	42.9	100.0		
	Col %	88.0	66.0	77.0		
	Incorrect Practice	6	17	23		
	Row %	26.1	73.9	100.0		
	Col %	12.0	34.0	23.0		
	TOTAL	50	50	100		
	Row %	50.0	50.0	100.0		
	Col %	100.0	100.0	100.0		

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