

## RESEARCH ARTICLE

# Knowledge, attitude and practice of using personnel protective equipment among Radiographers attending COVID-19 patients

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## Abstract:

Knowledge, attitude, and practices are three important aspects to understanding and analysing the behaviour of healthcare workers thoroughly. This study aims to evaluate the knowledge, attitude, and practice of using personnel protective equipment (PPE) among radiographers attending COVID-19 patients. A cross-sectional survey using a validated questionnaire was distributed to radiographers (n=50) at a radiology hospital of a health institution. The questionnaire comprised six knowledge, eight attitudes and 17 practice questions related to PPE. 86% (n = 43) had knowledge while 64% each (n = 32) possessed positive attitude and good practice, respectively. The radiographers demonstrate good knowledge of PPE when attending to COVID-19 patients. Although generally, the attitude and practice of the radiographers were good, donning and doffing of PPE was identified as an area for improvement.

**Keywords:** knowledge, attitude, practice, personnel protective equipment, COVID-19

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## 1. INTRODUCTION

Personal protective equipment (PPE) is protective gear designed to safeguard workers' health by minimising exposure to a biological agent. PPE is a primary strategy to prevent disease transmission in healthcare settings where healthcare professionals directly contact infected patients (Garg et al., 2020). Numerous types of PPE are used in clinical settings, including coveralls, gowns, hoods, masks, goggles, and face shields designed to protect the wearer from spreading infection or illness. PPE has the potential to block the transmission of contaminants from blood, body fluids, or respiratory secretions (FDA, 2018).

Apart from coping with increasing radiology demands during the COVID-19 pandemic, radiographers, as part of the healthcare workers' team, had to adapt to new policies and guidelines and be expected to deliver the highest standards of care (Ooi et al., 2021). Knowledge, attitude, and practices (KAP) are three essential aspects to understanding and analysing the behaviour of healthcare workers thoroughly. However, there is still a lack of literature on the knowledge, attitude and practice of using PPE among Malaysian radiographers attending COVID-19 patients. Therefore, this study is aimed to determine the level of knowledge, attitude and practice of using PPE among radiographers attending COVID-19 patients in a single health institution.

## 2. MATERIALS AND METHODS

This cross-sectional study investigated the knowledge, attitude and practice of using PPE among radiographers attending COVID-19 patients in a public hospital in Selangor. This study was conducted from June – July 2022. The radiographers attending COVID-19 patients for radiological examinations were included in this study, while those involved in the management were excluded.

This study collected data using an online self-administered questionnaire adapted from Garg et al. (2020). The questionnaire was designed on a Google form. Its link was shared with the radiographers in the radiology department via a dedicated WhatsApp group (WhatsApp Messenger Version 2.20.193.9. WhatsApp Inc. Boston, MA) and email. The questionnaire was divided into two parts. Part A was related to the demography of the respondents comprising age, gender, level of education and years of service. Part B consisted of six questions related to knowledge, eight questions related to attitude and 17 questions on the practice of donning and doffing PPE. These questions required the respondents to select the answer in each statement to be either yes, no or not sure. The questionnaire was validated by a pilot study which was conducted to obtain the reliability of this questionnaire. Cronbach's alpha ( $\alpha$ ) score for the questionnaire was 0.748.

The sample size was calculated using a sample size calculator, assuming a response rate of 50%, 95% confidence interval (CI), Z of 1.96 and margin of error of 5%, resulting in a final sample size of 50. Descriptive analysis was performed to determine the percentage of demographic variables and KAP results using SPSS version 25 (IBM Corp, Armonk, NY). This study was granted by the Research Ethics Committee of the Faculty of Health Sciences, Universiti Teknologi MARA (approval no. FERC/FSK/MR/2022/0134). The participation of the respondent in this study was voluntarily basis.

### 3. RESULTS AND DISCUSSION

All 50 respondents responded to the questionnaire (100% responses). The summary of respondents' demographic data is shown in Figure 1. The respondents consisted of 42% male (n=21) and 58% female (n=29). Of these, 30% (n=15) were aged between 31 – 35. Regarding working experience, 36% (n=18) had less than five years of experience. The summary of demographic details is shown in Figure 1.

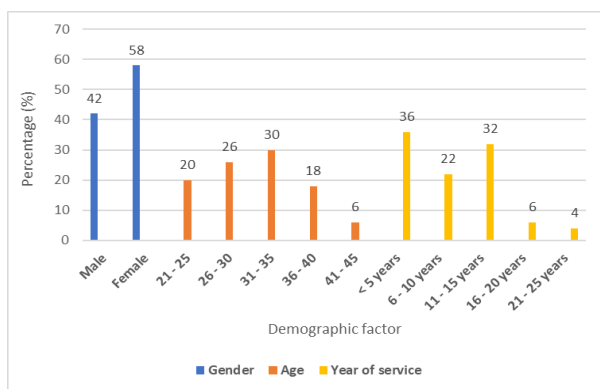


Figure 1. Demography of the radiographers

Our survey revealed that 86% of the respondents were knowledgeable, whilst 64% each showed a positive attitude and good practice in using PPE in attending to COVID-19 patients, respectively (Figure 2).

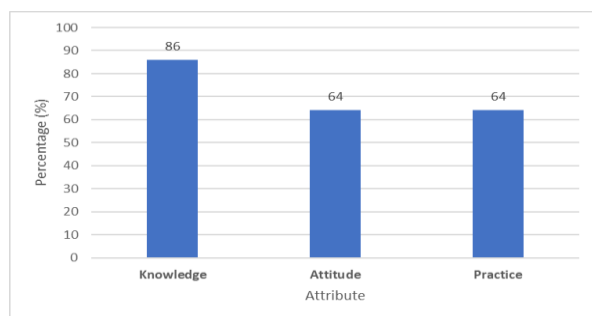


Figure 2. Prevalence of knowledge, attitude and practice among the radiographers on the use of PPE in attending COVID-19 patients

### 3.1 Knowledge of using PPE

This study revealed that most radiographers were knowledgeable, but some lacked a positive attitude and good practice in using PPE in attending to COVID-19 patients. The majority believed they were equipped with sufficient knowledge to handle COVID-19 patients. Knowledge is a prerequisite for establishing prevention beliefs, forming positive attitudes, and promoting positive behaviours. Based on the findings, 96% of the respondents were aware of using PPE to prevent COVID-19 infection. Additionally, it was found that 84% of the respondents had received formal training on the use of PPE during the COVID-19 pandemic. This study showed that they had good knowledge about PPE, with almost 86% of the respondents knowing what constituted the standard of PPE. Comprehensive training that includes indications for PPE, correct identification of equipment, proper donning and doffing technique, and correct maintenance and disposal of PPE is critical for increasing the likelihood of using PPE when necessary. The results also indicated that they had good knowledge regarding all the components of PPE kits in the facility and the complete procedure of donning and doffing of PPE, which is in line with a study by Hossain et al. (2021).

One of the best strategies for protecting patients and healthcare workers against transmissible infections is properly using PPE. PPE shields healthcare professionals from dangerous diseases by limiting exposure to bodily fluids and breathing droplets. The high infection rate among health workers has been linked to low adherence to the management and prevention of COVID-19 infection (Bani-Issa et al., 2021). Despite this result, 20.0% of the respondents demonstrated they were unaware of COVID-19 virus dispersion which commonly occurred during PPE doffing. While COVID-19 infection is mainly caused by direct droplet dissemination, hand hygiene and adherence to PPE guidelines are equally important in preventing viral transmission.

### 3.2 Attitude of using PPE

This study demonstrated that 64% of the participants had a positive attitude towards PPE in COVID-19 management. The proportion of radiographers having a positive attitude differed between the junior (58%) and senior radiographers (42%). Variances in internet accessibility and exposure to online information between junior and senior radiographers might explain this finding. Young radiographers are more readily accessible to the internet and various social media platforms to gain up-to-date information on PPE instead of conventional resources used by their senior colleagues.

On analysing the attitudes regarding donning and doffing of PPE, 100% of the radiographers believed that donning and

doffing of PPE is a critical process which must be taken seriously and 88.0% of the respondents strictly followed the systematic way of donning and doffing based on the guidelines. However, 54% of the respondents highlighted that it was inconvenient to care for the patients after donning, and 52% of the radiographers concurred that strict donning and doffing practices would not be possible if this pandemic stayed for a long time. 78% of the respondents implied that the facility is adequately equipped with all resources and space required for methodical donning and doffing practices. This type of attitude needs to be modified with the reinforcement of proper techniques, as studies have shown that 46% - 90% of healthcare workers practice self-contaminate routinely during doffing (Tomas et al., 2015; Herlihey et al., 2016).

### 3.3 Practice of using PPE

The high infection rate among health professionals may have been mainly caused by insufficient instruction in using and disposing of PPE (Ogolodom et al., 2020). Most respondents (94%) stated that they always perform donning procedures before entering the patient's room, and 96% of them claimed they always put the gown first before putting on the first pair of gloves. However, 50% of the respondents highlighted that they moved out of the patient area immediately after donning PPE.

Hand hygiene is an essential protective measure to prevent infection, especially SARS-CoV-2. Our survey found that they sanitise their hands or glove after each step of the doffing procedure. Furthermore, high compliance with hand hygiene practices (86%) was reported among the radiographers. However, the remaining 14% perceived intensified dryness and soreness of the hands. It might also be due to the inconvenient placement of the hand rub or sink, no hand rub in the dispenser, or no soap at the sink, being distracted by medical emergencies, low perception of hand hygiene importance to prevent infections, and low safety culture with no feedback for safety.

This study has several limitations. It was a single-centre study with a relatively small sample size of radiographers. To the best of our knowledge, currently, there is no published local data on this subject, hence the inability to compare with other facilities with similar settings. Future multi-centre studies equally distributed among radiographers are recommended to address these limitations. The association between knowledge, attitude and practice with patients' outcomes could be addressed for future studies. Therefore, based on the findings from this study, we recommend that training on the use of PPE for COVID-19 patients be conducted regularly for radiographers to improve their attitude and practice.

## 4. CONCLUSION

The radiographers demonstrate good knowledge of using PPE attending to COVID-19 patients. Although generally, the attitude and practice of the radiographers were good, donning and doffing of PPE was identified as an area for improvement.

## ACKNOWLEDGEMENTS

The authors thank the radiographers and staff of the Department of Radiology Hospital Selayang for their kind support during the data collection.

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