Assess the Level of Practice on Usage of Personal Protective Equipment among Health Care Workers

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Abstract

Background: Personal protective equipment (PPE) provides a physical barrier between microorganism and wearer. It's important to assess the level of compliance with use of PPE by the various health care workers (HCWs) who make direct contact with patients.

Methods: Non-experimental descriptive design was used with quantitative survey approach. Setting of the study was in a tertiary hospital, Bengaluru. Samples were all HCWs those who were available during study period. Sample size was total 200. Non probability, purposive sampling technique was used for the study. The data was collected using an observational checklist.

Results: Out of 200 HCWs, majority (34%) was nursing students and remaining (33%) of each were doctors, and staff nurses. Percentage wise distribution of HCWs according to the level of practice on usage of PPE in wards showed that majority (60%) had average practice, whereas the lowest percentages (6%) had poor practice. Majority (72%) of HCWs in intensive care unit (ICU), operation theatre (OT) and labour room (LR) had good practice whereas the lowest percentage (1%) had poor practice. There was significant association found between the practice scores on usage of PPE with the selected demographic variables i.e. HCWs, age, educational qualification and years of work experience.

Conclusion: Findings of the present study concluded that there is a requisite to improve the practices of HCWs' on usage of PPE. Periodic reinforcement and training programs are needed for all level of HCWs in order to maintain adherence with appropriate use of PPE.

Keywords: *Practice, Personal protective equipment, Health care workers*

Introduction

Personal protective equipment (PPE) is designed to protect health care providers from serious workplace injuries or illnesses. PPE provides a physical barrier between microorganism and wearer. It offers protection by preventing microorganism from contaminating hands, eyes, clothing, hair and shoes. A breach in infection control practices facilitates transmission of infection from patients to health care workers, other patients and attendants.

PPE includes gloves, protective eye wear (goggles), mask, apron, gown, boots/shoe cover, hair cover. PPE should be used by all health care providers, supporting staffs, laboratory staffs, and family members who provide care to patients in situations where they have contact with blood, body fluids, secretions or excretions.

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The emergence of life-threatening infections such as severe acute respiratory syndrome (SARS) and re-emerging infectious diseases like plague and tuberculosis had highlighted the need for efficient infection control programs in all health care settings and research into standard precautions has been carried out in many countries.

Nosocomial infections transmitted by direct-contact can be prevented by adapting standard precautions guidelines. Appropriate use of PPE is the easiest way to prevent contact from secretions and transfer of pathogens. It's important to assess the level of compliance with use of PPE by the various health care workers HCWs who make direct contact with patients.[1]

A HCW is one who delivers care and services to the sick and ailing either directly as doctors and nurses or indirectly as aides, helpers, laboratory technicians, or even medical waste handlers. There are approximately 59 million healthcare workers worldwide. Recognizing the vital role played by health care workers as "the most valuable resource for health" the World Health Organization (WHO) had declared the years 2006 to 2015 as the "The decade of the human resources for health."

In a report published by the WHO, the disease burden caused by percutaneous sharps injuries among HCWs was found to be three million per year. Moreover, 40% of hepatitis B, 40% of hepatitis C, and 4.4% of HIV among HCWs were due to needle stick injuries. It is very unfortunate that approximately 1000 HCWs die annually from occupational HIV, which can and should have been prevented. Despite this, almost 80% of healthcare workers remain unimmunized (against Hepatitis B) in many parts of the world.

The need of the hour is to prioritize occupational health of HCWs and ensure that the workforce is adequately trained and healthy. As humanitarians, it is our duty to help the most vulnerable sections but we should not end up paying the price of our lives for it.[2]

Material and Methods

The study was conducted in a tertiary hospital at Bengaluru during July 2019. In present study, a quantitative survey approach and non-experimental descriptive design was adopted. Non probability, purposive sampling technique was used to collect data from 200 HCWs (doctors, staff nurses & nursing students) who were available at the time of data collection. HCWs working in selected areas of hospital were taken as subjects. The investigators had collected the data after getting permission from administrator of hospital and principal of college of nursing. The data was collected through concealed observation method using an observational checklist to assess the practice on usage of PPE among HCWs (for wards) and a separate observational checklist to assess the practice on usage of PPE (for ICU, OT, & LR). Each sample was observed once to assess the practice. After the completion of data collection, subjects were informed regarding the study and demographic profile of HCWs were obtained. An observational checklist was also used to assess availability of PPE related resources in the hospital. Descriptive statistics includes frequency, percentage, range, mean, median and standard deviation was used to describe the result. Inferential statistic like Chi square test was used to find the association with selected demographic data.

Results

Study revealed that out of 200 HCWs majority (34%) was nursing students and remaining (33%) of each were doctors, and staff nurses. Majority (48.5%) of samples were of the age group of below 25 years, whereas the least percentages (5.5%) were of the age group of >50 years. (76.5%) of HCWs were females followed by (23.5%) were males. The highest percentage (45%) of respondents had work experience of > 2 years whereas the lowest percentages (3%) had work experience of < 1 year and (34%) were nursing students who were studying B.Sc. nursing. Majority (33.5%) of samples were working in the other wards (i.e. had both medical and surgical cases), whereas the least percentages (8%) were working in medical wards. Among 66 doctors, the highest percentage (64%) of doctors had MBBS and above education, whereas the lowest percentages (36%) were PG medical students. Out of 66 staff nurses' majority (74%) of staff nurses had B.Sc. nursing education whereas the least percentages (3%) had Post Basic B.Sc. nursing education. Among 68 nursing students majority (47%) of nursing students were studying 3rd year B.Sc., whereas the lowest percentages

(22%) were studying 2nd year B.Sc.

Table no. - 1 Frequency and percentage distribution of HCWs according to the level of practice on usage of PPE (wards

n=100

Sl no.	Variables	Frequency (f)	Percentage (%)
10.	Level of practice – Good practice Average practice Poor practice	 34 60 6	 34 60 6

Majority (60%) of HCWs had average practice, whereas the lowest percentages (6%) had poor practice.

Out of 33 doctors; who worked in wards, majority (67%) had good practice, (33%) had average practice whereas none of them had poor practice. Among 33 staff nurses, majority (58%) had average practice, (24%) had good practice whereas the lowest percentages (18%) had poor practice. Out of 34 nursing students, majority (88%) had average practice, (12%) had good practice whereas none had poor practice.

Table no.-2: Practice scores of HCWs according to the level of practice on usage of PPE (wards)

n= 100

Variables	No. of items	Maximum scores	Range	Mean	Median	Standard deviation
Level of practice on usage of PPE	23	23	13	16.58	17	3.03

Data in table-2 shows that the range of practice scores was 13, mean was 16.58, median was 17 and standard deviation was 3.03.

Table no.-3: Frequency and percentage distribution of HCWs according to the level of practice on usage of PPE (ICU, OT & LR)

n= 100

Sl no.	Variables	Frequency (f)	Percentage (%)
14.	Level of practice – Good practice Average practice Poor practice	 72 27 1	 72 27 1

Majority (72%) of HCWs had good practice whereas the lowest percentage (1%) had poor practice.

Out of 33 doctors, who worked in ICU, OT& LR; all (100%) had good practice, whereas none of them had average and poor practice. Among 33 staff nurses, majority (55%) had good practice, (42 %) had average practice whereas the lowest percentages (3%) had poor practice Out of 34 nursing students, majority (62%) had good practice, and (38%) had average practice whereas none of them had poor practice.

Tableno.-4: Practice scores of HCWs according to the level of practice on usage of PPE (ICU, OT & LR)

n=100

Variables	No. of items	Maximum scores	Range	Mean	Median	Standard deviation
Level of practice on usage of PPE	23	23	18	20.16	27	7.14

Data in the table-4 shows that the range of practice scores was 18, mean was 20.16, median was 27 and standard deviation was 7.14.

Tableno.-5: Association between the practice scores on usage of PPE among HCWs with demographic variables [Wards]

n=100

Sl no.	Variables	$\chi 2$	Level of significance
1	HCW	38.15	Significant
2	Age	16.13	Significant
3	Educational qualification	38.15	Significant
4	Years of experience	24.72	Significant

For HCWs, age and educational qualification (df- 4, chi square value- 9.49, $p<0.05$) and for years of experience (df- 6, chi square value- 12.59, $p<0.05$)

Chi square value was calculated to find out the association between the practice scores on usage of PPE with socio - demographic variables. The finding reveals that there is significant association between the practice scores on usage of PPE with selected demographic variables i.e. HCWs, age, and educational qualification and years of work experience.

The finding of association between practice scores on usage of PPE among 100 HCWs with selected demographic variables in ICU, OT & LR reveals that there is significant association between the practice scores on usage of PPE with selected demographic variables i.e. for HCWs - $\chi 2$ value of 16.36 (df- 4, chi square value- 9.49, $p<0.05$) , age- $\chi 2$ value of 38.36 (Df- 4, chi square value- 9.49, $p<0.05$) , educational qualification- $\chi 2$ value of 16.36 (df- 4, chi square value- 9.49, $p<0.05$) and years of work experience - $\chi 2$ value of 33.42 (df- 6, chi square value- 12.59, $p<0.05$) .

All the wards (medical, surgical, other wards, ICU, OT and LR) of the hospital have 100% resources related to PPE availability.

Discussion

Healthcare workers are at great risk of blood borne infections. Most of them are because of occupational exposure. [3] According to the fact sheet given by WHO, there are several factors which can cause health care-associated infections. Among this prolonged and inappropriate use of devices and antibiotics, high-risk and sophisticated procedures, immunosuppression and other severe underlying patient conditions and insufficient application of standard precautions are some of factors

which present regardless of the resources available.[4] To prevent disease transmission in healthcare settings, PPE must be used consistently and correctly by HCWs to prevent exposure and the transport of pathogens to their bodies.[5] We found that(34%) samples were nursing students whereas (33%) of each were doctors and staff nurses .With regard to usage of PPE in wards , majority (60%) of HCWs had average practice, (34%) had good practice followed by (6%) had poor practice whereas in ICU , OT & LR (72%) HCWs had good practice, (27%) had average practice followed by (1%) had poor practice. So, practices of HCWs on usage of PPE were not adequate.

A cross sectional study was study was done by Archana Lakshmi P. A., Gladius Jennifer H., Meriton Stanly A. etal (2018) [1] on PPE use among health care providers (HCPs) of two tertiary health care institutions in Tamil Nadu. The HCPs included in the study was 1060. Among them, there were (38.9%) doctors, (51.9%) nurses and (9.2%) technicians. Among 862 HCPs who worked outside the operation theatre (OT) and ICU, appropriate use of PPE among the HCPs were only (18.1%). Appropriate use of PPE was high among the doctors (31.5%) followed by nurses (9.3%) and technicians (8.2%) which was statistically significant ($\chi 2=56.82$, $p=0.0001$). Among the HCPs working in OT, appropriate use of gloves, mask, apron, gown and hair cover was 100%. But the use of goggles and shoe cover was very low.

Conclusion

Findings of the present study concluded that there is a requisite to improve the practices of HCWs' on usage of PPE. The demand of the hour is to observe cyclically practices of HCWs, prioritize their occupational health and to ensure that the workforce is adequately trained and fiercely motivated and encouraged. Periodic reinforcement and training programs are needed for all level of health care workers in order to maintain adherence with appropriate use of PPE. Authorities should monitor and supervise health care workers towards infection prevention practices and control measures with the routine services through preparing and introducing health care workers infection prevention guidelines, protocol, rules, regulations and opportunities to promote the desired team sprit at all health facility levels.

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Ethical Clearance: Taken from Institutional Ethics Committee of St. Philomena's Hospital and College, Bangalore.

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