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Original Article

Assessment of Nurses' Knowledge Regarding Personal Protective Equipment at Two Tertiary Care Hospitals, Peshawar

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ABSTRACT

Personal Protective Equipment (PPE) include gloves, protective eye wear (goggles), mask, respirator, apron, gown, boots/shoe cover, hair cover and are aimed to shield Health Care Professionals (HCP) including nurses from workplace infections and injuries. **Objective**: To assess nurses' knowledge regarding personal protective equipment at two tertiary care hospitals in Peshawar. **Methods:** A design of the study was descriptive cross-sectional survey. Overall, 150 nurses were involved by using consecutive sampling technique. Data were collected through structured, self-administered adopted questionnaire. **Results:** This study comprised of 150 contributors including 30% male and 70% female. The mean age of the participants was 29.15 with standard deviation ± 6.07. 53.3% of the participants had Diploma, 36.7% had Post RN, 8.7% of the participants had BSN and 1.3% of the participants had MSN degrees. The study showed that 58% of respondents had good knowledge due to their professional experiences while 36% had average knowledge level due to low professional experiences and lack of resource and availability of PPE's and only 6% participants had poor knowledge level regarding personal protective equipment due to lack of professional experiences. **Conclusions:** This study concluded that knowledge level was good in majority of nurses. Despite the good knowledge level, some of the personnel practices and attitudes towards PPE remain unchanged. This study pleas for a need to educate Nurses on PPE; it may be with continuing education on infection control or other informative platforms. When there is low level of knowledge it will affect practice related to PPE.

INTRODUCTION

The term "universal precautions" refers to a collection of actions designed to avoid the spread of blood-borne infections while delivering health care [1]. Patients infected with these diseases cannot be reliably identified through medical history and physical examination; therefore, the Centres for Disease Control (CDC) recommends that conventional precautions be followed on all patients, regardless of their infectious status [2]. Because health care personnel have close contact with patients, they are at a significant risk of occupational risks such as HCV and HIV exposure [3]. PPE give protection by preventing microorganism's transmission from contaminating hands, eyes, clothing, hair, body fluids, aerosols, and shoes [4]. Transmission of microorganisms occurs through different modes including direct, indirect and air borne. Direct transmission is through Sneezing, coughing, spitting, biting, touching, kissing, or sexual intercourse [5]. Indirect transmission is through non-living objects (fomites) such as toys, soiled clothes, through the hands of a caretaker, eating utensils, handkerchiefs, surgical instruments, or dressings [6]. On the other hand, airborne transmission occurs through air which includes

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droplets or dust particles containing the infectious agent like Clostridium difficile, Mycobacterium Tuberculosis, Rubeola virus (Measles), Varicella-Zoster virus (chicken pox), Smallpox, Influenza, Rhinovirus, and some gastrointestinal viruses e.g., Norovirus and Rotavirus [7]. HCP are at more vulnerable to acquire airborne infections like Tuberculosis (T.B), Severe Acute Respiratory Syndrome (SARS) and Influenza with 10-20 folds of contraction than the general population [8]. A disruption in PPE usage contributes to the transmission of infection from patients to HCP, other patients and attendants, the PPE shall be used properly by all HCP especially nursing staff, supporting staff, laboratory staff and family members who provide care to patients in situations where they contact with blood and body fluids [9]. Despite of the Centers for Disease Control (CDC) guidelines on PPE use to prevent the transmission of blood-borne and air-borne infections like MRSA, T.B, influenza etc; still prevalence of such infections is high in nurses and other HCP [10]. Prevalence of MRSA among nurses in Germany was 5.6% [5]. According to the CDC, the Ebola mortality rate in Liberia was 390 of 4810 deaths among HCP. In addition, the National TB control program of Pakistan (NTP) states that 510 000 new TB cases occur each year in Pakistan which also affect HCP [11].

PPE use is an integral part of infection control and prevention measures that protect HCP against infected air, body fluids, and other potentially infectious materials. The use of PPE by HCP is affected by their knowledge about PPE and their perception of infection. Based on their experience researchers assume that in KPK, HCP has lack of awareness of proper use of PPE. The researcher's conducted the study to investigate the nurses' knowledge level regarding PPE because there was no such study conducted regarding the stated problem in one of the health care settings in Khyber Pakhtunkhwa (KP).

METHODS

The quantitative descriptive cross-sectional study design was used in this study. The duration of the study was four months. The data collection process lasted from October 2018 to November 2018. Data were collected at one point in time from the participants. Prior to data collection written informed consent was taken from each participant. All registered nurses who were actively working in two tertiary care hospitals Khyber Teaching Hospital and Hayatabad Medical Complex Peshawar were included in this study. Those nurses who were either on leave or did not willing to participate were excluded from the study. In this study a consecutive sampling technique was used for the sample selection. Total population was 680 in the two tertiary care hospitals and the calculated sample size was 250, out of them 150 responded. Sample size was calculated by Rao soft with 0.5% margin error and 95% confidence interval. A modified well-organized questionnaire was used for data collection. The Questionnaire was consisted of two parts, 1st part included demographic characteristics and the 2nd part was relevant to the assessment of knowledge. Analysis of data was done by using SPSS version 22.0. In descriptive statistics, frequencies and percentages were determined for nominal and ordinal data while mean and standard deviation were determined for continuous variables. ≤ 50 % score was considered poor knowledge, higher than >50% to ≤ 75% were considered as having average knowledge and those who achieved higher than 75% were considered good knowledge.

RESULTS

This study comprised of 150 participants in which 45(30%) were male and the rest 105(70%) were female (Figure 1). The mean age of the subjects was 29.15 with standard deviation ± 6.070. Academic qualification of the participants was 53.3% of the participants had Diploma, 36.7% had Post RN, 8.7% of the participants had Generic BSN and 1.3% of the participants had MSN. Result of the data regarding the designation of participants shows that out of all 60% of the participants were staff nurse, 4.7% of the participants were head nurse, 34.7% of the participants were charge nurse, and 0.7% of the participants were shift supervisors. Professional experiences of the participants show that 96% of the participants had 2 to 12 years, 2.7% of the participants had 13 to 22 years, 0.7% of the participants had 23 to 32 years, and 0.7% of the participants had 33 to 42 years of experience. All the stated results are shown Table 1.

Table 1: Demographic variables of the participants

Variables	Frequency (%)
Gender	
Male	45 (30)
Female	105 (70)
Qualification	
Diploma	80 (53.3)
Post RN	55 (36.7)
Generic BSN	13 (8.7)
MSN	2 (1.3)
Designation	
Staff nurse	90 (60)
Head nurse	7 (4.66)
Charge nurse	52 (34.67)
Shift supervisor	1 (0.67)
Professional experience	
>2 to 12 years	144 (96.0)
13 to 22 years	4 (2.66)
23 to 32 years	1 (0.67)
33 to 42 years	1 (0.67)

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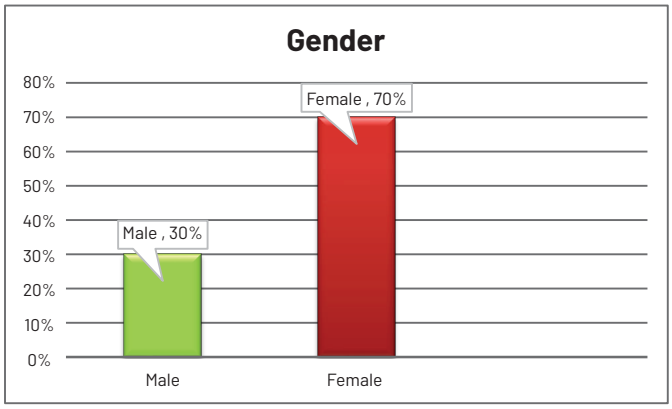

Figure 1: Gender distribution

Table 2 disclose that 97.3% of the participants stated that they knew the personal protective equipment. Result also shown that, 89.3% of the wear disposable gloves when there is a chance of contact to the human fluids or blood. In response to a question whether they have been trained to use PPE, 82.3% of the nurses contemplate that they have been trained to use PPE. Result illustrated that, 78.7% of the nurses consider handwashing the single most important measure for preventing hospital acquired infections. While answered given by the participants, 74.7% of the nurses ponder occupation health and standard shall be followed. Surprisingly only 43.3% of the nurses stated that guidelines for personal protective equipment should be followed on. Besides 90% of the nurses considered themselves knowledgeable in the use of personal protective equipment. This study result found that, 78.7% of the nurses' wear mask when there is a likelihood of any kind of splash or spray. To another question when the participants were inquired of whether nurses wear eye shield protectors when there are chances of splash, only 42.7% of the nurses 'responded yes. Furthermore, 78.7% of the participants dispose all possibly filthy items into a standard red bag. Similarly, 87.3% of the nurses take special precautionary measure while dealing with stilettos or sharp items.82% of the nurses stated that policies on personal protective equipment are posted in their work. Contradictory the participants stated that only 22% of the employs in their workgroup always follow the use of personal protective equipment. All these findings are shown in Table 2.

Table 2: Participants knowledge level

Question/Statement	Yes	No
	N (%)	N (%)
Do you know the personal protective equipment?	146 (97.3)	4 (2.7)
I have been trained to use PPE	124 (82.7)	26 (17.3)
Do you wear disposable gloves whenever there is a possibility of exposure to blood or other body fluids?	134 (89.3)	16 (10.7)
Do you wear disposable face mask whenever there is a possibility of splash or splatter to?	118 (78.7)	32 (21.3)
Do you wear disposable gloves whenever there is a possibility of exposure to blood or other body fluids?	64 (42.7)	86 (57.3)
Do you dispose of all potentially contaminated materials into a red bag for disposal as biomedical?	118 (78.7)	32 (21.3)
Do you take special caution when using scalpels or sharp objects?	131 (87.3)	19 (12.7)
Is handwashing the single most important measure for preventing hospital acquired infections?	118 (78.7)	32 (21.3)
Occupation health and safety standard shall be followed/not	112 (74.7)	38 (25.3)
Guidelines for Personal protective equipment should be followed on	65 (43.3)	85 (56.7)
I am knowledgeable in the use of personal protective equipment	135 (90)	15 (10)
Policies on personal protective equipment are posted in my work	123 (82)	27 (18)
Employs in my workgroup always follow the use of personal protective equipment	33 (22)	117 (78)
I can reduce my risk of occupational HIV infection by using personal protective equipment	109 (72.7)	41 (27.3)
If personal protective equipment is followed with every patient, my risk of infection will be decreases	30 (20)	120 (80)

To know about their level of knowledge, we developed three (3) categories that was poor, average, and good knowledge as shown in the Table 3. Those who had equal to 50 % score was considered poor knowledge, higher than >50% to ≤ 75% were considered as having average knowledge and those who achieved higher than 75% were considered good knowledge. Among the participants 6.0 had poor knowledge, 36.0 had average knowledge and 58.0 had good level of knowledge with a mean knowledge score 15.84 and standard deviation of ±3.09.

Table 3: Knowledge categories

Knowledge category	Frequency (%)
Poor	9 (6.0)
Average	54 (36.0)
Good knowledge	87 (58.0)

DISCUSSION

According to this study findings 97.3% of the nurses can define the PPE and know the ways of implementing PPE correctly during practice. In addition, 82% of the nurses presented that policies on personal protective equipment are posted in their work. Nevertheless, a similar study done in Nigeria showed that 89% staff had just heard about PPE but only 38% could correctly define it and 38% were not aware of any hospital policy on PPE while even greater per cent (95%) had not seen any hospital policy [12]. One more findings from the study conducted at Tokyo showed that PPE use and its adherence rate among nurses was 34% [13]. This study found that 6% of the participants had poor knowledge, 36% had average knowledge, and 58% had good knowledge or acceptable knowledge level. Contrary to this, a study conducted at tertiary care hospital of Lahore showed that 17.41% of the participants had good

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knowledge, while 42.29% of the participants had poor knowledge regarding the PPE [14]. This study found that 78.7% of the nurses dispose of all potentially contaminated materials into a red bag for disposal as biomedical. However, a survey conducted by WHO presented that slightly more than half 58% health care settings have acceptable mechanisms for the discarding of waste [15]. Similarly, a study in Nigeria indicated unawareness of the proper use of PPE directly predisposes HCP to dangerous health care-related infections [12]. Moreover, in this study 78.7% of the nurses agreed that handwashing is the single most effective measure to prevent hospital acquired infections. A study conducted in Indonesia illustrated that hand hygiene is widely regarded is solitary utmost effective method of reducing healthcare related illnesses however the compliance rate among nurses and doctors sometimes is very low [16]. Moreover, a survey on use of PPE was conducted in China during 2009, showed poor level of knowledge (33.7%) among HCP. The study also explored compliance to PPE; gloves (90%), gown (88%) and N95 respirator (88.3%) [17]. This study identified that 87.3% of the nurses take special precaution when using scalpels or sharp objects. Differing to this a study conducted in Ethiopia presented a total rate of injuries caused by sharp objects and needles was 43% among nurses [18]. In this study 72.7% of the nurses were of the opinion that they can reduce the risk of occupational HIV infection by using personal protective equipment. Likewise a study conducted in brasil showed similar results [19]. Opposingly a study conducted in Tanzania indicated work related HIV exposure among healthcare professionals with prevalence of 47.9% [20].

CONCLUSIONS

For prevention of infection in clinical setups PPE plays an important role. This study concluded that knowledge level was acceptable in majority (more than half) of nurses. Despite the acceptable knowledge level, some of the personnel practices and attitudes towards PPE remain unchanged.

Authors Contribution

Conceptualization: GN
Methodology: GN, IWA
Formal analysis: GN
Writing-review and editing: IWA, DM
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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