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Personal Protective Equipment Knowledge and Practices among Nurses Working at Al-Baha King Fahad Hospital, Saudi Arabia

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Abstract

Background: Infection prevention and control is an integral component of nursing care delivery in any setting to reduce risks for morbidity and mortality in patients and care givers at all levels. Nurses share responsibility with other health care personnel for infection risk reduction in patients across entire continuum of care and play vital role in reducing risks for infection through a variety of direct care activities.

Aims & Objective: This was a cross sectional descriptive study aimed at determining the knowledge, practice and factors that influence compliance with usage of Personal Protective Equipment (PPE) among nurses working at Al-Baha King Fahad Hospital, KSA.

Material and Methods: A cross-sectional survey conducted between October and December 2017 among staff nurses working at Baha KFH. One hundred eighty five nurses were enrolled in this study. Data were collected and analyzed using SPSS software.

Results: Most of the studied nurses were female, young in the age group of less than 40 years, carry bachelor's degree and work as staff nurses for more than 3 years (78.4% 81.1%,74.6% & 61.6%) respectively. There is strong evidence of positive relationship between awareness of the respondents with PPE, gloves (as an effective barrier for infection control), hand mediated transmission and catheter care practices with most of the nurse's demographic characteristics however there was no association between the age and wearing of gloves.

Conclusion: Nurses had excellent knowledge with and appropriate use of PPE as vital in safeguarding HCWs and spread of infection.

Keywords: Infection control; Knowledge, Nurses; PPE

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Introduction

Health care professionals and patients are at high risk to be exposed to potentially infected blood and body fluids that can lead to serious or even lethal infections [1]. Nurses in particular are repeatedly exposed to various infections during the course of carrying out their nursing activities [2]. This can be minimized by applying standard precautions as hand hygiene, use of personal protective equipment (e.g., gloves, gowns, masks), safe injection practices, safe handling of potentially contaminated equipment

or surfaces in the patient environment, and respiratory hygiene/cough etiquette which are designed to reduce the risk of acquiring occupational infection from both known and unexpected sources in the healthcare setting [3]. At 1996 the Center for Disease Control and Prevention (CDC), put forward guidelines, a revised version of a preventive concept against nosocomial infections. It advocates basic standard precautions for all healthcare delivery and additional specific measures to protect healthcare workers and patients from exposure to potentially harmful

microorganisms [4-6].

Despite the adoption of these guidelines by healthcare worker in several countries, compliance with aseptic precautions is known to be "poor and lacking" [7-10]. Numerous studies shown that factors that contribute to non-compliance with standard precautions include lack of understanding and knowledge among health care workers on how to properly use protective barriers, lack of time, lack of resources, and lack of proper training. Other reported that better knowledge of universal precautions among health care workers was one of the predictors of better compliance [11-20].

Nurses at King Fahad Hospital-Al-Baha (KFH–Baha) are responsible for directing and coordinating nursing care in all departments in line with the nursing clinical application standards. This cover observing and reporting patient condition, providing nursing care, recording pulse and temperature, administering drugs and other medicines and providing support to patients and relatives.

In King Saudi Arabia (KSA), as in several other countries, each hospital has a multidisciplinary Infection Control Committee, which provides advice on the issues of control of infection, defines standards, and recommends policies. Several studies have evaluated disinfection and sterilization procedures in hospitals, knowledge and practices of hospital staff, and compliance with universal precautions, but similar data are few if not available in KSA. Information on this topic is necessary to assess whether nurses are prepared to assume their responsibilities in preventing hospital infections. Studies on standard precautions are increasing over the world [3,6,7,10], studies from Saudi Arabia that assessed nurse knowledge and compliance towards SPs are scarce. Hence this study was conducted, with the objective to determine with usage of Personal Protective Equipment (PPE) among nurses working at Al-Baha King Fahad Hospital, KSA.

Methodology

This was a cross sectional descriptive study aimed at determining the knowledge, practice and factors that influence compliance with usage of Personal Protective Equipment (PPE) among nurses working at Al-Baha King Fahad Hospital, KSA.

Study population

The study population were nurses working in medical, surgical, maternity and pediatric wards, who had worked for a minimum period of six months. The study targeted nurses since they are amongst the healthcare providers who are in majority and are involved in a number of nursing activities which render them at risk of acquiring and transmitting HAIs. These activities include, wound management, initiation of intravenous infusions, administration of injections, management of labour, waste disposal and instrument processing. The medical wards admit patients with various disease conditions some of which are infectious. Patients in surgical wards are at increased risk of acquiring hospital acquired infections because of the nature of surgical interventions they go through most of which are invasive. Midwives in maternity wards are at increased risk of acquiring hospital acquired infections because the nursing and midwifery activities involve blood and body secretions as well as

being invasive in nature. Some of these activities include, vaginal examination, handling of second and third stage of labour, suturing of episiotomies, and removal of retained placenta. Paediatric ward admits patients with both medical and surgical conditions.

Sampling procedure

Purposive sampling was used for selecting the wards and in each selected ward a list of names for the nurses was obtained from the team leader. Simple random sampling was then applied to obtain eligible participants. All the eligible participants were selected and those who consented to participate were recruited into the study.

Data collection

Data was collected using self-administered semi structured questionnaire that composed of information about demographic and occupational characteristics of the respondents like: (gender, age, education and years of experience), as well as their knowledge and practices regarding compliance with usage of Personal Protective Equipment (PPE). The questionnaire was developed grounded on the associated literatures and statistical experts in our college assess its validity and reliability. The subjects were asked to rate their believe, awareness and practices about PPE using rating as "Excellent", "Good" or "Ok". Knowledge questions using rating as "Disagree", "Ok", "Agree" and "Strongly agree". These questionnaires were checked for completeness and consistency upon collection.

Data analysis

Statistical Package on Social Science (SPSS) version 16 was used to analyze the data. Descriptive statistics were used to analyse characteristics of participants. Chi-square and correlation was used to establish significance and relationship between variables.

Presentation of Results

The results have been presented in form of frequency tables and bar graphs and a narrative explanation accompanying each form of presentation.

Findings

A total of 185 nurses consented and the response rate, adjusted for non-delivery of questionnaires, was 92.5%.

Table 1 represents demographic characteristics of the studied sample, among the respondents, 145 (78.4%) were female and 40 (21.6%) were male; most of the studied nurses were young in the age group of less than 40 years, had bachelor's degree and work as staff nurses for more than 3 years in percentages of (81.1%, 74.6% & 61.6%) respectively.

Personal protective equipment (PPE)

The primary use of personal protective equipment (PPE) is to protect healthcare workers (HCWs) and reduce opportunities for transmission of microorganisms in healthcare facilities. It does not reduce the level of hazard itself nor guarantee total protection. They should be used as the supplement to the administration and

engineering control in the care of the infective patients.

The overall awareness amongst the entire questionnaire respondents was 172 (93%) as shown in **Table 2** below.

Regarding the correlation of PPE with the demographic characteristics of respondent nurses as shown in **Table 3** there is strong evidence of positive relationship [p – value of (0.024, 0.043, 0.001, 0.030)] between awareness of the respondents with PPE as an effective barrier for infection control and their gender, age, education and work experience respectively.

Hand mediated transmission

Hands are the most common vehicle of transmission of organisms. And 91.6 per cent of the nurse staff agreed that hand mediated transmission is one of the major sources of cross infection. As shown in **Figure 1** the majority (85.4%) of the studied sample were agreed that hands mediated transmission (spread) of infection is a main contributory factor to the infection risks for hospital in-patients.

Table 4 shows that there was an evidence of significant difference between hand mediated transmission of infection and

Table 1 Demographic characteristics.

Character	Components	Frequency	Percent
Gender	Male	40	21.6
	Female	145	78.4
Age	20 - 30 year	66	35.7
	31-40 years	84	45.4
	Over 40 years	35	18.9
Education	Diploma or less	47	25.4
	Bachelor and post	138	74.6
Work experience	Less than 3 years	71	38.4
	More than 3 years	114	61.6

Table 2 Overall awareness to PPE.

	Frequency	Percent
Excellent	141	76.2
Good	31	16.8
Ok	13	7.0
Total	185	100.0

Table 3 Statistical Relation between the respondent Awareness of using PPE and their Demographic Characteristics.

Character	PPE			P value	
	Excellent 141 (76.2%)	Good 31(16.8%)	Ok 13 (7%)		
Gender	Male	24 (17.0 %)	11 (35.5%)	5 (38.5%)	0.024
	Female	117 (83.0%)	20 (64.5%)	8 (61.5%)	
Age	20 - 30 year	55(39.0%)	6 (19.4%)	5 (38.5%)	0.043
	31-40 years	57 (40.4%)	22 (71.0%)	5 (38.5%)	
	Over 40 years	29 (20.6%)	3 (9.7%)	3 (23.1%)	
Education	Diploma or less	28 (19.9%)	15 (48.4%)	4 (30.8.0%)	0.001
	Bachelor and post	113 (80.1%)	16 (51.6%)	9 (69.2%)	
Work experience	Less than 3 year	51 (36.2%)	14 (45.2%)	6 (46.2%)	0.030
	More than 3 years	90 (63.8%)	17 (54.8%)	7 (53.8%)	

demographic characters of respondent nurse groups regarding age, sex, education and work experience years being more in females, ages less than 40 years, bachelor and post-graduation and more than 3 years experiences, (P value <0.005).

Wearing gloves

Routine use of disposable gloves has been recommended for all patient contacts. Gloves ideally should be removed after seeing a patient and the hands washed thoroughly before re-gloving to see a new patient. Out of the total staff, 86 per cent claimed to wear fresh gloves before patient examination and procedures but only 57 per cent of the staff actually did it during observations (**Figure 2**). Out of 185 nurses staff 126 (68.1%) claimed that they always wore gloves before patient examination (**Table 5**).

Discussion

To our knowledge, this is the first research study contracted in Al-Baha king Fahad hospital among any group of health care workers, investigating the issue of compliance with Standard Precautions to avoid occupational exposure to pathogens. Present study was carried out to assess the knowledge, practice and attitude of nursing staff related to infection control measures [21-24].

Infection control is a key factor of practice for all healthcare professionals, not only for their health but also to reduce nosocomial infections and thus improve the patient safety [25]. Standard precautions are a set of basic infection prevention

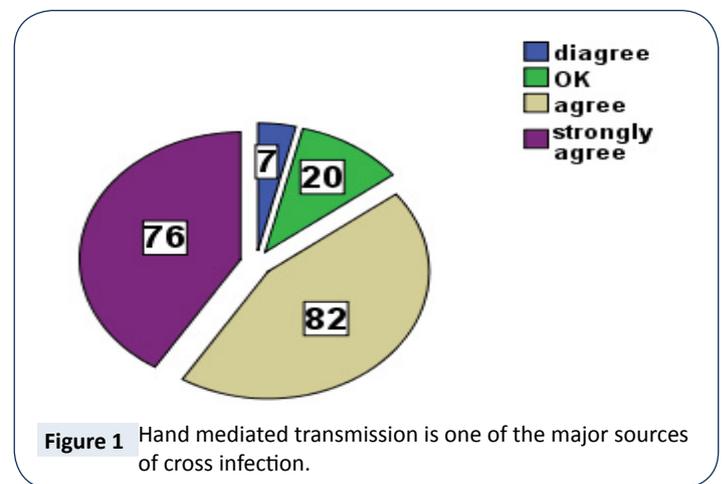


Table 4 Statistical Relation between the respondent Knowledge of Hand Mediated Transmission and their Demographic Characteristics.

Character		Disagree 27 (14.6%)	Agree 158 (85.4%)	P value
Gender	Male	15 (55.6 %)	25 (15.8%)	0.000
	Female	12 (44.4%)	133 (84.2%)	
Age	20 - 30 year	3(11.1%)	63 (39.9%)	0.001
	31-40 years	15 (55.6%)	69 (43.7%)	
	Over 40 years	9 (33.3%)	26 (16.3%)	
Education	Diploma or less	11 (40.7%)	36 (22.8%)	0.000
	Bachelor and post	16 (59.3%)	122 (77.4%)	
Work experience	Less than 3 year	9 (33.3%)	62 (39.2%)	0.000
	More than 3 years	18(66.7%)	96 (60.8%)	

Table 5 Association of demographic characteristics and wearing gloves.

Character		Sometimes 28 (15.1%)	Frequently 31 (16.8%)	Always 126 (68.1%)	P value
Gender	Male	13 (46.4%)	9 (29%)	18 (14.3%)	0.001
	Female	15 (53.6%)	22 (71%)	108 (85.7%)	
Age	20 - 30 year	6(21.4%)	11 (35.5%)	49(38.5%)	0.190
	31-40 years	17 (60.7%)	11 (35.5%)	56 (38.5%)	
	Over 40 years	5 (17.9%)	9 (29.0%)	21 (23.1%)	
Education	Diploma or less	4 (14.3%)	1 (3.2%)	42 (33.3%)	0.013
	Bachelor and post	24 (85.7%)	30 (96.8%)	84 (66.7%)	
Work experience	Less than 3 year	8 (28.6%)	9 (29.0%)	54 (42.9%)	0.030
	More than 3 years	20 (71.4%)	22 (71.0%)	72 (57.1%)	

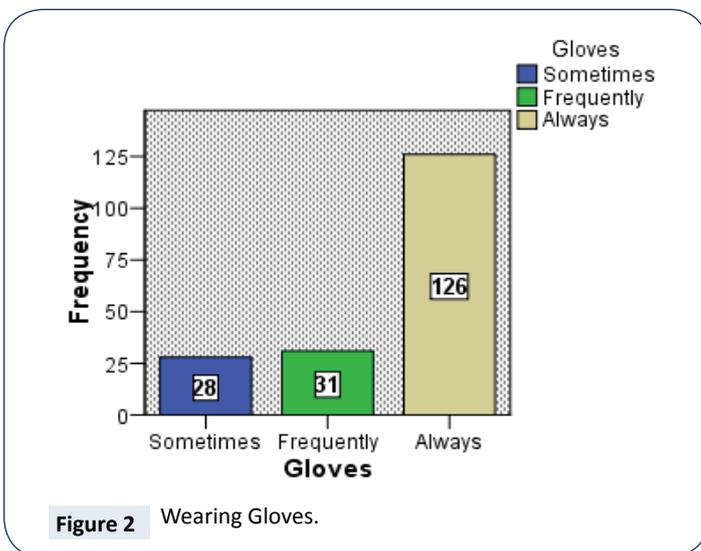


Figure 2 Wearing Gloves.

practices intended to prevent transmission of infectious diseases from one person to another. Because it is not always known if a person has an infectious disease or not, standard precautions should be applied to every person every time to ensure that transmission of diseases do not occur [3].

By means of their knowledge and practice to protect themselves and patients from exposure to potentially infection, nurses show an important part in infection management [26,27]. Our study discovered that, among 185 nurses consented and participated in this study, 21.6% were males and 78.4% were females. Nursing is a female dominated profession hence most of the participants

were females. Female nurses had a higher perception of being at risk by virtue of working in a hospital than their male counterparts and this difference was statistically significant $p=0.002$. In our study most of the studied nurses were young in the age group of less than 40 years, had bachelor's degree and work as staff nurses for more than 3 years in percentages of (81.1%, 74.6% & 61.6%) respectively, in comparison with some other studies in the area in which three quadrants of the studied nurses had diploma degree and nearly half of them attended training programs in infection control. Moreover, their years of experience was more than 15 years at workplace [28]. These results come in agreement with similar studies that revealed dominance of females, majority of nurses in their study had bachelor's degree and most of nurses attended infection control programs [29-31].

Regarding PPE, the mandatory use of PPE defined by health authorities in Saudi, our study showed the overall awareness amongst study respondents was 93%, this was not in accordance with may studies in Egypt [32,33]. Routine use of disposable gloves has been recommended for all patient contacts. Gloves require hand hygiene before wearing and be removed after seeing a patient and the hands washed thoroughly before re-gloving to see a new patient. In our study nurses showed satisfactory knowledge 86% on this regard, this finding was in concordance with a study reported that compliance with hand hygiene performance is high [34] but was not in concordance with three studies who reported that compliance with hand hygiene performance is low [35-38].

Conclusion

Our study concluded that nurses had excellent knowledge with and appropriate use of PPE as vital in safeguarding the HCWs and spread of infection. However, practice was unsatisfactory about infection control standard precautions.

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Recommendation

Continuous monitoring of nurses' practice parallel with providing adequate resources, decrease of work load by increasing the number of nursing staff and emphasizing training courses is crucial issues that improve the compliance with infection control standard precautions.

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