

# Evaluation of Nurses' Performance Regarding Personal Protective Equipment at Rania Teaching Hospital

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**Volume 4 – Special Issue:  
3rd International  
Conference on Health &  
Medical Sciences: Insight  
into Advanced Medical  
Research (ICHMS 2019)**

**DOI:**  
10.24017/science.2019.  
ICHMS.20

**Received:**  
14 June 2019

**Accepted:**  
5 July 2019

## **Abstract**

*Personal protective equipment (PPE) refers to protective clothing that acts as a barrier between infectious materials such as viral, bacterial contaminants and the skin, mouth, nose, eyes and mucous membranes. It includes gloves, mask, eye goggles and gown. It is a shortage of study of the university students. The aim of the current study was perform to provide demographic data and to evaluate nurse's performance regarding PPE at Rania teaching Hospital in Kurdistan region of Iraq, during the period of 10<sup>th</sup> October up to 7<sup>th</sup> of March. A non- probability purposive sample of (72 nurse), data collection of the study instrument was constructed of total (42) items. A professional team that contain of (11) experts were performed validity of the instrument. Reliability of the instrument was determined through the use of Equivalence (inter-rator or inter observer), the data were collected through the use of evaluation technique then organized and coded into computer files. Statistical approaches were uses for data analyzed, also data analysis by (SPSS version 25). The result have revealed that highest age of the sample were between 30-39 years and most of them were institute nurses and more than half of nurses had less than 10 years of employment but most of them not trained yet . The majority of nurses were performed many nursing*

*procedures such as wound dressing, suturing, suctioning, naso-gastric tube and Foley catheter insertion without using PPE properly and without washing hands before procedures. Also there were no significant relationship between personal protective equipment and some socio-demographic data. The researchers recommended training course regarding personal protective equipment by ministry of health/infection control department and participants of symposia.*

**Keywords:** Nurses, Evaluation, personal protective equipment, Rania Teaching Hospital.

## 1. INTRODUCTION

Personal protective equipment (PPE) is a vital tool in health care setting. So these tools are barrier between the nurses and disease that may be present during nursing care for the clients. A specialized clothes that worn by nurses staff for defense against infectious materials is a PPE that defined by Occupational Safety and Health Act(OSHA)[1].

It is taken into account as a physical barrier between organism and health care employee. Preventing of contaminating hands, eyes, clothing, hair and shoes with microorganisms result in shield the human's health[2].

Gloves, mask, eye goggles, gown, head cover, boots/shoe cover are the components of PPE such as gloves, mask, eye goggles, gown, head cover, boots/shoe cover. Every health care worker should be use PPE during their procedures when they contact with blood, body fluids to protect them and the clients[3].

## 2. RELATED WORK

American Centers for Disease Control and Prevention (CDC) and also the World Health Organization (WHO) in their guidelines supported that hand hygiene is the most vital purpose for all the nursing procedures as a result of several infective agent that transmit from the hands than other different components of the body; at the moment full coverage of attention worker's body particularly secretion membranes as contact with infected bodily fluids is incredibly important to forestall further risks on their health, therefore acceptable and hygiene and PPE along keep health care employee and to forestall transmission to patients. The guidelines of WHO,2014 explained that the most common important ways to protect nurses staff from infections disease is wearing PPE because it can protect the mucosa, mouth, nose and eyes from many infections which can spread by infect blood, emesis, seed and body secretion[4].Using PPE has a major task for facilities, despite of the setting or places, to wear PPE influentially and high advantage of infection bar arrange embrace follow nationwide recognized pointers and standards for interference of transmission of organisms from health care employee to patient, patient to health care worker and patient to patient because of these vital tools the PPE has developed as health care worker requirements also inflated and become tougher over the centuries[5].

Hands are the most parts that carry microorganisms than other parts of the body because hand hygiene and gloves are very important to prevent transmission of disease. The mucosa of mouth, nose and eyes must be kept from patient's droplets and fluids by face mask. Gown is protecting lower part and foot of the body, and head cover prevent transmission through non-intact skin and insensible contamination of mucosa from soiled skin[6].

The easiest and very essential technique to stop or prevent contact from body fluid and move of microorganisms are wearing PPE appropriately, because nosocomial infections transmitted by direct-contact with patient's secretion and excretion also easily can be prevented by adapting guidelines and standard precautions of infection control, so it is important to assess the level of compliance with use of PPE by the health care workers who make direct contact with patients[7].

After cleaning/disinfecting of the hands, wearing gloves is one of a significant standard in infection prevention during checking blood sugar, because the hands of nurses staff have play a vital role in transmission of pathogenic microorganisms in hospital settings [8].Sterile techniques is considered as the most element for management of the wound especially during the dressings wound to prevent contamination of the wound [9].Also aseptic technique is a gold standard for the management of surgical wounds and it helps to avoid infection and facilitate healing process [10]. Nosocomial infection can reduced by most favorable nursing management of wounds by nurses staff [11], Because of this, Center for Disease Control and prevention recommends application of aseptic technique for dressings within the first and second day after operation and then clean dressing changes after 2-3 days and this follow up lead to reduce the cost of antibiotics especially in a developing country like ours [10].The nurse must use mask and non-sterile gloves during suctioning procedure especially if caused splashing with body fluids [12].Aseptic technique must be Strict by the nurses staff and used for preparation and administration of inject able of drugs[13].One of the purpose of inserting of a catheter through the urethra into the bladder is to remove urine or elimination of urine is called urinary foley catheter or indwelling catheter procedure, it must be performed under full sterile technique and must be only disposable sterile equipment used to help or ensure that pathogenic microorganisms are not passed into the bladder, using eye goggles, mask with face shield and gown are used optionally according to the situation of the procedure and patient's condition[14].Disposable gloves should only be worn if the nurse performing a procedure that involves a risk of contact with body fluids, broken skin, dirty instruments. PPE is used to protect nurses from patient's (blood, saliva, sputum, vomit, urine and feces) The nurses are attentive of the rationale for hand hygiene procedures. And they symbolize a large working set that performs the most amount of direct patient care in Health setting. Hand hygiene is one of the most effective measures to prevent nosocomial infections [15].

The objective of this study is to evaluate nurses' performance regarding personal protective equipment at Rania teaching Hospital in Rania city.

This purpose will attend these objectives:

- 1- To describe socio-demographic data of the study.
- 2 - To detect the relationship between some socio-demographic data of the study sample and performance of nurses concerning PPE.

### **3. METHODS AND MATERIALS**

A cross sectional study was done within the period of 10<sup>th</sup> October 2018 to 7<sup>th</sup> March 2019 at Rania teaching Hospital in Rania city. All nurses' that performed the nursing procedures for the patients closely were participated in medical, surgical and emergency department. And then the informed consent has gotten, so the data collected by pretested designed questionnaire. The data analyzed by SPSS version 25.

### **4. RESULTS**

The nurses' staff who performed nursing care for the patients included in the current study was 72 nurses. Among there were 6 (8.3%) secondary school nursing, 46 (63.9%) institute nurses and 20 (27.8%) graduated from collage of nursing out of all of nurses who worked

inside the medical , surgical and emergency department, appropriate using PPE by the nurses' staff were nearly (0%).

**Table1.**Socio- demographic Descriptive:

Variables	Categories	No.	(%)
Age	20-29	19	26.4
	30-39	44	61.1
	≥ 40	9	12.5
Gender	Male	29	40.3
	Female	43	59.7
Level of Education	Secondary School Nurse	6	8.3
	Institute Nurse	46	63.9
	Academic Nurse	20	27.8
Number of training course	No Trained	68	94.4
	Trained	4	5.6
Years of Employment	>10	39	54.2
	10 - 19	27	37.5
	≤ 20	6	8.3

**Table (1)** described that highest level of age group was female institute nurse between 30-39 years and the most years of employment of them were between 10-19 years but most of them not trained regarding the PPE.

**Table (2):** Using mask during the procedures:

NO.	Using mask during these procedures	F	Always	Some times	Never
1.	Dressing	63	0 (0%)	22(35%)	41(65%)
2.	Suturing	33	0 (0%)	5(1%)	28(9%)
3.	Naso gastric tube	29	0 (0%)	3(10%)	26(90%)
4.	Foley catheter	20	0 (0%)	2(10%)	18(90%)
5.	Suctioning procedure	14	0 (0%)	6(43%)	8(57%)

**Table (2)** Showed that the nurses' staff did not wear the mask every time with the procedures and only a few of them used it sometimes.

**Table (3)** Using gloves during the procedures

NO.	Using gloves with these procedures	F	Always	Some times	Never
1.	Preparing equipment for cannulation	60	3(5%)	17(28.3%)	40 (66.7%)
2.	IV cannulation	61	6(9.8%)	20(32.8%)	35(57.4%)
3.	Removing previous gauzes before dressing the wound	60	60(100%)	0 (0%)	0 (0%)
4.	Sterile gloves for dressing wound.	63	0 (0%)	0 (0%)	63(100%)
5.	Sterile gloves for suturing	33	0 (0%)	0 (0%)	33(100%)
6.	NG tube	29	29(100%)	0 (0%)	0 (0%)
7.	Checking blood sugar.	71	7(9.8%)	39(55%)	25(35.2%)
8.	Measuring body temperature.	71	4(5.6%)	6(8.4%)	61(86%)
9.	O2supplement.	63	1(1.5%)	23(36.5%)	39(62%)
10.	Suctioning.	14	14(100%)	0 (0%)	0 (0%)
11.	ID injection	48	1(2%)	6(13%)	41(85%)
12.	IM injection.	47	0 (0%)	21(44.7%)	26(55.3%)
13.	SC. injection	62	0 (0%)	2 (3%)	60 (97%)
14.	IV. injection	58	11(19%)	18(31%)	29 (50%)
15.	Insertion of foley catheter	20	0 (0%)	0 (0%)	20 (100%)

**Table (3)** demonstrated that all nurses' were wore gloves only in dressing and removing previous gauzes before dressing, but the few number wore it for checking blood sugar as usual.

**Table (4):** Wearing gown during the procedures:

NO.	Using gown during these procedures	F	Always	Some times	Never
1.	Dressing	63	0 (0%)	0 (0%)	63(100%)
2.	Suturing	33	0 (0%)	0 (0%)	33(100%)
3.	Foley catheter	20	0 (0%)	0 (0%)	20(100%)
4.	Suctioning	5	0 (0%)	0 (0%)	5(100%)

**Table (4)** described that there are nobody wore gown for dressing, suturing,foley catheter and suctioning procedures (0%).

**Table (5):** Wearing eye goggles during the procedure:

NO.	Wearing eye goggles	F	Always	Some times	Never
1.	Suturing procedure	33	0 (0%)	0 (0%)	33(100%)

**Table (5)** indicated that there are nobody wore eye goggles for suturing, procedures (0%)

**Table (6):** Performing hand washing **before** thenursing procedures:

NO.	The nurses washed their hands by alcohol or soap before the procedure	F	Always	Some times	Never
1.	Preparing equipment for cannulation procedure.	59	0 (0%)	0 (0%)	59(100%)
2.	Intravenous cannulation	60	0 (0%)	0 (0%)	60(100%)
3.	Dressing procedure	63	0 (0%)	0 (0%)	63(100%)
4.	Suturing procedure	33	0 (0%)	0 (0%)	33(100%)
5.	insertion of naso-gastric tube	29	0 (0%)	0 (0%)	29(100%)
6.	Checking blood sugar	71	0 (0%)	0 (0%)	71(100%)
7.	Measuring body temperature	71	0 (0%)	0 (0%)	71(100%)
8.	O2 supplement	63	0 (0%)	0 (0%)	63(100%)
9.	Suctioning procedure	14	0 (0%)	0 (0%)	14(100%)
10.	Intra dermal injection	48	0 (0%)	0 (0%)	48(100%)
11.	Intra muscular injection	47	0 (0%)	0 (0%)	47(100%)
12.	subcutaneous injection	62	0 (0%)	0 (0%)	62(100%)
13.	Intra venous injection	58	0 (0%)	0 (0%)	58(100%)
14.	before foley catheter insertion	20	0 (0%)	0 (0%)	20(100%)

**Table (6)** showed that there are no any nurses' washed hands before any procedures every time

**Table (7):** Performing hand washing **after** the nursing procedure:

	F	Always	Some times	Never
The nurse washed his/her hands by alcohol or soap after each procedure	72	61 (84.7%)	10 (13.90%)	1 (1.4%)

**Table (7)** demonstrated that there are only one nurse did not washed hands after procedures but the majority of them washed their hands after every procedure.

**Table (8):** Relationship between some socio-demographic data and performance of personal protective equipment:

Variables	F	mean	SD	p-value
<b>Age</b>				
20-29	19	.3939	.10728	0.000
30-39	44	.2964	.11196	
More than and equal to 40	9	.2201	.08157	
<b>Gender</b>				
Male	29	.2998	.11454	0.459
Female	43	.3212	.12329	
<b>Years of employment</b>				
> 10	39	.3515	.11752	0.001
10 – 19	27	.2874	.10480	
More than or equal to 20	6	.1730	.04536	
<b>Level of education</b>				
Secondary School Nursing	6	.2033	.08772	0.000
Institute graduation	46	.2765	.09612	
College of Nursing graduation	20	.4284	.09170	
<b>Number of training course</b>				
No trained	68	.3097	.11959	0.406
Trained	4	.3612	.12301	

**Table (8)** showed that there were no significant relationship between personal protective equipment and gender, number of training course at p value more than 0.05.

## 5. DISCUSSION

Quantitative design, a descriptive study was performed on nurse's staff at the Rania teaching hospital in Rania city to evaluate nurses' performance regarding personal protective equipment. The socio-demographic data demonstrated that the female nurses were more than half percent in the study sample, nearly quarter of the participants were graduated from institute, and they had less than ten years of employment, but unfortunately the majority of the participants were not trained yet, which is measured as a big tragedy to prevent nosocomial infection inside the hospitals. The results of this study showed that the nurse's staff had a poor performance of using PPE, this outcome is nearly agree with the study done by Hakim et al, 2016 in Egypt, a quarter percent among health care workers had a poor performance of

using PPE[16], and Emmanuel et al, 2016 less than five percent used PPE properly [17].Regarding using mask the outcome of the present study demonstrated that, there are no any nurse wore the mask usually but 35% used it some time for dressing, 1% for suturing, 10% for each of Foley catheter and naso gastric tube insertion also 43% for suctioning procedure. But unfortunately about wearing eye goggle and gown there are nobody used them at all, this outcome is slightly agree with the study of Punia, et al, 2014 in India[17] and Jeong et al.,2008 which they had a poor performance of wearing PPE less than five percent [18].

Concerning wearing gloves the current study demonstrated that all nurses' were wore gloves only in a procedure of wound dressing and removing previous gauzes on wounds before dressing, but the few number wore it for checking blood sugar as usual however using gloves is very important point during checking blood sugar to prevent transmit of blood born pathogen between patients and nurses staff. This outcome is disagree with study of Asare, et al., 2009 that showed the majority of them were wore gloves and changed it between procedures[19]. Table (6) showed hand washing or disinfectant of nurses' before starting the procedures, but there were no any nurses' performed it before the procedures ; however the CDC and However OSHA suggested that some nursing procedures are not required for wearing gloves such as practices of immunization from intramuscular or intra dermal except the nurse who administering the drug has lesions on their hands or are likely to come into contact with a patient's body fluids, but every health organizations are agree with hand hygiene before and after every nursing procedures to prevent contamination[20]. The most single significant point to prevent spread of infection in health setting is hand hygiene pre and post contact with every patient in nursing procedures when hands become dirty or contaminated with infected materials or clearly dusty, after contact the blood or body fluids with non intact skin must be washed by antibacterial soap and running water instead of use alcohol-based hand products and then dry it by paper towels before wearing gloves [21].The researchers in the present study return the reason for inappropriate use of PPE for non availability of some materials of PPE, busy schedule, patients might get upset by use of PPE by nurses however there are several study detected barriers that interfere in matters of PPE such as work overload, physical structure, accessibility of PPE, and determined by the context practiced in the biological point[22]. But the outcome of the present study showed that there was no any nurse washed their hands before each nursing procedure, but they believe inappropriate hand hygiene before and after procedures results of lack of information regarding infection control issues. Eventually the researchers believe that the nurses have no the subspecialty in nursing care especially infection control issue in the country of Iraq and Kurdistan region, also the continuation of limitations on the way of staff of nurses for studying and achieving a high degree concerning their specialty is considered as a main dilemma for them. Because of that the researchers recommend these points:

- 1- Design the training course for the staff of nurses regarding Infection control department by the ministry of health
- 2- Extra opportunities to attend symposia for nurses concerning infection control issues is very important and evaluating them by a special team of infection control after training.

## 6. CONCLUSION

The results of the present study demonstrate that the staff of nurses were used PPE inappropriately; however appropriate use of PPE is considered as a vital tool for protecting both of health care workers and patients and to prevent spread of infection in community. Also the current study indicated that hand washing and disinfection before starting procedures is really very poor. Steps infection control issues should be taken to ensure adequate

accessibility and continuous following of infection control guidelines should be designed to improve nursing procedures.

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