

KNOWLEDGE AND USE OF PERSONAL  
PROTECTIVE EQUIPMENT AMONG NURSES  
IN TEACHING HOSPITAL WARDS, ENUGU,  
NIGERIA

BY

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At Sigma International Nursing Research Congress, Calgary, Canada

25<sup>th</sup> - 29<sup>th</sup> July 2019

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# Introduction and background

- Microorganisms that predispose to infection abound in health care institutions, and when allowed to remain may cause problems for the patients, health care workers and the health institutions.
- Body fluids are particularly major vehicles for transmitting infections, and are hazardous to health care workers, hence the high need for a preventive approach in the protection of health workers. Health care workers are at risk of blood borne pathogens as they perform their clinical activities in the hospital (Beltrami, Williams, Shapiro & Chamberland 2007).
- Health care workers' contact with the body fluid of patients exposes them to blood-borne infections through pathogens such as Human immunodeficiency virus (HIV), Hepatitis B and C viruses.

# Introduction and Background

- Personal protective equipment (PPE) are designed to protect health care providers from serious workplace injuries or illnesses. Personal protective equipment provide a physical barrier between microorganism and wearer.
- Personal protective equipment (PPE) include gloves, protective eye wear (goggles), mask, apron, gown, boots/shoe cover, hair cover. Appropriate use of PPE is the easiest way to prevent contact from secretions and transfer of pathogens. Nurses in surgical wards stand a greater risk of exposure to pathogens (Gershon and Dejoy 2008) .
- Nurses therefore need to have knowledge of personal protective equipment and be able to maximize their use in order to protect themselves and others.

# Introduction and Background

- The importance of appropriate personal protective equipment (PPE) as a component of healthcare worker (HCW) protection was highlighted during the Ebola virus disease (EVD) outbreak in West Africa, where according to Fang et al (2016), the large number of HCW deaths that occurred could partly be attributed to lack of resources and/or prior training in PPE usage.
- Gloves protect hands from infectious materials and protect patients from microorganisms on staff members hands (Tenorio, 2010).
- Masks protect the nose and mouth from organisms that are infectious, and prevent accidental splashes of blood or other contaminated body fluids from entering the health worker's nose or mouth.

# Types of Personal Protective equipment

- Goggles and eye wears protect staff in the event of an accidental splash of blood or other body fluids by covering the eyes. Masks and eye wear should be worn when performing any task where accidental splash into the face is likely.
- Respirators, which are specialized types of masks called particulate respirators are recommended for situations in which filtering inhaled air is deemed important. Respirators are considerably more difficult to breathe through and are more expensive than surgical masks (Chen and Welleke, 2009).
- Caps are used to keep the hair and scalp covered so that flakes of skin and hair are not shed into the wound during surgery. They protect the wearer from blood or body fluid splashes and sprays.
- Gowns are protective clothing worn by health care workers to protect their uniform and body from microorganism.

# Purpose of study

**Purpose of study:** The study set out to;

- ascertain the knowledge of personal protective equipment by nurses in two very busy units, surgical and labour wards of the hospital.
- determine the various personal protective equipment used by nurses in surgical and labour wards of the hospital
- ascertain adequate use of personal protective equipment by nurses in surgical and labour wards of the hospital
- determine the factors that affect the use of personal protective equipment by nurses in surgical and labour wards of the hospital.

# Method

- A descriptive design was used to study all eighty six (86) nurses working in the teaching hospital surgical and labour wards.
- Data was collected using a questionnaire and an observation check list developed by the researchers. The questionnaire consisted of twelve (12) closed ended questions arranged into sections A, B and C. Section A had items that generated demographic information. Section B had items that enabled the researchers to obtain data related to knowledge and use of PPE by nurses. Section C elicited information on the factors that affect the nurses' use of PPE. The observation checklist was made up of thirteen (13) items that checked how the nurses used PP equipment to achieve efficiency. The instruments had content and face validity and Cronbach's Alpha reliability index of 0.89. Ethical clearance was obtained from the Ethics Committee of the hospital, and verbal consent of each nurse obtained before data collection.
- Data analysis, using descriptive statistics with SPSS, version 16 was performed based on the 79 questionnaires returned (92% return).

# Results

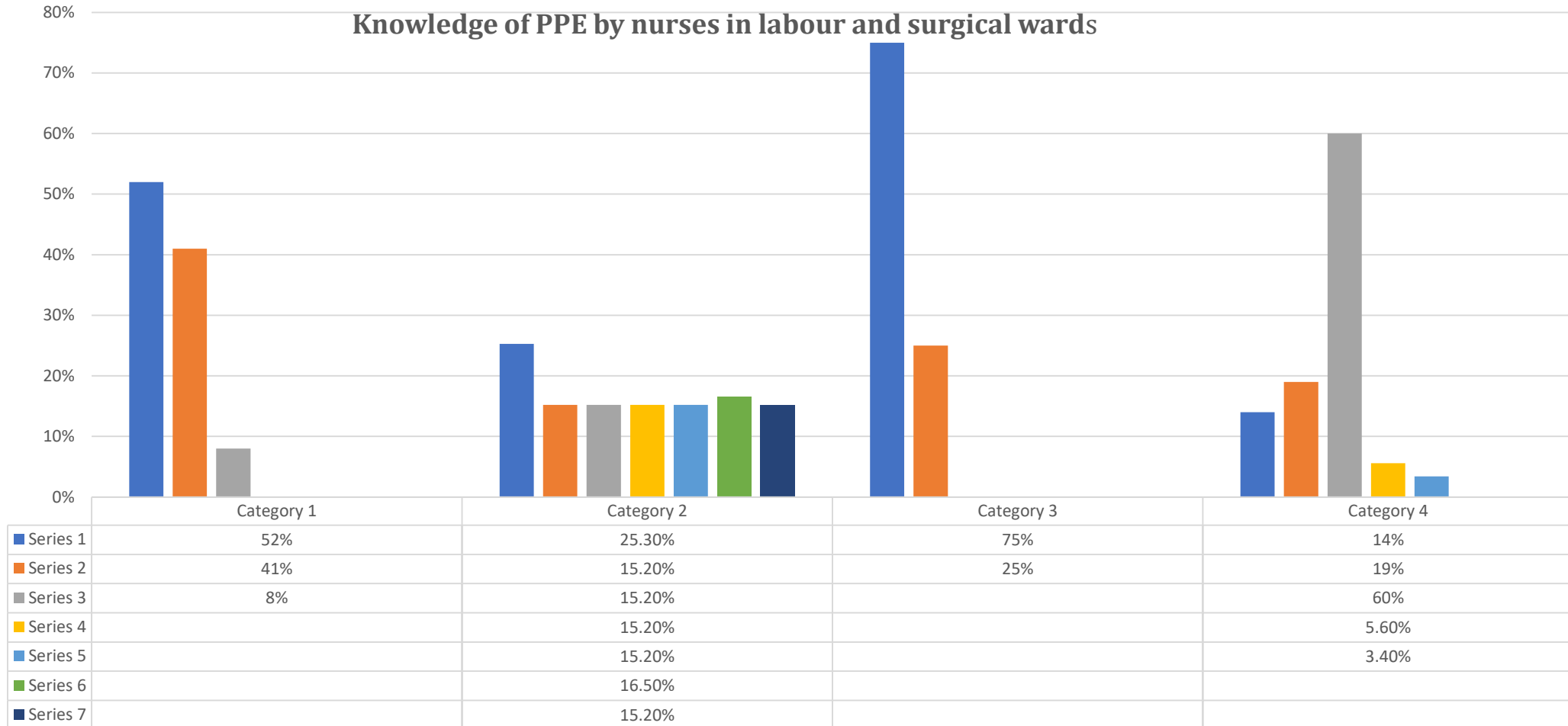
## **Demographic profile of nurses (N = 79)**

- Age range: 20 – 50
- Gender: Male – 14 (18%); Female – 65(82%)
- Marital status: Married –52 (65.8%); Single–23(29%);widowed–(4)5%
- Educational qualification: Registered nurse –(63) 80%; Degree in Nursing – (16) 20%
- Cadre: Nursing Officer – (13)17%; Nursing Sister – (19)24%; Senior Nursing Officer –(20)25%
- Principal Nursing Officer –(14)17%; Assistant Chief Nursing Officer – (8)10%, Chief Nursing Officer – (5)6%



# Results

Knowledge of PPE by nurses in labour and surgical wards



# Results

- Key: Category 1: Knowledge about PPE and use Category 2: Knowledge sources Category 3: Training on PPE in past 3 years. Category 4: Additional knowledge received.
- Of the 79 nurses, 41 (60%) knew about PPE and the uses. Thirty two (42%) knew that PPE are used to protect against splashes from blood and body fluids, while six (8%) knew that PPE protects nurses from contact with infected body surfaces.
- Data revealed that information for the nurses were from lectures for 20 (25.3%), from friends 12 (15.2%), from media, 12 (15.2%), from colleagues 12 (15.2%), 13 (16.5%) from workshops and 10 (12.7%) from seminars.

# Results

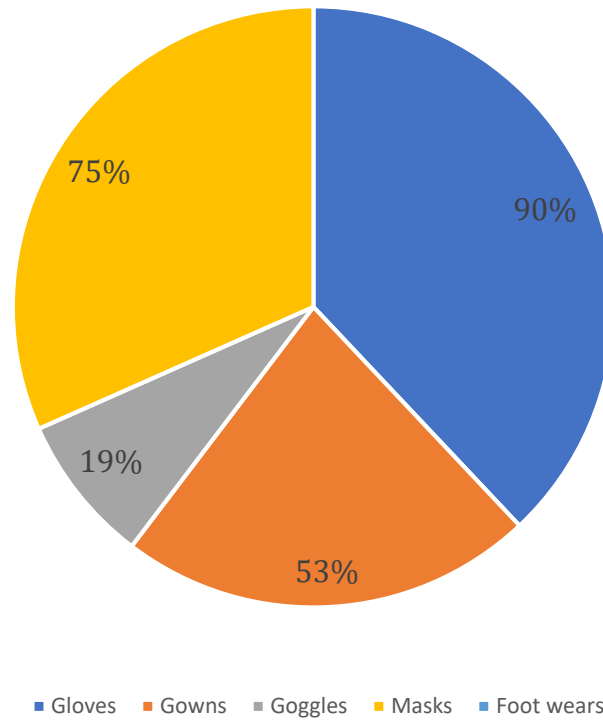
- In the last three years preceding the study, 59 (75%) of the nurses received training while 20 (25%) did not. Of the 59, 26 only (44%) received additional knowledge about handwashing, infection control, safety precautions and benefits of PPE.

## Personal Protective Equipment used by the nurses

The PPE used are as displayed in the pie diagram: Gloves (90%); Gowns (53%); Masks (75%); Goggles (19%) and foot wears (29%).

# Results

## PPE used by nurses



# Results

Table 1: Adequacy of PPE use by nurses in surgical and labour wards

S/No	Observed use of PPE	Yes		No	
		Freq.	%	Freq.	%
14	Washed hands before putting on gloves	31	39.2	48	60.8
15	Washed hands after removing gloves	41	51.9	38	48.1
16	Remove rings before washing hands	37	46.8	42	53.2
17	Follows standard guideline to remove used gloves	60	75.9	19	24.1
18	Uses gloves as a single use for a procedure	51	64.6	28	35.4
19	Changes gloves in between procedures when soiled.	43	54.4	36	45.5
20	Uses gloves for more than one patient when in hurry.	37	46.8	42	53.2
21	Washes hands before wearing masks.	16	20.3	63	79.7
22	Uses face mask for more than one patient	43	54.4	36	45.6
23	Follows standard guidelines for removing mask.	37	46.8	42	53.2
24	Wears goggles for procedures that demand it.	35	44.3	44	55.7
25	Wears PPE only when necessary	36	45.6	43	54.4
26	Puts gloves in uniform	18	22.8	61	77.2

# Results

Table 1: Adequacy of PPE use by nurses in surgical and labour wards

- From Table 1, 31 nurses (39.2%) washed their hands before putting on gloves while 48 (61%) did not; Forty one nurses (52%) washed hands before removing gloves, while 48% did not. Thirty seven (47%) of the nurses removed rings before putting on gloves while 42 (53.2%) did not.
- Sixty of the nurses (76%) followed standard guidelines for removing gloves while, 19 (24.1%) did not. Fifty one nurses (65%) used gloves as single use for procedures while 28 (35.4%) did not; Forty three nurses changed gloves when soiled in between procedures while 36 (45.6%) did not. Thirty seven nurses (46.8%) used same gloves for more than one patient while 42 (54.4%) used new gloves for each patient attended.

## Table 1: Adequacy of PPE use by nurses in surgical and labour wards

- In nurses' use of masks, 16 nurses (20.3%) washed their hands before wearing masks while 63 (79.7%) did not; forty three nurses (54.4%) used the same face masks for more the one patient. Thirty seven nurses (46.8%) followed standard guidelines for removing masks while 42 (45.6%) did not. Thirty five of the nurses (44.3%) used goggles for procedures that demanded it while 44 (55.7%) did not. Thirty six nurses (45.6%) wore PPE only when necessary while 43 (54.4%) did not. Eighteen (22.8%) of the nurses put gloves in their uniform while 61 (77.2%) did not.

# Table 2: Factors that influence use of PPE by nurses on surgical and labour wards

## A. Easy factors

S/N	Factors that make it easy	Frequency	Percentage
12 a	Training on personal protective equipment.	63	79.7
b	Hospital policy emphasizing use of PPE.	14	17.7
c	Availability of equipment.	57	72.2
d	Knowledge of the implication of not using PPE on oneself.	55	69.6
e	Knowledge of the implication of not using PPE on patient's health.	18	22.8

## B. Difficult factors

S/No	Factors that make it difficult	Frequency	Percentage
13 a	Lack of training on the use of PPE.	70	88.6
b	No Hospital Policy emphasizing the use of PPE.	14	17.7
c	Non Availability of equipment.	71	89.9
d	Non accessibility of the equipment even when available.	70	88.6
e	Discomfort associated with the use of PPE.	40	50.6
f	Poor communication associated with wearing the materials.	15	19.0
g	Excessive workload on Nurses that gives one no time to put them on.	8	10.1
h	Sensitivity to the materials used in producing the personal protective equipment.		
i	Lack of knowledge on implication of not using PPE	4	5.1
j	Lack of knowledge on its implication on patient's health.	68	86.1
		68	86.1



# Discussion

- In the present study nurses' knowledge of personal protective equipment and their use was quite high (91.9%) similar to the findings of Vaz et al (2010) whose study showed that 90% of nurses were knowledgeable about universal precautions (PPE). The knowledge did not translate to appropriate use of PPE however.
- Training of nurses is of importance for adherence to use of PPE and the findings of this study revealed that more than half of the nurses (74.4%) received training on PPE in the 3 years preceding the study. Lakshmi et al (2018) recommended frequent training of health workers on appropriate use of PPE based on findings of their study.
- In this study, 48% and 36% of nurses respectively did not wash hands before putting on gloves and did not change gloves in between procedures even when soiled. Thirty six percent (36%) used a facemask for more than one patient, while 19% did not follow standard guidelines for removal of gloves.

# Discussion

- The major factor that facilitated easy use of PPE was training while non availability (89.8%) and lack of training (88.6%) were revealed as inhibitors to PPE use. These findings are similar to those of other studies on noncompliance to use of PPE (Aguwa et al, 2016, Ganczak and Szych, 2007).
- Non availability of PPE for personal protection of employees especially health care workers is not in line with the Occupational Safety and Health Administration (OSHA) stipulation. There may be need for more research to establish the reasons for non availability of PPE in health facilities.

# Conclusion

- The findings of this study reveal that infection prevention measures are yet to be fully embraced by nurses in surgical and labour wards of the University of Nigeria Teaching Hospital, Enugu, Nigeria.
- This study could serve as a basis for further studies in the same hospital after reorientation and training of the nurses on PPE, and other hospitals in Africa as a baseline to ascertain the use of PPE by nurses among other hospital workers
- The study further recommended that the hospital authorities and occupational health nurses should take the lead roles to ensure adequate use of PPE in patient care.