Caring : Jurnal Keperawatan
Vol. 10, No. 1, Maret 2021, pp.30. – 47
ISSN 2656-1557 (Online), 1978-5755 (Print)
DOI: 10.29238
Journal homepage: http://e-journal.poltekkesjogja.ac.id/index.php/caring/

Knowledge and Compliance with Universal Precautions amongst Nurses in Selected Hospitals in Imo State, Nigeria

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HIGHLIGHTS

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ARTICLE INFO

Article history

Received date 29 June 2020
Revised date 20 July 2020
Accepted date 30 September 2020

Keywords:

Universal precautions
Nurses
Social sciences

Kata kunci:

Kewaspadaan universal
Perawat
Ilmu sosial

A B S T R A C T / A B S T R A K (DALAM DUA BAHASA)

This study assessed the knowledge and compliance with universal precautions amongst nurses in selected hospitals in Imo State, Nigeria. Four research questions and objectives guided the study. The study adopted a cross sectional descriptive design. Stratified and simple random sampling techniques were adopted in selecting sample size of 290 which was determined by the use of Taro Yamane. Data were collected using a self-developed structured questionnaire validated by the project supervisor. The Data were analyzed using descriptive statistics and Statistical Package for Social Sciences (SPSS) version 21.0.The findings revealed that majority of the nurses possessed high knowledge of universal precautions. An overall mean value of 3.26, ±0.9 showed majority of nurses has high level of compliance with universal precautions. The result further revealed that overall mean of 2.58,and ±1.034agreed that there are many barriers to compliance with universal precautions which includes, lack of available equipment, overall mean 2.83 and ±.98.The study also revealed that overall mean of 2.22 and ± 0.518 showed that nurses always practices different universal precautions. There exists no significant relationship between level of knowledge and compliance (x^2=2.347; P>0.05, c=094; Sig = 672). Socio-demographic characteristics and level of compliance (x^2=220;P>0.05, c=029; Sig = .974). Recommendations were made, pertinent among which are there is urgent need for targeted mass education and mobilization of nurses on the public health implications of non-compliance with Universal Precautions. Nursing and self-help groups in the campaign against barriers to compliance with universal precautions should be formed; professional guidelines on universal precaution for healthcare providers should be defined. Lastly compliance with Universal Precautions should be encouraged among nurses irrespective of their socio-economic profiles.

Abstrak

Penelitian ini menilai pengetahuan dan kepatuhan dengan kewaspadaan universal di antara perawat di rumah sakit tertentu di Negara Bagian Imo, Nigeria. Empat pertanyaan dan tujuan penelitian memandu penelitian. Penelitian ini mengadopsi desain deskriptif cross sectional. Teknik sampling acak bertingkat dan sederhana diadopsi dalam memilih ukuran sampel 290 yang ditentukan dengan menggunakan Taro Yamane. Data dikumpulkan dengan menggunakan kuesioner terstruktur yang dikembangkan sendiri yang divalidasi oleh supervisor proyek. Data

dianalisis menggunakan statistik deskriptif dan Statistical Package for Social Sciences (SPSS) versi 21.0. Hasil penelitian menunjukkan bahwa sebagian besar perawat memiliki pengetahuan yang tinggi tentang kewaspadaan universal. Nilai rata-rata keseluruhan sebesar 3,26, ±0,9 menunjukkan sebagian besar perawat memiliki tingkat kepatuhan yang tinggi terhadap kewaspadaan universal. Hasilnya lebih lanjut mengungkapkan bahwa rata-rata keseluruhan 2,58, dan ± 1,034 setuju bahwa ada banyak hambatan untuk mematuhi kewaspadaan universal yang meliputi, kurangnya peralatan yang tersedia, rata-rata keseluruhan 2,83 dan ± 98. Studi ini juga mengungkapkan bahwa rata-rata keseluruhan 2,22 dan ± 0,518 menunjukkan bahwa perawat selalu mempraktikkan kewaspadaan universal yang berbeda. Tidak terdapat hubungan yang signifikan antara tingkat pengetahuan dan kepatuhan (x2=2,347; P>0,05, c=094; Sig = 672). Karakteristik sosiodemografi dan tingkat kepatuhan (x2=220;P>0,05, c=029; Sig = 0,974). Rekomendasi dibuat, yang relevan di antaranya adalah kebutuhan mendesak untuk pendidikan massal yang ditargetkan dan mobilisasi perawat tentang implikasi kesehatan masyarakat dari ketidakpatuhan terhadap Kewaspadaan Universal. Keperawatan dan kelompok swadaya dalam kampanye melawan hambatan kepatuhan terhadap kewaspadaan universal harus dibentuk; pedoman profesional tentang kewaspadaan universal untuk penyedia layanan kesehatan harus ditetapkan. Terakhir kepatuhan dengan Kewaspadaan Universal harus didorong di antara perawat terlepas dari profil sosial ekonomi mereka..

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1. INTRODUCTION

Healthcare Acquired Infections (HAIs) is the most common infection in any healthcare delivery system and it affects millions of people each year leading to significance increase in morbidity and mortality [1,2]. Exposure of nurses to occupational hazards and susceptibility to disease are on the increase. The continuous exposure to threats from infectious ailments has caused numerous nurses and other healthcare workers to suffer from different illness contracted by handling of patients infected with various transmissible disease such as Human Immune Deficiency Virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Tuberculosis, Flu, Mumps, Chicken pox and other occasionally recurring infections like Severe Acute Respiratory Distress (SARS), Ebola, Lassa Fever, and recently Corona virus (Covid-19). For the above, there is need for precautionary and reaction safety practice in the hospitals[3].

Universal Precaution is the international term used by the medical industry to describe the set of precautionary measures introduced to allow medical staff to safely handle material that may carry blood or body fluids infected with diseases. Universal precaution are designed to prevent infection from inoculation, contact with mucous membranes such as mouth or eye, or through skin damages such as cuts[4].

Hand hygiene is the number one precaution; it is simple and the most effective methods to prevent transmission of pathogens. If all hospitals would stick to this precaution it would reduce unnecessary risks. Moreover hospital management and staff should promote safety

regulations to improve their workplace and avoid health risks. Adequate staff and supplies, together with leadership and education of health workers, patients and visitors should be the first priority[5]. Milind (2014) opined that it is essential for all nurses to follow universal precaution during their clinical care to the patients[6]. Percutaneous or per mucosal exposure to the blood or body fluids, represent a potential HIV infection these includes skin piercing procedures with contaminated objects and even broken skin, open wounds, cuts and mucosal membranes (mouth or eye) to the blood and body fluids of an infected person. Protection of healthcare workers is an essential component of any strategy to prevent disease against HIV infected patients by health care workers.

There has been a worldwide increase of incidence of blood borne viral infections. According to Centre for Disease and Control in Nigeria (2017), it stated that the presence of Acquired Immune Deficiency Syndrome (AIDS), Hepatitis B, and Hepatitis C, and other blood pathogens is now recognized in most communities. It went further to state that AIDS was first identified in the United States in 1981 and is caused by a virus (HIV) that can remain undetected in blood and certain body fluids. This disease in combination with Hepatitis B,C and other blood borne pathogens has caused a change in cross infection policy throughout the world. One impact has been on health care workers and methods to prevent nosocomial Infection. It was on this background that brought about development of Universal Precaution or Universal Blood and Body Fluid Precaution and Body Substance Isolation[7].

Universal Precautions (UPs) is important in protecting nurses from contact with blood and body fluid while given care to their patients. This exposure occurs during major or minor surgical procedure, during routine clinical and nursing services like simple physical examination, while handling laboratory specimen and during disposal of hospital wastes as well as during accident and lifesaving emergency procedures[8]. On exposure nurses can equally transmit HAIs to their patients and may be a source of infection for their families and communities. Occupational exposure to blood and body fluid is of great concern in developing countries where there are higher risks of exposure to blood borne pathogens, frequent contacts with patients' body fluids and little or no protection against airborne infections[3]. Evidences showed that a large proportion of nurses and patient has acquired infections within health care facility. These infections apart from posing very serious and life threatening conditions on nurses and patients, is responsible for deterioration in hospital cost[9].

Nursing professions is the most numerous contingent among health professionals and provide direct care to patients making them more vulnerable to the risks of biological exposure during nursing practices. Nurses may acquire an infection during provision of nursing care because of exposure to blood and body fluid with resultant effect of being exposed to micro-organisms leading to significant morbidity and mortality[2].

According to Powers (2016), Exposure to blood and bodily fluids represents a significant occupational risk for nurses. The most effective means of preventing blood borne pathogens transmission is through adherence to Universal precautions. Despite published guideline by

centers for disease control and prevention (CDC) on infection control and negative health consequences of non-compliance, significant issues are still around compliance with Universal Precautions to protect nurses from blood borne infections diseases like hepatitis B virus, hepatitis C virus, (HCV) HIV/AIDS etc. Furthermore, despite the simplicity and clarity of these guide lines, compliance among nurses is reported low. Only 37% of nurses knew that universal precautions comprises of hand hygiene before and after any procedure[2,3].

Although high incidence of occupational exposure to micro-organisms is observed among all health care professionals, nurses are among those who are more highly exposed. Arinze (2018) stated that although universal precautions policy was introduced 20 years ago, adherence to these precautions is of poor quality in health care sector. Poor knowledge of infection control practices among nurses has been noted to hinder compliance with universal precautions. He went further to state that, in strengthening universal precautions training for health care works is recommended as a major means to promoting adherence to universal precautions and protects nurses and patients from HAIs non availability of materials, limited organizational support, and lack of knowledge regarding infection control practices among nurses are some of the factors responsible for poor compliances to universal precautions.

According to World Health Organization (2015) an estimated 3 million Health care workers all over the world experience percuteneous exposure to blood borne viruses Hepatitis B and C, and HIV viruses annually, which results from non-adherence to safety precautions while discharging their duties[10].

The study carried out in the United States of America by Donald, Davidson, Michalsen, Andrey, Delclos, George, Felknor and Sarah (2017), assessed level of compliance with Universal Precautions (UPs) among hospital based physicians and determined significant factors associated with both compliance and non-compliance[11]. A total of 322 physicians recruited from three geographical locations were surveyed using detailed confidential questionnaire that assessed personal, work-related, and organizational factors. Compliance with Universal precautions was measured using eleven (11) items that examined how often physicians follow specific recommended measures. Compliance was found to vary among 11 items: they were high for certain activities e.g. glove use 94%, sharp disposal 92%, and low for others such as wearing protective clothing 55%, recapping needles 55%. The study affirms that compliance with all items was low 31%-38%. It was also noted that non-compliance physicians were of age 37 years or older, and to report high work stress and a perceive conflict of interest between providing patient care and protecting themselves. This study recommends training of the physicians in Universal Precautions, to perceive protective measures as being effective to protect and to perceive an organizational commitment to safety.

Another study carried out in Ethiopia by Tariku, Eshetu and Abdella (2017), the study seek to determine compliances with standard precautions and associated factors among healthcare workers[2]. In their findings, a total of 12% of health workers are always compliant with standard precautions, and in conclusion and recommendations stated that compliance with

standard precaution among healthcare workers is very low. Interventions which include training of healthcare workers on standard precautions and consistent management support are recommended.

Statistics has shown that knowledge and compliance are still low among nurses, in one of studies conducted in Asian Country by Milind, Manisha and Mahadeo (2014), knowledge and practice of Universal precautions among the Basic B.Sc[6]. Nursing students observed that 66% of students nurse had an average knowledge of universal precautions, while 20% of nurse showed satisfactory performance of universal precautions. Also, the study showed that 8.2% nurse never used safety equipment. The study therefore recommended that appropriate training programs and other relevant measures should be put in place to promote the appropriate use of protective barrier equipment by healthcare workers at all time.

In Nigeria, a study carried out by Dime, Kenrbradikimo, Babatunde, George, Christian and Sanusi (2015) on knowledge, attitude and practice of standard precautions of infection control by hospital workers, the result showed that: a total of 290 workers, (HCW) participated in the study 76% response rate, 38.3% doctors, 50.7% nurses and 32% laboratory scientists[12]. Overall median knowledge and attitude scores towards standard precautions were above 90%, but median practice score was 50.8% indicating low knowledge and compliance with standard precautions of infection among HCWs in Nigeria.

Nurses by virtue of their profession are known as change agents and motivators in the health care system. By the nature of their training, they should have knowledge, and as role model in upholding compliance to Universal precautions so as to promote reduction in HAI. Their attitude to such issue might affect the masses positively or negatively in their decision making. The World Health Organization (2015) states that three million (3,000,000) health care workers all over the world experience exposure to blood borne viruses Hepatitis B and HIV viruses annually as a result of non-compliance to safety precautions while discharging their duties[10]. Inadequate understanding of the far reaching consequences of non-compliance is a strong reason to ascertaining knowledge and compliance of universal precaution among nurses. This is an overt call for action to health care professionals especially nurse as role models and caregivers. There is need to assess the current level of knowledge and compliance with Universal Precautions among nurses. Majority of the studies were done outside Nigeria.

The aim of the study is to ascertain the level of knowledge and compliance with universal precautions amongst nurses in selected hospitals in Imo State, Nigeria. The findings will help to ascertain the level of knowledge of nurses on universal precautions, and assess nurses compliance with universal precautions. The findings will also help to identify factors that constitute barriers to compliance to universal precautions. To the department of nursing, it will contribute to the body of knowledge and serve as basics for in service education of nurses. That will ensure sustained and regular practice of compliance to universal precautions, among nurses. The findings will also serve as a guideline for nurse administrators in planning continuing education program, for nursing update or training in the hospitals. The research

findings could also be used as a reference for other studies that could be conducted in the future. Being role models, the findings will help in further educating the nurses in epic position of leadership by example which tends to influence the masses positively. The findings will also help policy makers to plan and prioritize activities geared at reducing hospital acquired infections in Nigeria through vital recommendation which will enhance advocacy programs, this is important in order to achieve the 2030 goal on complete elimination of preventable diseases in Nigeria.

The study is delimited to knowledge and compliance with universal precautions amongst nurses in selected hospitals in Imo State, Nigeria. It was delimited to dependent variables of knowledge and compliance with Universal Precautions amongst nurses in the selected hospital. It was also delimited to independent variable of age, gender, educational qualification of the nurses. It was further delimited to the use of structured questionnaire for determining the level of knowledge and extent of compliance to Universal Precaution. It was equally delimited to frequency percentage, and chi-square test of hypotheses.

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2. RESEARCH METHOD

2.1 Research Design

According to Ezeani (2011), research design is defined as the specification of procedure for collecting and analyzing the data necessary to help solve problems at hand[13]. In line with this, the researcher basically used a descriptive cross-sectional survey design, to ascertain knowledge and compliance with universal precautions amongst nurses in selected hospitals in Imo State. Arinze- Onyia, Ndu, Aguwa, Modebe, Nwamoh, (2018), used descriptive cross sectional survey design to assess the knowledge and practices of standard precautions among health care workers in tertiary health care facilities in University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu State[8].

2.2 Area of the Study

The study was conducted in two major tertiary hospitals in Imo State, Nigeria, namely Federal Medical Centre (FMC) Owerri and Imo State Teaching Hospital (IMSUTH) Orlu, Imo State. Both hospitals are government owned tertiary health institutions located in the south eastern region of the country and offers various specialized care to patients both far and near. Both hospitals are centre for training of healthcare professional in different specialties.

2.3 Population of the Study

The accessible population for the study consisted of one thousand and forty six (1046) nurses.

2.4 Sample and Sampling Technique

The sample size was determined by Taro Yamane, sample size of two hundred and ninety (290) which is 95% of the population. The nurses were first grouped into different wards/units, then 12 wards/units were selected using stratified and simple random sampling

technique 95% of nurses were selected, excluding nurses on leave, night duty and those who did not consent to participate in the study.

2.4.1. Variables

Dependent Variables: In this study knowledge and compliance with universal precaution amongst nurses are the dependent variables.

Independent Variable: In this study socio- demographic, age, sex, group, practice and barriers are being studied.

Inclusion Criteria: All nurses that consented to be part of the respondent were included in the study.

Exclusion Criteria: All nurses that refused to be part of the study, those on annual, maternity, sick leave were excluded in the study.

2.5 Instrument for Data Collection

Data were collected using structured questionnaire which consist of five sections:

Section A: Socio-demographic variable,

Section B: Level of knowledge of universal precaution

Section C: Level of compliance to universal precaution.

Section D: Barriers to compliance and

Section E: Practice of universal compliance.

2.6 Validity

The instrument was approved by the project supervisor. The face and content validity of the instrument were validated by the supervisors. The supervisor examined the instrument alongside the objectives of the study and research questions of the study in order to ascertain the possibility of eliciting appropriate responses for the study.

2.7 Reliability

A split half method was adopted in establishing the reliability of the instrument. Twenty (20) copies of the instrument were distributed to twenty (20) nurses in Imo State Specialist Hospital Owerri. The Imo State Specialist Hospital Owerri has similar characteristics with the hospitals being the hospital for the study. Results of the single administration were split into two equal halves using odd and even numbers representing X and Y respectively. Spearman Rank Order Correlation Co-efficient was used in establishing a high positive correlation of 0.9.

2.8 Procedure for Data Collection

A self-developed structured questionnaire was used which have 5 sections. .The administrations of the questionnaires were done on face to face basis by the researcher and all were adequately filled and collected thereafter.

2.9 Data Analysis

The data obtained were analyzed using descriptive statistics of frequency percentage, mean and standard deviation, and Chi-square test for test of hypothesis, Statistical Package for Social Sciences (SPSS) version 21.0, was used for analysis.

3. RESULTS AND ANALYSIS

Results

The results of the data analysis are presented according to the research questions and hypotheses that guided the study. From the table (Table 1), it shows that female nurses are greater with 236 (87.3%) while nurses 54 (18.6%).

Table 1: Showing Gender of Respondents

Variables	Frequency	Percentage (%)
Gender		
Male	54	18.6
Female	236	81.3
Total Population	**290**	**100%**

Table 2: Showing Age of the Respondents

Age (year)	Frequency	Percentage (%)
20-29	50	18.8
30-39	110	41.4
40-49	80	30.1
50-59	26	9.8
	290	**100**%

The table 2 shows that age between 20-29years 50(17.2%) followed by 30-39years 134 (46.2%) having the highest frequency 40-49years 80(27.5%) while 50-59years recorded the least 26(8.9%).

Table 3 Showing Marital Status of the Respondents

Variables	Frequency	Percentage (%)
Marital Status		
Single	45	15.5
Married	219	75.5
Divorced/Separated	10	3.4
Widow/Widower	16	5.5
Total Population	**290**	**100%**

The table 3 shows that half of the respondents are married 219 (75.5%) followed by single nurses 45 (15.5%) widow/widower 16(5.5%) and divorced/separated 10 (3.4%).

Table 4: Showing Religious affiliation of the Respondents

Religion	Frequency	Percentage (%)
Christianity	275	94.8
Muslim	15	5.1
Total Population	**290**	**100%**

From the Table 4 that half of the nurses belong to Christian religious background 275(94.8%) while Muslim is 15(5.1%).

Table 5. Showing Rank of Nurses

Rank	Frequency	Percentage (%)
ADNS	18	6.2
CNO	24	8.2
ACNO	39	13.4
PNO	55	18.9
SNO	84	28.9
NOI	25	8.6
NOII	45	15.5
Total Population	**290**	**100%**

The rank category (Table 5) shows that the majority of the respondents are mainly nurses at SNO cadre 84(28.9%) followed by PNOs 55(18.9) NOIIs 45(15.5%) ACNOs 39(13.4%), CNOs 24(8.2%) and ADs recorded the least 18(6.2%).

Table 6. Showing Ward Location of the Nurses

Variables	Frequency	Percentage (%)
Ward Location		
Surgery	45	15.5
Medicine	100	34.4
Gynae	45	15.5
Orthopedics	40	13.7
Others (A/E, ICU)	60	20.6
Total Population	**290**	**100%**

From the table 6, it shows 100 (34.4%) works in Medical Ward, followed by others in (A/E, ICU) 60(20.6%), Surgery and Gynae wards 45 (15.5%) and Orthopedic 40(13.7%).

Table 7: Showing Years of Service of the Nurses

Year of Service Variables	Frequency	Percentage (%)
1-5	40	13.7
6-10	55	18.9
11-15	89	30.6
16-20	58	20.0
21-25	28	9.6
26-30	12	4.1
31-35	8	2.7
Total Population	**290**	**100%**

The years in service of the respondents (Table 7) ranges from 1 to above 35 years, with 11-15 years, 89 (30.6%), followed by 16-20 50(20.0%) 6-10years 55(18.9%), 1-5years 40(13.7%), 21-25years 28(9.6%), 26-30years 12 (4.1%) while the least 31-35years 8 (2.7%).

Table 8 Showing Qualification of Nurses

Variables	Frequency	Percentage (%)
Qualification		

Reg. Nurse/Midwife	160	55.1
B.Sc.	70	24.1
M.Sc.	45	15.5
PhD Nursing	15	5.1
Total Population	**290**	**100%**

From the table Registered Nurse/Midwife have the highest 160(55.1%), followed by B.Sc. 70 (24.1%), M.Sc. 45 (15.5%) and PhD Nurses 15 (5.1%).

Research Question 1

What are the levels of knowledge of universal precautions amongst nurses in Imo State?

Table 9: Respondents knowledge on universal precautions amongst nurses

S/N	KNOWLEDGE QUESTIONS (MULTIPLE CHOICE)	Frequency	%
1	**What do you understand by the concept, Universal Precautions**		
	Hand washing before and after any direct contact with patients.	81	27.9
	Avoidance of infectious agent to patients through needle prick and accidental exposure to blood and body fluid.	47	16.2
	Observing habits of covering mouth/nose when coughing or sneezing.	73	25.2
	Consistent use of mask when attending to patients.	90	31
		290	**100%**
2	**What are the aims of Universal Precautions**		
	Protect healthcare workers	37	12.8
	Protect patients getting infected from Nurses	43	14.8
	Prevent mutual transfer of infections	73	25.2
	Protect Nurses while handling infections substances.	72	24.8
	Protect Nurses while handling sharp equipment	65	22.4
		290	**100%**
3	**What are the potential ways of accidental exposure to blood, and body fluids?**		
	Splash on the body, eye and mouth	69	23.8
	Needle stick/sharp injury	67	23.1
	Talking to patients	41	14.1
	Touching patients	54	18.6
	Inhalations	59	20.3
		290	**100**%
4	**What are the components of Universal Precautions?**		
	Hand hygiene	50	17.2
	Use of Personal Protective Equipment (PPE)	53	18.3
	Safe infection practices	47	16.2
	Safe handling of potentially contaminated equipment or surface.	50	17.2
	Respiratory hygiene.	46	15.9
	Anal/perineal hygiene	45	15.5
		290	**100%**
5	**According to Universal Precautions, hand washing is performed**		
	Before any direct contact with patients	52	17.9
	Between patients contact	53	18.3
	Immediately after removing gloves.	31	10.7
	After touching body fluids such as blood excretions and sweat.	54	18.6
	Before performing any aseptic procedure	51	17.6

	Before exiting the patient's care area.	48	16.6
		290	**100%**
6	**What are the body fluids that require Universal Precautions?**		
	Blood	88	30.3
	Saliva	76	26.2
	Vaginal fluids	44	15.2
	Blood tinged body fluids.	82	28.3
		290	**100%**
7	**For which of these conditions should Universal Precautions be followed?**		
	To all hospitalized patients	85	29.3
	When patients has a known or suspected infection.	57	19.7
	When the health worker has known or suspected infections.	70	24.1
	At the discretion of the healthcare worker.	78	26.9
		290	**100%**
8	**What are the important factors in deciding when to use Personal Protective Equipment (PPE)**		
	HIV/AIDS	75	25.9
	Hepatitis B Virus (HBV) infection	73	25.2
	Hepatitis C Virus (HCV) infection	69	23.5
	Tuberculosis	72	24.8
		290	**100%**

The result presented in Table 9 shows the respondents overall knowledge of universal precautions amongst nurses. It revealed that the respondents believed the concept of Universal Precautions deals with consistent use of mask when attending to patient 90(31%), aim of Universal Precautions is to prevent mutual transfer of infection 73 (25.2%), potential ways of accidental exposure to blood and body fluids 69(23.8%), while use of Personal Protective Equipment (PPE) 53 (18.3%), 54 (18.6%) agreed that hand washing should be performed after touching body fluids such as blood, excretions and sweat 88(30.3%) also agreed that body fluid that require Universal Precautions is blood contact, 85 (29.3%) indicated that Universal Precautions should be followed on all hospitalized patients and 75(25.9%) agreed that cases of HIV/AIDS PPE should be used in attending to them. The above results revealed that majority of the nurses possessed high knowledge of universal precautions.

Research Question 2

What are the current levels of compliance with universal precautions amongst nurses in Imo State?

Table 10: Mean levels of compliance with universal precautions amongst nurses

S/N	Compliance with universal precautions	Mean	SD	Remark
1	Use of PPE to protect against blood and body fluids of all patients.	3.41	1.075	High
2	Put used needles into sharp container.	2.79	1.208	High
3	Wears glove during procedures.	3.96	.705	High
4	Wash hand after removing gloves	3.69	.702	High
5	Wear eye protection	2.44	1.038	Low
6	Do not recap needle	2.16	1.013	Low
7	Wiping all blood spills promptly	3.92	.741	High
8	Ensure broken skins are well covered with sterile materials.	3.83	.780	High
9	Report needle stick injury	3.24	1.054	High
10	Training of staff in Universal Precautions.	3.32	.994	High
11	Supervisors encourage staff training.	3.11	1.055	High
	Overall Mean	**3.26**	**0.942**	**High**

Result present in Table 10 shows high level of compliance with universal precautions. This is because the grand mean value of 3.26 falls within the high level. Therefore, the nurses have high level of compliance with universal precautions.

Research Question 3

What are the barriers to compliance with universal precautions amongst nurses in Imo State?

Table 11: Mean responses on the barriers to compliance with universal precautions amongst nurses

S/N	Barriers to compliance with universal precautions	Mean	SD	Remark
1	Wearing PPE might cause fear in patients.	2.54	1.082	True
2	PPE is not always available to enable use.	2.83	.986	True
3	Practice in Universal Precautions is time consuming	2.41	1.079	False
4	Compliance during emergency put patients at risk.	2.46	.865	False
5	Complying with Universal Precautions interferes with the ability to provide care.	2.29	1.104	False
6	Exposure to infections is unanticipated.	2.96	1.343	True
7	Patients care demand does not allow ample time to comply with Universal Precautions.	2.87	.881	True
8	Protective gear is usually uncomfortable.	2.58	.908	True
9	Ineffective equipment.	2.29	.844	False
10	Patients do not pose a risk	2.62	1.251	True
	Overall Mean	**2.58**	**1.034**	**True**

Result from the data of Table 11 shows the respondents agreed that wearing PPE might cause fear in patients, PPE is not always available to enable use, exposure to infections is unanticipated, patients care demand does not allow ample time to comply with universal precautions, protective gear is usually uncomfortable, and patients do not pose a risk are the barriers to compliance with universal precautions amongst nurses. This is because their mean responses fall within the agreement level. This indicates that there are many barriers to compliance with universal precautions amongst nurses.

Research Question 4

What are the trends of practice of different universal precautions amongst nurses in Imo State?

Table 12: Practice of different universal precautions amongst nurses

S/N	Practice of universal precautions	Mean	SD	Remark
1	Practicing universal precautions in the ward	2.45	.499	Always
2	Practicing of properly recapping needles after use	2.08	.574	Always
3	Observing proper disposal of used needles and sharps using biohazard box or vacutainers	2.21	.575	Always
4	Using gloves when attending to patients	2.54	.499	Always
5	Using protective eye wear when attending to patients	1.83	.627	Not Always
6	Using impervious gowns while carrying out procedures on patients	2.08	.276	Always
7	Using protective foot wear during procedures on patients	1.95	.544	Not Always
8	washing hands before and after attending to patients	2.67	.552	Always
	Overall Mean	**2.22**	**0.518**	**Always**

Result from the data of Table 12 shows the trends of practice of different universal precautions amongst nurses. It revealed that nurses always practice different universal precautions amongst nurses except on using protective eye and foot wears during procedures on patients.

Test of Hypothesis

H_{01}: There is no significant relationship between the level of knowledge of nurses in Imo State and compliance to universal precautions.

Table 13: Contingency Coefficient on level of knowledge and compliance with universal precautions

Variables	N	χ^2	C	Sig.
Level of knowledge Level of compliance	290	2.347	.094	.672

From the Contingency analysis shown in Table 13, the statement of hypothesis 1 is accepted; implying that there is no significant relationship between the level of knowledge of nurses in Imo State and compliance to universal precautions ($\chi^2 = 2.347; C = .094, Sig. = .672$).

H_{02}: There is no significant relationship between the socio demographic characteristics ((variables)) of the nurses and the level of compliance with universal precautions.

Table 14: Contingency Coefficient on socio-demographic characteristics of Age and the level of compliance with universal precautions

Variables	N	χ^2	C	Sig.
Socio-demographic Characteristics of (Age) of the nurses and Level of compliance	290	.220	.029	.974

From the Contingency analysis shown in Table 14, the statement of hypothesis 2 is accepted; implying that there is no significant relationship between the Age of the nurses and the level of compliance with universal precautions (Age) of the Nurses in this result is not determinant of compliance ($\chi^2 = .220; C = .029, Sig. = .974$).

4. Discussion of the Findings

4.1. The level of knowledge of universal precautions among nurses

The result shown in Table 2, it revealed that the majority of the respondents had knowledge of universal precautions. Therefore, on average, more than half of the nurses possessed high knowledge of universal precautions. This finding is in line with Milind et al (2014) whom in his study assessed the knowledge and practice of universal precautions among nursing students and found (66%) of the students possessed high knowledge of universal precaution and showed a satisfactory performance of universal precautions[6]. In support of this result, Akagbo et al (2017) reported that the majority of health workers knew the standard precautions includes hand washing before and after any direct contact with the patient[14]. However, at the end of the study, it showed less knowledge of universal precautions by nursing staff at their hospital. This result therefore suggests that nurses possessed high knowledge of universal precautions. This is not surprising since universal precautions cover sets of infection control practices used to prevent transmission of diseases that can be acquired by contact with blood, body fluids, non-intact skin (including rashes), and mucous membranes. These measures are to be used when providing care to all individuals, whether or not they appear infectious or symptomatic. This is in line with Shinde and Mohite's (2014) submission that the main principles of universal precautions to be washing hands, care of intact skin, protection of damaged skin, proper handling and careful handling of blood and body fluids[15].

4.2. Level of compliance with universal precautions among nurses

The result in Table 3, revealed high level of compliance with universal precautions. This is because the grand mean value of (3.26) and standard deviation 0.942 falls within the high level. Therefore, the nurses have high level of compliance with universal precautions. This is at variance with Solanky et al (2016) who conducted a study in hospital in South Gujarat, India to ascertain the knowledge and practice of universal precautions among nursing staff[16]. The result concluded that all the participants were aware about the word universal precaution. The findings revealed that nurses knew all the correct steps for universal precautions as well as practice hand hygiene as an important step in universal precautions. In the study also, it was found that nurses had received proper training of universal precautions. The results obtained by Obi et al (2017) and Milind et al (2014) showed that practice of universal precaution were highest among doctors and nurses and showed strong association with respondents level of education, work place and occupation[6,17]. Tariku et al (2017) assessed compliance with standard precautions and associated factors among health care workers in North east Ethiopia and found similar results[2]. This result is not surprising due to the fact that compliance can be influenced or controlled by a variety of factors like culture, economic and social factors, self-efficacy, and lack of knowledge or means. More so, from the hypothesis testing shown in Table 6, the statement of hypothesis is accepted; implying that there is no significant relationship between the level of knowledge of nurses and compliance to universal precautions. That is, compliance to universal precautions does not necessarily depend on the level of knowledge of nurses. It could depend on fear of disease contamination.

4.5. Barriers to compliance with universal precautions among nurses

The summary of the results in Table 4 shows that wearing PPE might cause fear in patients, Personal Protective Equipment (PPE) is not always available to enable use, exposure to infections is unanticipated, patients care demand does not allow ample time to comply with universal precautions, protective gear is usually uncomfortable, and patients do not pose a risk are the barriers to compliance with universal precautions among nurses. This is because their mean responses fall within the agreement level. This indicates that there are many barriers to compliance with universal precautions among nurses. This agrees with Akagbo et al (2017) who also conducted a study to barriers to compliance among health care workers in the lower Manya Krobe District, Ghana[14]. They concluded that some nurses do not have enough time to comply with the rigours of standard precautions because of demands of patient care. Also, the findings of Abdulraheem et al (2012) submission that, often nurses come across many responsibilities to be fulfilled[18]. This leads nurses to avoid the use of universal precautions, even when it is anticipated that they may be exposed to micro-organism including exposure to blood and body fluids. In addition, many nurses fail to adhere to universal precautions in many cases saying it is time consuming for example putting on a gown. This indicates that there exist many barriers to compliance with universal precautions among nurses.

4.6. Practice of different universal precautions among nurses

Result from the data of Table 5 shows the trends of practice of different universal precautions among nurses. It revealed that nurses always practice different universal precautions except on using protective eye and foot wears during procedures on patients. This corroborates the findings of Obi et al (2017) who ascertained the practice of universal precautions among Health Workers in southeast[17]. The finding showed that practice of universal precaution were highest among doctors and nurses and showed strong association with respondents level of education, work place and occupation. The predominant universal precautions practiced by respondents were screening of blood before transfusion, use of disposable gloves and hand washing after patient care. The least practiced universal precautions by respondents were use of eye wear, not recapping needle and use of face masks. Milind et al (2014) who conducted a study to assess the practice of universal precautions among nursing students found similar results[6]. Thus, this result is expected due to the fact universal precautions is important in protecting nurses from contact with blood and body fluid while given care to their patients. This exposure occurs during major or minor surgical procedure, during routine clinical and nursing services like simple physical examination, while handling laboratory specimen and during disposal of hospital wastes as well as during accident and lifesaving emergency procedures. This goes to show that nurses always practice different universal precautions.

4.7. Socio-demographic characteristics (Age) and the level of compliance with universal precautions among nurses

Result in Table 7 showed no relationship between age of nurses and the level of compliance with universal precautions. From the Contingency analysis shown in Table 7, the statement of hypothesis 2 is accepted; implying that there is no significant relationship between the socio-demographic characteristics of age and the level of compliance with universal precautions among nurses. It goes to show that socio-demographic characteristics, such as age, gender, religion, marital status, rank, ward location as well as qualification may have little or nothing with the level of compliance to universal precautions among nurses. This implies that compliance with universal precautions will be encouraged among nurses irrespective of their socio-demographic profiles. This is in accordance with Solanky et al (2016) and Tariku et al (2017)[2,16]. They concluded that the impact of socio-demographic characteristics on the level of compliance with universal precautions among nurses is not significant.

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4. CONCLUSION

Based on the findings of the study, it was concluded that majority of the nurses possessed high knowledge and high level of compliance with universal precautions. There are many barriers to compliance with universal precautions among nurses. More so, nurses always practice different universal precautions. There is a weak relationship between the socio-demographic characteristics and the level of compliance with universal precautions among nurses.

5.1. Implications of the Study

The findings of the study have implications for health and nursing education. For one thing, the study has provided empirical evidence to support the fact that nurses possessed high knowledge and high level of compliance with universal precautions. There exist many barriers to compliance and nurses always practice different universal precautions. This implies that efforts should be made by relevant bodies to encourage high level of compliance with universal precautions among nurses. The National Association of Nigerian Nurses and Midwives (NANNM) and others, through the support of the WHO, will now strive hard to put modalities on how to punish any nurse that refuse to comply with universal precautions.

Again, to promote knowledge and compliance with universal precautions, it is necessary for health authorities in Nigeria to institute policies that make it mandatory to establish Infection Prevention and Control (IPAC) committees in all hospitals. Such policies should also ensure strategies and resources are routinely available and that knowledge and practice of universal precautions are improved through regular training of hospital staff, especially for newly qualified nurses.

Another implication of this study is that compliance with universal precautions will be encouraged among nurses irrespective of their socio-demographic profiles. This goes to show that more proactive steps are required to tackle the non-compliance with universal precautions. Therefore, encouraging practice of different universal precautions among nurses will require awareness campaign on universal precautions among health works.

5.2. Recommendations

Based on the findings of the study, the following recommendations are made:

1. There is urgent need for targeted mass education and mobilization of nurses on the public health implications of non-compliance with universal precautions.
2. Nursing and self-help groups in the campaign against barriers to compliance with universal precautions should be formed; professional guidelines on universal precaution for healthcare providers should be defined.
3. Lastly compliance with universal precautions should be encouraged among nurses irrespective of their socio-demographic profiles.

5.3. Limitations of the study

The following limitations were observed in the course of carrying out the study:

1. Results may have been affected by considering only the nurses in Imo State because it may have resulted in a sample not representative of the population of the nurses.
2. Only knowledge, level of compliance, barrier and practice of universal precaution were considered in this study.

However, these limitations observed in this study did not invalidate the findings of the study.

5.4. Suggestions for Further Study

The following suggestions for further studies are made:

1. Replicate the study by involving other hospitals in Imo State.
2. Examine the correlates of compliance with universal precautions among nurses in Imo State.
3. Investigate factors to compliance with universal precautions among health workers in Imo State.

Conflict of interest

The authors declares no conflict of interest regarding the publication of this manuscript

Ethical Consideration

Ethical approval was obtained from the ethical committee of the institutions. Informed consent was obtained from each study participants after detailed explanation of the purpose for the study. They were assured of complete confidentiality to the responses; participants who were not willing to participate in the study had full right not to participate, no persuasions.

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