UNIVERSAL STANDARD PRECAUTION: ACHIEVING IMPROVEMENT IN KNOWLEDGE, ATTITUDE AND PRACTICE AMONG HEALTH CARE WORKERS IN A SECONDARY HEALTH CARE FACILITY IN BENUE STATE, NORTH CENTRAL NIGERIA

Ogbeyi Ofikwu Gabriel[1*], Adekwu Amali[2], Amede Peter Okpe[3], Audu Onyemocho[1], Afolaranmi Tolulope Olumide[4]

[1]Department of Community Health and Epidemiology, College of Health Sciences, Benue State University,Makurdi, Nigeria.

[2]Department of Otorhino-laryngology, College of Health Sciences, Benue State University, Makurdi, Nigeria.

[3]Nigeria Prison Service, Bauchi Command, Nigeria.

[4]Faculty of Medicine, Department of Community Medicine, University of Jos, Jos. Nigeria.

[*]**Corresponding author:** Gabriel Ofikwu Ogbeyi; **Email:**ogbeyiofikwu@gmail.com

ABSTRACT

Background: *Adequate provisions for health care workers to observe proper universal standard precaution are lacking in most health facilities in developingcountries. This has contributed immensely in exposing many health care workers to infectious diseases such as hepatitis B and C viruses, human immunodeficiency virus, tuberculosis etc. Budgetary allocations to infection control in many hospitals are rising because of challenges of universal standard precaution. This study assessed knowledge, attitude and practice of universal standard precaution among hospital staff in a secondary health facility in Nigeria.*

Methods: *A cross sectional descriptive study was employed in this study. The calculated sample size was 76 and all the nurses and waste handlers were recruited into the study.*

Results: *A total of 76 respondents were assessed in this study. Overall, majority(>77%) had good knowledge, attitude and practice of universal precaution. All the respondents(100%) were aware of universal standard precaution; and majority (68%) were females. Furthermore most(85%) became aware of universal standard precaution through workshops and seminars. More than 72% agreed that they would carry out procedures in patients infected with hepatitis B and C and human immunodeficiency virus.*

Conclusion: *Universal standard practice is a fundamental tool in reducing incidence and prevalence of infectious diseases particularly in a hospital setting. Hospitals and clinics should concentrate on the job training for effective improvement in knowledge, attitude and practice in poor resource environment like Nigeria.*

Key words: *Universal, standard, practice and Nigeria.*

The Nigerian Health Journal, Volume 19 No 3, July to September, 2019
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A Publication of Nigerian Medical Association, Rivers State, Nigeria

108

INTRODUCTION

Health Care Workers (HCWs) are prone to infection of blood borne pathogens whenever they come in contact with infected body parts, blood and body fluids in the course of carrying out their duty. Most occupational exposures to blood pathogens usually result through percutaneously, mucocutaneously or through blood contact with non-intact skin[1,2,3].According to the World Health report, an estimated three million HCWs all over the world experienced exposure to blood-borne viruses Hepatitis C, B and Human Immunodeficiency virus (HIV) annually[4,5,6,7]. Similarly, it has been estimated that about 2.5% of HIV cases and 40% of hepatitis B virus (HBV) and hepatitis C virus(HCV) cases among HCWs worldwide are the result of these exposures[1,8,9]. Hospital-associated infections form a major worldwide public health problems and threat to the health and safety of patients and medical workers. These are infections that arise within the hospital environment[1,2].

Although infection is most prevalent in patients upon admission[2], health care workers also act as potential vectors for pathogenic agents. Hospitals provide a favourable transmission pathway for the spread of nosocomial infections, owing partly to poor infection control practices among health workers on one hand and overcrowding of patients in most clinical settings on the other[2].

Health care-associatedinfections have long been recognized as crucial factors undermining the quality and outcomes of health care delivery[3,5].Reported cases of nosocomial infection assumed such terrifying proportions in 2002 that World Health Organization member states approved a World Health Assembly resolution on patient safety. Developing countries were reported to have up to 20 times the risk of contracting a nosocomial infection compared to developed countries[2,5].

Hospital-associated infections also include occupational infections which occur among health care workers due to occupational hazards[2,4]. Healthcare workers are potentially exposed to blood and body fluids in the course of their work and therefore are at risk of infection with blood borne pathogens[3,7].Data from the US Centre for Disease Control and Prevention (CDC) showed that at the end of the year 2002, of the 57 medical workers diagnosed with HIV infection following occupational exposure (including 24 nurses), piercing by a sharp instrument had resulted in 48 infections (84.2%).Other studies have also shown evidence of clinical nurses becoming infected due to occupational exposure. In a prevalence survey conducted by the World Health Organization (WHO) in 55 hospitals across 14 countries, it was found that 8.7% of in-patients acquire infections in the hospital[1,8].Occupational transmission of blood borne infections may occur through parenteral, mucous membranes, and non-intact skin exposure. The greatest risk for transdermal transmission is via a skin penetration injury sustained with a sharp hollow-bore needle that recently have been removed from a blood-contaminated source, or through contact with the eye, nose, mouth, or skin with a patient's blood[4,9].

These injuries and infections affect the

quality of medical care and increase medical care costs. They have many effects which may include the direct and indirect costs of the post-exposure medical treatment and the disability and absenteeism of the injured health care worker. Also, this exposure can have a further influence on the quality of life of the injured health care worker, and can cause great worry, anxiety, and fear for himself and his family and colleagues, as well as feelings of stigma and low self-confidence[1,4].

In the light of the above challenges and to holt the alarming rate of the spread of hospital acquired infection (HAI) the US Centre for Disease Control and Prevention 1985recommended that nurses and all health care workers, practice universal precautions when providing patient care[5]. It was shown that Universal Precautions made health care workers to discriminate and stigmatize patients with confirmed cases. As a result in 1996 the United States CDC changed Universal Practices to Standard Precautions. Standard Precautions are the minimum infection control protocols that are required to be applied in all cases irrespective of whether the patient's health status has being confirmed. Universal precautions are intended to prevent parenteral, mucous membrane, and non-intact skin exposures of health-care workers to blood borne pathogens. Under universal precautions, blood and certain body fluids of all patients are considered potentially infectious for human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other blood borne pathogens[7,10]. Universal precautions therefore protect patients as well as medical workers and help to control the occurrence of hospital infections.

According to the World Health Organisation 2003, standard precaution can be defined as a set of infection control measures meant to reduce the risk of transmission of blood borne and other pathogens from both recognized and unrecognized sources[5,10]. These measures are to be used by HCWs when providing care to all individuals, whether or not they appear infectious or symptomatic. Furthermore, the elements of standard precautions include use of personal protective equipment and other self-protection behavioural practices such as hand hygiene, use of gloves and other barriers for example masks, eye protection, face shield and gowns. Others include proper handling of patient care equipment and linen, environmental control, and prevention of injury from sharp devices[10,11,12].

Knowledge, practice and compliance to standard precaution guidelines by HCWs have been highlighted to be a sure way of preventing occupational infection[1,13,14]. However, knowledge and practice of standard precautions have shown to be low and fair among health workers in developing countries especially in Nigeria despite the establishment and implementation of detailed standard precaution guidelines for HCWs[15, 16, 17].Therefore this study was designed to determine the knowledge, attitude and practice of standard precautions among HCWs in General Hospital Okpoga a rural area with rising cases of HIV/AIDs and other infectious diseases.

METHODOLOGY
Study design
The study employed a descriptive cross sectional study design.

Study setting

The study was carried out at General Hospital Okpoga, Okpokwu Local Government Area of Benue State, Nigeria. It is a secondary health care facility and was established by Benue state government in 1990. It has bed occupancy of 60 and has work force of 130. It has four clinical wards: Internal Medicine (male and female), Paediatrics, Surgery(male and female), and Obstetrics/Gynaecology. The other departments areradiology, out patients and HIV antiretroviral therapy.

Study population

The population chosen for this study comprised nurses and waste handlers in General Hospital Okpoga, Benue State. General hospital Okpoga was selected using multi stage sampling technique. Benue state government has 23 general hospitals that is one per local government. The state has three senatorial zones, A, B and C. Zone A has six local governments with six general hospitals, Zone B has the same number of local governments and general hospitals as zone A and zone C has nine local governments and nine general hospitals. The first stage was the listing of all the zones and zone C was selected using systematic random sampling by balloting. The second stage was the listing of all the local governments in zone C and Okpokwu local government area with general hospital Okpoga was selected by balloting.

Sample size determination

The nursing department runs three shifts, morning, evening and night for its staff while waste handlers come to work only in the morning and close by 4 PM on daily basis. Nurses and waste handlers who were directly involved in the handling of patient's blood, body fluids, needles, sharp objects and waste, and who have been in employment for at least 6 months, and were willing to participate in the study were included.

The sample size of 87 was calculated using the formula $n=Z\alpha^2 p\ (1-p)/d^2$, n=sample size, Zα=standard deviation, at 95% confidence level=1.996, d=precision at 5%(0.05),p=un-standardized prevalence.

Sampling procedure

The sampling frame in this study was 76.The selection of the respondents was by cluster sampling technique. All the nurses 68 of them and all the waste handlers 8 were included in the study. Ethical clearance was obtained from the supervising hospital, Benue State University Teaching Hospital Makurdi. Permission was got from the medical superintendent in-charge of General Hospital Okpoga and verbal consent from the respondents.

Instruments for data collection

The instrument for data collection was an interviewer-administered questionnaire comprising of five sections. Section A contained socio-demographic characteristics, section B sought the knowledge of the respondents on standard precautions, section C sought the attitude of the respondents towards standard precautions and section D explored the practice of standard precautions among the respondents.

Data analysis

To ensure the validity and reliability of the instrument for data collection, the questionnaires were pretested among 10 health care workers in a private hospital in

Okpoga. The aim of the pretesting was to ascertain whether the questions and instructions in the questionnaires were well understood by the respondents, and whether the format or presentation of the questionnaires were well designed, with respect to sequence, wording, order and clarity of questions, relevance of the questions, the need for additional instructions, length of the questionnaires and time required to complete them. The questionnaires were sorted and checked for completeness in order to determine their usability.

The 76 questionnaires were administered and all (100%) were completed, available for analysis, giving a response rate of 100%. The responses were coded and entered into SPSS version 24.0 statistical package for analysis. The knowledge, attitude and practice scores were obtained as follows: for knowledge each correct answer was scored one and incorrect answer zero, attitude, one mark to correct answers were the respondent agreed and zero for disagreement and do not know. Practice score was assessed in a similar way. Total score was obtained by totalling the points obtained and divided by the total number of maximum points multiplied by hundred for each. Marks < 60% were classified poor and marks> 60% were classified as good.

RESULTS

Table 1 showed socio-demographic characteristics of the respondents. Majority (35.4%) of the respondents were in the age bracket of 30-39 years and females were the predominant sex (68.0%). Furthermore, 62.0 were married. It was also shown that 80.3% of the respondents had tertiary education while majority 31.0% had been in service between 6-10 years. Waste handlers were only 8%.

Table 1: Socio-demographic characteristics of the respondents

Variable	Frequency	Percentage
Age		
20-29	17	22.4
30-39	27	35.5
40-49	22	28.9
50-59	10	13.2
60-69	0	0.0
Total	**76**	**100**
Sex		
Male	24	31.6
Female	52	68.4
Total	**76**	**100**
Marital Status		
Married	47	61.8
Single	22	28.9
Divorced	4	5.3
Widow	3	4.0
Total	**76**	**100**
Educational Level		
Primary	7	9.2
Secondary	8	10.5
Tertiary	61	80.3
Total	**76**	**100**
Years of Service		
Less than 1year	7	9.2
1-5 years	11	14.5
6-10 years	24	31.5
11-15 years	17	22.4
Above 15 years	17	22.4
Total	**76**	**100**
Designation		
Nurses	68	87.2
Waste Handlers	8	12.8
Total	**76**	**100**

Table 2 showed the knowledge of the respondents on standard universal precaution. All the respondents (100%) heard about SUP; while most of the respondents (85.0%) their source of information was from workshops and seminars. Fifty one percent (51.0%) opined that SUP is mandatory in all patients. Almost 45.0%% said that the method of treating instruments that came in contact with

infectious patient was sterilization and this was followed by disinfection 37.0%.

Table2: Knowledge of respondents on Standard Universal Precaution (SUP)

Variables	Frequency(N)	Percentage
Have you heard of SUP		
Yes	76	100
No	00	00
Sources of information about(SUP)		
Hospital		
Yes	34	45
No	42	55
Radio		
Yes	9	11.8
No	67	88.2
Television		
Yes	11	15.1
No	65	84.9
From School		
Yes	36	47.3
No	40	52.7
From Colleague		
Yes	23	30.3
No	53	69.7
Seminars/Workshops		
Yes	64	85.0
No	12	15.0
Condition in which SUP is mandatory		
Ebola	22	30.0
Hepatitis B	14	18.0
Very ill patients	11	15.0
Hospital acquired infections	10	13.0
All patients	39	51.0
Method of treating instruments that come in contact with infectious patient		
Sterilization	34	44.4
Disinfection	28	37.0
Cleaning	13	17.0
None of the above	1	1.6

Table three showed the attitude of the respondents to SUP. Majority (92.1%) of the respondents agreed that SUP could reduce the incidence of diseases and 88.2% agreed that they would report to the hospital after needle prick injuries. Furthermore 55.3% and 70.1% of the respondents respectively agreed that they would be screened for hepatitis B and C viruses for needle prick injuries. Over 70% agreed that they will carry out procedures such as passing of catheter involving hepatitis and HIV positive patients,

82.1% for veno-puncture, 88.0 for taking deliveries and assisting in taking deliveries, 75.0% for wound dressing and 80.0% for vaginal examination. Majority of the respondents agreed they would use all available options in SUP in managing patients.

Table3: Attitude of respondents towards SUP

Variables	Agree	Percentage	Disagree	Percentage	_ _	Percentage
Attitude towards(SUP)						
Does SUP prevent disease?	70	92.1	4	5.3	2	2.6
Recapping of needle is necessary in SUP	29	38.2	44	58.0	3	3.8
In needle prick injuries						
Report to the hospital	67	88.2	7	9.2	2	2.6
Screen for HBV	42	55.3	12	15.8	22	28.9
Screen for HIV	53	70.1	2	2.5	21	27.4
Could take immunization	31	40.7	30	39.5	15	19.8
Could take anti-retroviral drugs.	37	49.2	21	27.0	18	23.8
I could do the following procedures in HIV and HBV positive patients						
Catheter insertion	55	72.0	3	4.2	18	23.8
Veno-puncture	62	82.1	3	3.5	11	14.4
Taking deliveries or assisting in taking deliveries	67	88.0	1	1.2	8	10.8
Wound dressing	57	75.0	2	2.0	17	23
Vaginal examination	61	80.0	1	1.0	14	19.0
Surgical operation	32	41.5	1	1.0	43	57.5
Self-protection in managing patients						
Wearing double hand gloves	76	100	0	0	0	0
Wearing goggles and face masks	56	74.0	18	24.0	2	2.0
Wearing aprons/gowns	71	93.0	4	5.5	1	1.5
Wearing boots /foot wears	68	89.2	5	7.1	3	2.7

Table 4 showed the practice of standard universal precaution by the respondents. Majority of the respondents agreed that all available options of SUP would be used in managing patients. A greater proportion (59.1%) of the respondents opined that

The Nigerian Health Journal, Volume 19 No 3, July to September, 2019
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113

bleach should be used as SUP in blood and body fluid spills. All the respondents (100%) affirmed that they would despatch needle and syringes immediately after use, while 45.5% said they would detach needle from syringe after use, 92.5% would dispose needle and sharps in sharp containers and 77.2% would burn need and syringes in tight containers. Most of the respondents opined that SUP would apply in disinfecting used and reusable equipment.

Table 4: Practice of SUP by the respondents

Variables	Yes	%	No	%	Don't know	%
What do you do when there are blood spills and body fluids?						
Clean with soap and water	24	31.0	22	28.4	30	40.6
Use mop stick and water	15	19.5	39	51.2	22	29.3
Clean with chlorine bleach	45	59.1	17	22.1	14	18.8
Clean with alcohol	8	10.1	32	42.5	36	47.4
Clean with antiseptics	24	32.0	30	39.3	22	28.7
Practices of injection safety						
Do you recap needle after use?	35	45.5	37	48.2	4	6.3
Do you detach needle from syringe after use?	23	30.0	48	62.5	5	7.5
Do you despatch needle and syringe immediately after use?	76	100.0	0	0.0	0	0.0
How do you dispose your needles/sharps/syringes?						
Do you bury them?	9	12.0	47	61.2	20	26.8
Do you keep them inside dustbin?	24	31.4	38	50.6	14	18.0
Do you keep them inside tight container for burning?	59	77.2	5	6.8	12	16.0
Do you dispose sharps and needles in sharp containers?	70	92.5	0	0.0	6	7.5
How do you handle used and re-usable equipment?						
Do you keep them in autoclave?	73	96.1	1	1.5	2	2.4
Do you keep them in sterilizing units?	73	95.7	1	1.5	2	2.8
Have you ever had needle injury after a procedure?	44	58.2	32	41.8	0	0..0
After washing used and re usable instruments with soap and water, do you soak them in disinfectants?	63	82.4	10	13.6	3	4.0

Table 5: (a) Association between needle prick injuries on duty and health worker category and PPE workshops; (b) between use of hand gloves and boots on duty and health worker category and PPE workshops.

Yates's continuity correction was used because at least 1 cell had an expected frequency of <5.

There was no statistically significant association between needle prick injuries on duty and health worker category nor attendance of PPE workshops.

There was no statistically significant association between use of hand gloves and boots on duty and health worker category nor attendance of PPE workshops.

Variable (a)	Needle prick injury on duty	
	Yes (n=57) N (%)	No (n=19) N (%)
Category of health workers		
Nurse	52 (76.5)	16 (23.5)
Waste handlers	5 (62.5)	3 (37.5)
Yates's correction = 0.186; P value = 0.666		
Attendance of workshops on use of Personal Protective Equipment (PPE)		
Yes	42 (73.7)	15 (23.6)
No	18 (94.7)	1 (5.3)
Yates's correction = 2.639; P value = 0.104		
Variable (b)		
	Yes (n=50) N (%)	No (n=26) N (%)
Category of health workers		
Nurse	43(63.2)	25 (36.8)
Waste handlers	7 (87.5)	1 (12.5)
Yates's correction = 0.950; P value = 0.330		
Attended some workshops/seminars on the use of protective equipment		
Yes	35 (70.0)	15 (30.0)
No	16 (61.5)	10 (38.5)
Yates's correction= 0.555; P value = 0.456		

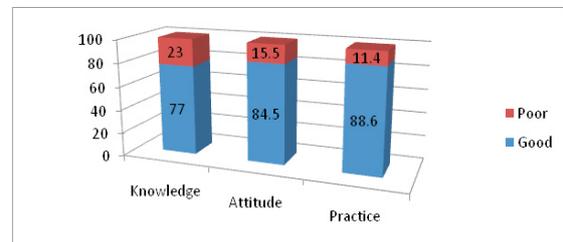Overall majority of the respondents had good knowledge, attitude and practice about SUP.

Fig 1: Knowledge, attitude and practice scores of the respondents.

DISCUSSION
This study assessed knowledge, attitude and practice variables in relation to standard universal precaution in a secondary health institution in Nigeria. There were more females than males in this study; and were the majority in the nursing profession in this secondary hospital. The respondents had good knowledge, attitude and practice towards standard universal precaution. A high proportion of the respondents knew

that standard precaution is necessary for disease prevention. This high knowledge about disease prevention in our study compared favourably with similar studies done in Edo state and south western Nigeria[1,12]. The study in north eastern Nigeria is different because of the differences in the levels of experience of various cadres of staff[18,19].Furthermore majority of the respondents were aware of universal standard precaution in this study.

The frequently used mode of channel for information about universal standard precaution was workshops and seminars. This is because the secondary level hospital used seminars and workshops as means of continuous learning and up grading of staff for best practices. The respondents in this work also showed good knowledge of universal standard precaution in the management of patients. Some studies done in other regions of Nigeria showed lower knowledge[20,21]. Most respondents showed good knowledge in this work and this is an indication that they attended workshops and seminars. Locally organized seminars and workshops are the cheapest ways staff can improve their knowledge.

In this study, only 39% knew that SUP should be applied all the time in handling patients whether from recognised or unrecognised sources. This is worrisome because that is the basic level of infection control measures. It has been shown that infection control at suboptimal level encourages the spread of hospital acquired infections[22]. Recently there was an outbreak of dermatitis in the various wards of the hospital which was attributed to resistant staphylococcus species.

The overall attitude of the respondents in this study towards universal standard precaution was good. This was demonstrated by the way they went for medical check-ups for infectious diseases such as hepatitis B and C when they had needle prick injuries. However 38.2% of the respondents had negative attitude towards needle recapping. This is lower than a study done in Nigeria and other countries where more than 50% of the respondents showed poor attitude in recapping needles[23,24,25]. Recapping is a bad attitude because the needle could miss the cap and stab the hand holding it. The needle could also pierce the cap and stab the hand holding it. The poor fitting cap could slip off a recapped needle and stable the hand holding it. Respondents in this study also had a positive attitude towards the use of personal protective equipment(PPE). The percentages of the use of PPE ranged from 74.0% those wearing goggles to 100% in those wearing double hand gloves. This is in contrast to the study done in Nigeria where only 37.0% used PPE while on duty. Studies done in other parts of Nigeria recorded lower percentages in the use of PPE. The reason for these differences could be due to healthy competitions organized amongst various departments in this hospital by the management[4,23,26]. Furthermore majority of the respondents wore double gloves when attending to patients. This agreed with some studies done in Nigeria[4,18]. It has been demonstrated that most of the respondents in this work showed good knowledge of universal standard precaution; this might had encouraged them to have good attitude towards universal standard precaution in this hospital.

It had been shown that training of health care

workers improves USP practices. Training has profound effect in changing people's views and perception positively about issues.[23,27].This work contrasted the above findings because there was no significant difference between needle prick injuries while on duty and attendance of workshops and also there was no significant difference between wearing of boots while on duty and attendance of workshops. Generally, respondents in this work showed good practice of universal standard practice. This agreed with previous studies done in various parts of Nigeria[17,18].It had be shown that the practice of standard precaution is not the same in the various health institutions especially in areas of needles recapping and detaching needles from syringes after use[18].

CONCLUSION

Standard universal precaution is a very important tool in disease prevention. The concept has been very useful in controlling infectious diseases such as HIV, HBV, HCV, Ebola etc. Respondents in this study had good knowledge of, practice of and attitude towards standard precaution. The worrisome aspect of this study is that a good number of the respondents still recap needles after use and detach needles from syringes. This will affect the quality of care in the hospital. The hospital management has to provide more continuous education in aspects of standard universal precaution.

RECOMMENDATIONS

With the rapidly growing population in Nigeria and rapid increase in the number of health facilities to meet up the challenges there is urgent need to strength the practice of standard universal precautions in the various hospitals. Hospital management

should institute healthy competitions amongst the various departments on quarterly basis to determine wards with best practices on SUP. Staffs of such departments should be rewarded with accelerated promotions and other incentives. Personal protective equipment such as gloves, boots, aprons, goggles etc should be provided by the hospital authorities and ensured that they are worn properly. More trainings and retraining should be carried out on regular basis in the various hospitals as these will improve their knowledge and attitude on SUP. Involvement of external assessors from the local governments and states in SUP in the various hospitals will strength the practice of SUP and this will reduce the prevalence of hospital acquired infections.

Conflict of Interest: The authors have no financial interest to declare.

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The Nigerian Health Journal, Volume 19 No 3, July to September, 2019
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117

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The Nigerian Health Journal, Volume 19 No 3, July to September, 2019
www.tnhjph.com
A Publication of Nigerian Medical Association, Rivers State, Nigeria

118