

KNOWLEDGE AND PRACTICE OF UNIVERSAL PRECAUTIONS AMONG PROFESSIONALS IN PUBLIC AND PRIVATE HEALTH FACILITIES IN UYO, SOUTHERN NIGERIA- A COMPARATIVE STUDY

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Abstract

Background: Occupationally acquired blood borne pathogens are becoming major killers globally. Consequently, the practice of Universal Precautions (UP) is key in protecting health workers from these pathogens.

Objective: This was to assess the knowledge and practice of UP among health workers in private and public hospitals in Uyo, Nigeria.

Method: This was a cross sectional study in which all eligible health workers in the private facilities were enlisted, while health workers from the public facilities were selected through multistage sampling method. Data obtained was analysed using SPSS version 11.

Result: A total of 360 respondents participated in the study, 240 (66.7%) from the public and 120 (33.3%) from the private facilities. Overall, 154 (64.2%) of the health workers in the public, compared to 65 (54.2%) in the private facilities had good knowledge of UP ($\chi^2 = 8.09, p < 0.05$) with a mean score of 14.5 out of 20 in the public and 12.3 in the private facilities. Those in the public facilities had a UP practice score of 11.86 out of a total score of 18 which was significantly higher than 9.54 in the private hospitals ($t = 6.01; p < 0.05$). Gloves and leak proof containers were the UP materials most in use in all facilities. Doctors recorded the highest use of UP materials in all facilities.

Conclusion: Though the knowledge and practice of UP were generally better in public compared to private facilities, there is need for training on UP in both public and private health facilities to improve the practice of UP.

Keywords: Knowledge, Universal Precautions, Health Workers, Health Facilities, Bloodborne Pathogens, Practice Score

INTRODUCTION

Universal Precautions (UP) as defined by the United States Center for Disease Control and Prevention is a set of precautions designed to prevent the transmission of blood borne pathogens when providing health care. Under UP principles, blood and certain body fluids of all patients are considered potentially infectious of blood borne pathogens, regardless of actual infectiousness.^{1,2} The World Health Organization (WHO) reports that among the 35 million health workers worldwide, about 3 million sustain percutaneous exposures to the blood borne pathogens each year, including, 2 million to hepatitis B virus (HBV), 0.9 million to hepatitis C virus (HCV) and 170,000 to human immune deficiency virus (HIV). These injuries may result in 70,000 HBV, 15,000 HCV and 5,000 HIV infections.³ In addition, more than 90% of the occupational infections occur in developing countries.³ Thoughtful adherence to UP remains the primary means of preventing occupational exposures and thus of reducing occupational risk of infection with blood borne pathogens.⁴

Various studies in health institutions in Nigeria have reported poor knowledge of UP among health workers. A study done in Lagos in 2003 among nurses reported that only 26% were aware of the existence of UP at the workplace⁵, while studies have documented knowledge of UP among doctors in different health institutions to be within the range of 26-44%.^{6,7,8,9} Poor practice of UP was reported among 271 doctors in University College Hospital, Ibadan, western Nigeria.⁶ Similarly, another study carried out among health workers in health institutions in Abeokuta, western Nigeria also found a high rate of non-

compliance to UP.⁷ Also in south-eastern Nigeria, a study done among doctors, nurses, laboratory staff and cleaners in three tertiary health institutions to assess the use of protective equipment and materials reported that where available, these equipments were found to be inconsistently used.¹⁰

With Akwa Ibom State in Southern Nigeria having the second highest Human Immune deficiency Virus sero-prevalence of 8% (national prevalence of 4.4% in 2005) and 4th highest prevalence of 9.7% in 2008, (national prevalence of 4.6%),^{11,12} it became necessary that this study be conducted to assess the knowledge and practice of UP in both the private and government hospitals in Uyo, the state capital with the intention of making information available to management/policy makers in the hospitals to ensure more effective application of these precautions in the health facilities.

Method

A comparative cross sectional survey of health workers in public and private health facilities in Uyo, Akwa Ibom State, Nigeria was carried out between July and August 2008. The State is located in the Southern part of the country with Uyo as the capital. The estimated population of Uyo metropolis as at 2006 was 304,000¹³ There were only 3 public health facilities in Uyo metropolis at the time of the study made up of one primary health centre, one secondary and one tertiary facility. The primary health centre attended to an average of 50 clients a day. The secondary health facility attended to an average of 102 patients daily. It is also one of the centres for anti-retroviral therapy for HIV/AIDS treatment in the state. The tertiary facility is a teaching hospital and attended to an average of 363 patients daily. It is one of the federal government designated centres for anti-retroviral therapy for HIV/AIDS treatment in Nigeria. There were a total of 20 private health facilities in Uyo metropolis at the time of the study. Most of these facilities were owned by

general practitioners with just a few specialist clinics.

Study population

The study population was made up of health workers in both public and private health facilities who were directly involved in patient care and were therefore at risk of occupational exposure to body fluids. There were a total of 240 health workers in the private health facilities made up of doctors, nurses, midwives, laboratory scientists/ technicians and auxiliary nurses. In the public facilities, there were a total of 570 health workers made up of doctors, nurses, midwives, laboratory scientists/ technicians, community health officers (CHO) and community health extension workers (CHEW).

Exclusion criteria

A total of 120 auxiliary nurses, found only in the private facilities and 90 community health officers (CHO) and community health extension workers (CHEW) found only in the public facilities were excluded from the study in order to ensure comparability between the health workers in the public and private facilities. These excluded health workers can be collectively referred to as auxiliary health workers.

Inclusion criteria

Only health workers found in both public and private facilities were included in the study. The total number of eligible health workers in the public and private facilities was 480 and 120 respectively.

Sample size

The minimum sample size per group which was calculated using the sample size formula for comparison of 2 independent group proportions was 120. All the eligible health workers in the private facilities therefore participated in the study. In order to increase the proportion of those participating from the public facility, the sample size of that group was increased to 240.

Sampling technique

All eligible health workers in the private

facilities made up of doctors, nurses, midwives, laboratory scientists/technicians who agreed to participate were enlisted into the study (total sampling). A total of 120 health workers were enlisted from the private facilities. Multistage sampling method was used to select the required 240 health workers from the public facilities. In order to ensure

comparability among the health workers in the private and public health institutions, stratified sampling method was used to categorize the health workers in the public institutions into comparable groups as those found in the private hospitals and equal proportion selected from each stratum of health workers. The health workers in both

Table 1: Socio-demographic characteristics of respondents

Variable	Public facilities N=240 n (%)	Private facilities N=120 n (%)
Age (year)		
20-29	43 (17.9)	28 (23.3)
30-39	132 (55.0)	61 (50.8)
40-49	60 (25.0)	29 (24.2)
50-59	5 (2.1)	2 (1.7)
Mean age	31.7± 5.6	31.7± 4.2
Sex		
Male	94 (39.2)	47 (39.2)
Female	146 (60.8)	73 (60.3)
Profession		
Physician	88 (36.7)	44 (36.7)
Nurse	132 (55.0)	66(55.0)
Laboratory scientist	20 (8.3)	10 (8.3)

Table 2: Association between demographic variables and awareness of UP among health workers

Characteristics	Awareness about UP		Statistics χ^2	p-value
	Aware N=281 n (%)	Not aware N=79 n (%)		
Age group (years)				
20-29	47 (66.2)	24 (33.8)	8.35	0.04
30 – 39	154 (79.8)	39 (20.2)		
= 40	80 (83.3)	16 (16.7)		
Sex				
Male	125 (88.6)	16 (11.4)	15.2	0.00
Female	156 (71.2)	63 (28.8)		
Profession				
Doctor	123 (93.2)	9 (6.8)	28.17	0.00
Nurse	136 (68.7)	62 (31.3)		
Lab scientist	22 (73.3)	8 (16.7)		
Health facility				
Public	212 (88.3)	28 (11.7)	44.4	0.00
Private	69 (57.5)	51 (42.5)		

Table 3: Respondents' knowledge on reduction of the risk to sharps injury

Hospital staff should	Public Facilities N= 240 n (%)	Private Facilities N= 120 n (%)	Statistics χ^2	p-value
Not break or bend used needle before disposal	160 (66.7)	67 (55.8)	4.03	*0.04
Not detach used needle from syringe before disposal	146 (60.8)	61(50.8)	3.27	0.07
Not recap used needle before disposal	152 (65.0)	63 (52.5)	3.90	0.05
Place needles and syringes in puncture resistant container after use	187 (77.9)	78 (65.0)	6.87	*0.01
Place sharp containers close to where sharps are used	168 (70.0)	86 (71.6)	0.11	0.74

* Significant

Table 4: Categorization of respondents' knowledge and score of UP

Knowledge categories	Public Facilities N=240 n (%)	Private Facilities N=120 n (%)	Statistics χ^2	p-value
Good e14	154 (64.2)	65 (54.2)	8.09	*0.02
Fair 10-13	19 (7.9)	7 (5.8)		
Poor <10	67 (27.9)	48 (40.0)		

Mean Knowledge: Public facilities = 14.5±5.72; private facilities = 12.3±6.1
t-test =3.28 , p= 0.02

* Significant

the private and public facilities were grouped according to their profession. Twice the number of health workers enlisted in each stratum in the private facilities was selected from the corresponding stratum in the public facilities by simple random sampling method. A total of 240 health workers were enlisted in the study from the public institutions. This increase in size was in view of the larger proportion of health workers in the public compared to the private health facilities. This therefore made the private to public hospital ratio 1:2.

Data Collection/Analysis

A self administered semi-structured questionnaire was used to obtain information on knowledge and practice of UP. The respondents were asked 20 questions that tested their knowledge of UP. One mark was awarded for every correct answer while no mark was awarded for a wrong answer (range 0-20). The total scores were then grouped into 3: poor knowledge (<10), fair (10-13) and good knowledge (>13). There were 9 questions testing the practice of UP by health workers in the public and private facilities. Each question had a response of always, most times, sometimes and never. Respondents

Table 5: Distribution of respondents from public and private health facilities by use of protective items

Item	Public Facilities N=240 n (%)			Private Facilities N = 120 n (%)			χ^2	p-value		
	Always	Most times	Sometimes Never	Always	Most times	Sometimes Never				
Latex gloves	195 (81)	27 (11)	12 (5.0)	6 (2.4)	92(77)	12 (10)	12 (10.0)	4 (3.3)	3.53	0.32
Utility/heavy duty gloves	19 (8)	10 (4)	42 (17.5)	169 (70.4)	7 (6)	2 (2)	6 (5.0)	105 (87.5)	14.42	*0.00
Face mask/shield	141 (59)	42 (18)	30 (12.5)	27 (11.2)	24 (20)	9 (8)	6 (5.0)	81 (67.5)	120.73	*0.00
Apron/gowns	153 (64)	30 (12)	45 (18.7)	12 (5.0)	48 (40)	9 (7)	24 (20.0)	39 (32.5)	52.70	*0.00
Goggles/eye glasses	11 (5)	13 (5)	26 (10.8)	190 (79.2)	18 (15)	3 (2)	9 (7.5)	90 (75.0)	13.40	*0.00
Boots	108 (45)	15 (6)	9 (3.8)	108 (45.0)	33 (28)	7 (6)	5 (4.2)	75 (62.5)	11.13	*0.01
Leak proof container	195 (81)	22 (9)	6 (2.5)	17 (7.0)	92(77)	7 (6)	18 (15.0)	3 (2.5)	23.09	*0.00
Running water for hand washing	205 (85)	11 (5)	7 (2.9)	17 (7.1)	84 (70)	12 (10)	6 (5.0)	18 (15.0)	12.16	*0.01
Appropriate disinfectant	198 (82.5)	21 (8.8)	15 (6.2)	6 (2.5)	96(80.0)	12 (10.0)	6 (5.0)	6 (5.0)	1.91	0.59

Mean Practice score: Public facilities = 11.86±5.30 ; Private facilities = 9.54±5.63 ; t-test 6.01, p<0.05

* Significant

Table 6: Association between practice of UP and profession of health workers

Characteristics

Profession	Public facilities		Statistic χ^2	p-value
	Good Practice N=156 n (%)	Poor Practice N=84 n (%)		
Doctor	69(78.4)	19(21.6)	10.33	<0.01
Nurse	73(55.3)	59(44.7)		
Lab scientist	14(70.0)	6(30.0)		

Private Facilities

	N=64 n (%)	N=56 n (%)		
	Doctor	29(65.9)		
Nurse	30(45.5)	36(54.5)		
Lab scientist	5 (50.0)	5(50.0)		

who answered always were scored 2 marks, most times 1 mark, while sometimes and never had 0. The maximum obtainable score was 18, while the minimum was 0. Data obtained was analysed using the Statistical Package for the Social Sciences (SPSS) version 11. Frequencies were generated and the Chi-square test was used to compare different proportions and test associations. The mean scores were calculated and the differences compared using student's t-test.

Ethical Consideration

Prior to the study, ethical approval to carry out the study was obtained from the ethical review committee of the teaching hospital. In addition, permission to carry out the study was obtained from the State Ministry of Health and the heads of the individual facilities involved in the study. Written informed consent was also obtained from respondents.

Results

A total of 360 respondents participated in the study, 240 (66.7%) from the public hospitals and 120 (33.3%) from the private hospitals. The mean age of respondents from the public hospitals was 31.7 (\pm 5.6) years which was very similar to the mean age of 31.7 (\pm 4.2) years among respondents in the private hospitals. Nurses formed 55.0%, while doctors formed 36.7% of respondents interviewed in each group. (Table 1) Awareness to UP was highest among physicians,(93.2%)and lowest among nurses, (68.7%). Respondents in the public facilities had greater awareness of UP, 212 (88.3%), compared to 69 (57.5%) in the private hospitals and this difference was statistically significant (Table 2). A significantly higher proportion of respondents, 125 (59.0%) in the public hospitals knew that UP was concerned with measures to avoid blood borne infections at workplace compared to only 15 (21.7%) from the private facilities. Generally, health workers in the public facilities had better knowledge of what should be done to

reduce sharps injury at workplace. Specifically, up to 152 (65.0%) of the health workers in the public facilities, knew that needles should not be recapped compared to 63 (52.5%) in private facilities. Also, a significantly higher proportion of health workers in the public facilities, 160 (66.7%) knew that needles should not be bent or broken before disposal compared to 67 (55.8%) in the private facilities. (Table 3)

A higher proportion of health workers in the public hospitals 157 (65.4 %) considered the blood/other body fluids of all patients as potential sources of infection to health care workers compared to 69 (57.5%) from the private hospitals.

On the whole, the overall knowledge score of respondents was above average with 219 (60.8%) of them scoring 14 and above. However, up to 48 (40.0%) of health workers in the private facilities had poor knowledge of UP compared to 67 (27.9%) in the public facilities. The difference was statistically significant. The mean knowledge score for those in the public facilities was 14.50 (± 5.72) compared to 12.30 (± 6.1) in the private facilities. The difference was also statistically significant at $p < 0.05$. (Table 4)

The use of UP materials by health worker was generally higher in the public compared to the private facilities. Gloves and leak proof containers were always being used by 195 (81%) respondents in the public facilities, compared to 92 (77%) in the private facilities. Two hundred and five (85%) respondents in the public facilities always washed their hands or other skin surfaces when they came in contact with blood or other body fluids compared to 84 (70%) in the private facilities. However only 108 (45.0%) and 33 (28%) in the public and private facilities respectively always used boots. The use of goggles was also low in both facilities, being 18 (15%) in the private facilities and 11 (5%) in the public facilities. Similarly, only 19 (8%) and 7 (6%) of respondents in the public and private

facilities always used utility gloves when necessary. The mean practice score was significantly higher in the public facility, 11.86 ± 5.30 as compared to 9.54 ± 5.63 in the private facilities, $p < 0.05$. (Table 5)

Doctors recorded the highest practice of UP while the nurses recorded the lowest in both the public and private facilities. The difference was statistically significant in the public facilities, being 69(78.4%) and 73(55.3%) respectively for doctors and nurses in those facilities ($p < 0.05$). (Table 6)

DISCUSSION

This cross sectional study was conducted to assess the knowledge and practice of Universal Precautions (UP) among health workers in public and private health facilities in Uyo, a city in southern Nigeria. Most health workers in this study were young people, still having many years of productive lives ahead and as such the need to protect themselves from blood borne pathogens was a serious necessity. This finding is similar to what was obtained in a study done among health workers in Pakistan where the mean age of the respondents was reported to be 30 years.¹⁴ The greater awareness of UP among health workers in this study was better than findings from a study carried out among doctors and laboratory workers in Benin City where it was reported that only about a third had heard about UP.⁹ The fact that awareness was highest among doctors and lowest among nurses in this study was not surprising since doctors by virtue of their training are supposed to be more knowledgeable than other groups of health workers. However, hearing about a term does not necessarily translate to knowledge about it. For example, those who actually understood the correct definition of Universal Precautions were fewer. Similar findings were reported in a study conducted among resident doctors in a public facility in India in which only 53 (56.9%) correctly knew about Universal Precautions.¹⁵ Another study conducted in Ibadan, Nigeria also reported poor knowledge of UP among doctors in the University

College Hospital (UCH) Ibadan, as only 24% of the doctors knew the correct definition of UP.⁶

Every health worker needs to know that needles should not be recapped as it increases the risk of needle stick injuries. A possible explanation for recapping of needles among some of the health workers in this study was the fact that many of them may have reused the needles in order to save cost for the patients. Some of them may also have felt that recapping makes disposal safer. These faulty practices exposed the health workers to needle stick injuries. Proper needle manipulation is an important aspect of compliance with the UP guidelines especially in countries where injection use is very high.

About one third of health workers in the public and up to half of those in the private facilities did not know that needles should not be bent or broken before disposal. This finding is worrisome because of the high risk of needle stick injury that such workers were exposing themselves to. Worse findings were reported in a study to assess safe injection practices among 1100 health-care workers in 25 health-care facilities in Egypt in which knowledge of proper needle manipulation before disposal was reported in only 41% of injections.¹⁶

About one third of respondents from both public and private hospitals respectively considered body fluids of only patients diagnosed with disease as potential sources of infection to health workers. This group of health workers are unlikely to adopt protective measures when handling patients not diagnosed with any disease, thus unnecessarily exposing themselves to blood borne pathogens. Different findings were reported in a study carried out to assess the knowledge, attitude and practice of UP by 50 medical personnel in department of surgery of a teaching hospital in Ghana as 48 (96%) of the respondents agreed that UP should be practiced for all patients, 1 respondent (2%) said it should be so only for infected patients and 1 (2%) was silent on the issue.¹⁷ The high

level of knowledge in that study may have been due to the fact that the study was limited to doctors and final year medical students. This group of health personnel is expected to be better informed than the rest of the health workers.

The finding that the mean knowledge score of respondents concerning UP was significantly higher in the public facilities than private facilities was different from findings in some other studies where knowledge of UP was reported to be low in both the public and private hospitals.^[6,14] This may have been due to the fact that two of the three public facilities used were centres for antiretroviral therapy and the respondents were likely to be more enlightened.

Glove use was high in this study unlike what was reported in a study done in Pakistan in private clinics where about 48% of the health workers in that study had never worn gloves during performing procedures with potential blood or body fluid exposure while only 20.9% wore gloves for most of the time to always and up to 37% of the doctors reported never using gloves for procedures.¹⁴ These health workers put themselves at risk of blood borne pathogens in the course of carrying out their duties. A much higher use of gloves was reported among 271 doctors in University College Hospital, Ibadan, Nigeria where for specific tasks like taking deliveries compliance with glove use was 95%.⁶ Every health facility should target 100% glove use by their workers since the hands are commonly involved in most medical procedures.

The low goggles use during deliveries or surgeries in this study was similar to findings reported in a study in western Nigeria where only 13.6% in the public and less than 20% in the private facilities always used goggles.⁷ In a study among community hospital based health workers, reasons given for not using precautions included: belief that stopping to use the precautions would have put the

patient at risk (22%); using precautions would have interfered with patient care (20%); precautions were not warranted in a specific situation (14%); did not anticipate the potential for exposure (14%); and high job demands that had caused respondent to be in a hurry (11%). Less often, equipment was not available (7%), respondent forgot (6%), respondent thought that the patient did not pose a risk (4%), or the available equipment was not effective (3%).¹⁸

The high use of leak proof containers by respondents in this study differed from findings reported in a cross sectional survey conducted in Nigeria in July/August 2004 in 80 health facilities in which about 62.5% were observed not to have safety boxes in use and 23.8% had no injection rooms, exposing a large number of people to unsafe injection practices.¹⁹ In developing countries, the frequency of these factors gets accentuated with high injection use at health care facilities, most of which are provided with previously used syringes.^{20,21} Sharps waste handling within such clinics and the out-of-clinic disposal of these wastes are also unsafe, putting the injection providers, as well as the community, at risk of needle sticks injury.^{22,23}

The mean practice score of UP among health workers in private facilities in this study was higher than that reported in private health institutions in Abeokuta, western Nigeria, where the overall regular use of UP materials was 43.2%. The use of UP in the cited study was based on only 4 items (gloves, apron, gowns and goggles) compared to the present study where the practice score was based on 9 items (gloves, apron, gowns, goggles, running water, disinfectant, boots, utility gloves, mask and leak proof container), and therefore gave a more comprehensive result. Though doctors have been reported to consistently de-emphasize the importance of and to be poorly compliant with universal precautions compared to other groups of health workers,²⁴ in this study, doctors recorded the highest practice of UP while the nurses recorded the lowest in both the public and private facilities.

Conclusion

The practice of Universal Precautions was higher among health workers in the public than private health facilities. Some health workers especially in the private facilities had very erroneous ideas such as assuming that needles should be recapped, bent or detached from syringes before disposal. Routine training sessions are necessary in all health facilities to improve the health workers' knowledge of the different aspects of UP in order to ensure safe practice and adherence to Universal Precaution guidelines.

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