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RESEARCH ARTICLE

KNOWLEDGE AND PRACTICE OF STANDARD PRECAUTIONS AMONG HEALTH CARE PROVIDERS
IN PRIMARY AND SECONDARY HEALTH CARE FACILITIES IN IMO STATE

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ABSTRACT

Background:

Objective: This is a study to determine the knowledge and practice of Standard Precaution among Health care providers in primary and secondary health care facilities in Imo State. With the occurrence of new and re-emerging infectious diseases in the world today especially in the West African sub-region; such as Ebola Viral Disease, Lassa Fever, etcetera; It becomes imperative to examine the knowledge and practice of health care providers of preventive measures established by the World Health Organization, for the prevention of hospital acquired infections. These diseases become nosocomial infections when standard precautionary procedures are not followed.

Methodology: A Cross-sectional descriptive study using semi-structured, structured and interviewer administered questionnaires; conducted among 404 health-care providers in different secondary and primary health-care facilities across the three geopolitical zones of Imo state.

Result: Of the 404 respondents, 195(48.3%) were Nurses, 78(19.3%) were Doctors, 93(23%) were laboratory scientists, 38 (9.4%) were laboratory attendants. Of the respondents, 200(49.5%) got their information from textbooks/Journal. 21(5.14%) from someone, 112 (27.7%) from seminar/symposium, 31(7.6%) from Television, 17(4.2%) from Radio. Those who were knowledgeable about the use of gowns/aprons and gloves among the Health care providers were 273 (67.7%), adequate hand-washing 318 (78.8%), wearing of surgical mask 207 (51.4%), use of goggles 107 (26.6%), face shield 109 (27%). On knowledge of the route of transmission of blood-borne pathogens: through improper use of sharp objects, those who knew were 269(66.7%). Total number of Health care providers that practiced Standard Precautions always were 300(74.3%). On the immunization status of health care providers: 313 (77.7%) had been immunized or had been vaccinated with BCG vaccine and hepatitis B vaccine.

Conclusion: In view of the importance of standard precaution in the prevention of nosocomial infection, its knowledge and practice should be optimal in all health facilities. The teaching of Standard Precaution for health care practitioners cannot be left to the media; it must be a major part of the training curriculum of health care providers. The situation in Imo State is sub-optimal and needs to be upgraded for the safety of the healthcare practitioners and their patients.

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INTRODUCTION

Background

With the occurrence of new and re-emerging infectious diseases in the world today especially in the West African sub-region; such as Ebola Viral Disease, Lassa Fever, etcetera; It becomes imperative to examine the knowledge and practice of health care providers of preventive measures established by the World Health Organization, for the prevention of hospital

acquired infections. These diseases become nosocomial infections when standard precautionary procedures are not followed. The recent Ebola epidemic in Nigeria clearly illustrates this. Nosocomial infections are feared because most are resistant to the usual drugs used in their treatment. Health care facilities according to WHO are hospitals, primary health care centres, isolation camps, burns patient's units, feeding centres and others. Health care providers are people who engage in various actions with primary intention of enhancing health. These include people who provide services such as doctors, nurses, midwives, pharmacists, laboratory scientists, technicians, physiotherapists, dieticians as well as management and support workers such as hospital managers, financial

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officers, drivers and cleaners (WHO, 2012). Health care providers may be exposed to blood and other body fluids during the course of their work; consequently they are at risk of contracting or transmitting infections from and to patients at the workplace (Amoran, 2013). Health care associated infections have posed serious problems in health care facilities as they are common causes of morbidity and mortality among health care provider (Eriksen, 2005). Occupational exposure to the body fluids of patients may occur from skin to skin contact, or through injury from sharp instruments. Mucocutaneous injury or from splash of blood or other body fluids into the eyes, nose, mouth or body contact with non-intact skin which can all cause substantial health consequences and psychological stress for health care providers and their families (Omiepirisa Yvonne Buowari, 2012 and Vaz, 2010), Patients who get infected from health facilities run high risk of contracting drug resistant strains of the disease.

Some of these infectious diseases have no vaccines or cure; diseases like hepatitis B (HBV), Hepatitis C Virus (HCV), Human immune deficiency Virus (HIV), Ebola Virus and other body fluid borne and air borne diseases. At high risk are health workers as they are in direct contact with patients and frequently handle sharps in the course of their work (Omiepirisa Yvonne Buowari, 2012; Vaz, 2010 and Nduka, 2012). Hospital acquired infections have serious consequences including long term illness, disability and even death (Akeem, 2011). Compliance with the practice of standard precautions is thus essential for all health care Providers as it has been shown to reduce the risk of exposure to blood and body fluids (Amoran, 2013 and Chan, 2002). Universal precautions refers to the practice, in medicine of avoiding contact with patients' bodily fluids, by means of the wearing of nonporous articles such as medical gloves, face shields and goggles. The practice was introduced in 1985–88. In 1987, the practice of universal precautions was adjusted by a set of rules known as body substance isolation.

In 1996, both practices were replaced by the latest approach known as standard precautions. Standard Precaution was designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in healthcare settings and apply to all patients regardless of diagnosis or presumed infection status. Use of personal protective equipment is now recommended in all health settings. Standard Precaution was established to abolish stigma and discrimination in health-related settings. As universal precautions was implicated as a means by which health care workers discriminate against patients. Particularly the employment of universal precautions when working with people with HIV and/or hepatitis C. This has been demonstrated to cause feelings of stigmatization reported by some patients. With standard precautions, all patients are treated the same (Sridhar et al., 2004; CDC, 1988; CDC, 1985 and World Health Organization, 2007).

Key elements of standard precaution

The WHO health care facility recommendations for standard precautions are stated below (World Health Organization, 2007):

Hand hygiene: Hand washing or rubbing of alcohol-based sanitizers before and after any direct contact with a patient; whether or not gloves were worn. Immediately after gloves are removed hands must be washed and also before handling an invasive device. After touching blood, body fluids, secretions, excretions, non-intact skin and contaminated items, even if gloves were worn hands should be washed. After contact with inanimate objects in the immediate vicinity of a patient.

Gloves: Wear when touching blood, body fluids, secretion, excretion, mucus membrane, non-intact skin. Change between tasks and procedures on the same patient after contact with potentially infectious material. Remove after use, before touching non-contaminated items and surfaces and before going to another patient. Perform hand hygiene immediately after removal.

Facial protection (eyes, nose and mouth): Wear a surgical or procedure mask and eye protector (eye visor, goggles) or a face shield to protect mucous membranes of the eye, nose and mouth during activities that are likely to generate splashes or sprays of blood, body fluids, secretion and excretions.

Gown or scrubs: Wear to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or spray of blood, body fluids secretions or excretion. Remove soiled gown as soon as possible, and perform hand hygiene.

Prevention of needle stick and injuries or from other sharp instruments. Care when: Handling needles, scalpels, and other sharp instruments or devices, Cleaning used instruments and disposing of used needles and other sharp instruments to prevent injuries.

Respiratory hygiene and cough etiquette. Persons with respiratory symptom should apply source control measure such as cover nose and mouth when coughing/sneezing with tissues or masks, dispose of used tissue and masks, and perform hand hygiene after contact with respiratory secretions. Health-care facilities should place acute febrile respiratory symptomatic patients at least 1 meter (3feet) from themselves and other patients in common waiting rooms and should also make hand hygiene implements available in examination rooms.

Environmental cleaning: Use adequate procedures for the routine cleaning and disinfection of environmental and other frequently used or touched surfaces.

Linens: Handle, transport and process used linen in a manner which: Prevents skin and mucus membrane exposures and contamination of clothing. Avoid transfer of pathogens to other patients and or the environment.

Waste disposal: Ensure safe waste management. Treat waste contaminated with blood, body fluids, secretions and excretion as clinical waste, in accordance with local regulations. Human tissues and laboratory waste that is directly associated with specimen processing, should also be treated as clinical waste. Discard single use items properly.

Patient care equipment: Handle equipment soiled with blood, body fluids, secretions and excretions in a manner that prevents skin and mucus membrane contact, contamination of clothing and transfer of pathogens to other patients or the environment. Clean, disinfect and reprocess reusable equipment appropriately before use on another patient. A high understanding of standard precautions and adherence with practice of standard precaution is even more important with the emergence of infectious diseases such as Ebola viral infections, Lassa fever, Avian influenza, Severe Acute Respiratory Syndrome in addition to HIV, HCV, HBV and others not mentioned (Mehrdad Askarian, 2007).

MATERIALS AND METHODS

Study area: Imo State is one of the 36 states of Nigeria and lies in the South Eastern part of Nigeria with Owerri as its capital and largest city. Imo State lies within Latitude $4^{\circ}45'N$ and $7^{\circ}25'E$ with an Area of around 5,100sq km. It is bordered by Abia State on the East, by Anambra State to the North and Rivers State to the South. This study was carried out in the three Geo-political zones of Imo state namely: Owerri, Orlu and Okigwe zones of Imo State. In each of the zones, a secondary health-care facility and two primary health-care facilities were randomly selected. For owerri zone, the study was conducted at Holy Rosary Hospital Emekuku, Owerri Municipal Health Centre, and Primary Health Centre Ogbuaku. For Orlu zone, the study was conducted at Joint Hospital Amaigbo, Comprehensive Health Centre Osina, and Primary Health Center Eziachi, For Okigwe zone, it was conducted at General Hospital Okigwe, Primary Health Centre, Anara and Ogii Primary Health Care Centre Okigwe.

Study population: Health-care providers in the above mentioned hospitals and health centres.

Study design: A descriptive Cross-sectional study.

Sample size estimation: The total number of health care providers in our study population was estimated to be greater than 10, 000. Thus, the sample size was calculated using the Cochran formulae. With 10% attrition added, the sample size was 422.

Sampling technique: A multistage sampling technique was used: A list of all the primary and secondary health-care facilities in each zone of Imo state was established. Using simple random sampling method, two centres from the list of primary HCFs and one centre from the list of secondary health care facilities were selected from each zone. The study population in all the selected health care facilities were stratified according to gender, and profession, that is doctors, nurses, midwives, ward maids, laboratory scientists and physiotherapist, and respondents selected proportionately according to population size. Health care providers eligible for the study were those exposed to blood and body fluid borne pathogens. These include: doctors, nurses, laboratory scientists, laboratory workers, ward maids, cleaners, orderlies and Physiotherapist.

Data collection: Data was collected by the use of structured and semi structured self-administered questionnaires and

interviewer administered questionnaires for illiterate respondents.

Data analysis: Data was analyzed using computer statistics software SPSS version 16.

Ethical consideration: Approval was obtained from the Ethical committee of Imo state University Teaching Hospital. Informed consent was also obtained from the relevant health facilities and each respondent. Confidentiality of information and anonymity were assured.

RESULTS

The questionnaires retrieved were 404, giving a response rate of 95.7%. The socio-demographic parameters (Table 1) shows that 147(36.4%) were males while 257(63.6%) were female, giving a male: female ratio of 1:7. Within the age group of 20-24yrs were 20(4.7%) , 62(15.3%) were 25-29yrs, 101(25%) were within 30-34 yrs,86(21.3%) were within 35-39 yrs, 63(15.6%) were within 40-44 yrs, 44(10.9%) were within 45-49 yrs, while 28(6.9%) were above 50 yrs of age. 116(28.7%) were single,274(67.1%) married, 17(4.2%) were separated. 221(54.7%) had 0-9 yrs of practice experience 136(33.7%) had practiced for 10-19yrs, while 47(11.6%) had practiced for over 20 yrs Nurses were 195(48.3%), 78(19.3%) Doctors, 93(23%) laboratory scientists, 38(9.4%) were laboratory attendants.

Table 1. Socio-demographic parameters

Gender		
	Frequency	Percentage
Males	147	36.4
Females	257	63.6
Total	404	100
Age		
Age range	Frequency	Percentage
20-24	20	4.7
25-29	62	15.3
30-34	101	25
35-39	86	21.3
40-44	63	15.6
45-49	44	10.9
>50	28	6.9
Total	404	100
Marital status		
	Frequency	Percentage
Single	116	28.7
Married	274	67.1
Separated	17	4.2
Divorced	NIL	NIL
Total	404	100
Years of practice		
Years	Frequency	Percentage
0-9	221	54.7
10-19	136	33.7
20 and above	47	11.6
Total	404	100
Occupation		
Occupation	Frequency	Percentage
Nurse	195	48.3
Doctor	78	19.3
laboratory scientists	93	23
laboratory attendants	38	9.4
Physiotherapist	Nil	Nil
Total	404	100

Table 2 shows that of the respondents, 200(49.5%) got their information from textbooks/Journal. 21(5.14%) from someone, 112(27.7%) from seminar/symposium, 31(7.6%) from Television, 17(4.2%) from Radio, 23(5.7%) did not respond.

Table 3 on knowledge of standard precaution: There was good knowledge of the use of gowns/ aprons and gloves among the Health care providers 273 (67.7%), adequate hand-washing 318 (78.8%), a fair knowledge of wearing of surgical mask 207 (51.4%), recapping of used needles 225(55.9%) and poor knowledge of use of goggles 107 (26.6%), face shield 109 (27%) and re-use of used gloves as precautionary measures 43 (10.6%).

On knowledge of health-care providers of the route of transmission of blood-borne pathogens: through the improper use of sharp objects, those who knew were 269 (66.7%). Not by staying in same room with person with pathogens: 367(91%). Sexual contact: 246(60.9%).

Table 2. Source of knowledge/information on standard precaution

Questions	Frequency	Percentage
textbook/journals	200	49.5
someone told me	21	5.14
seminar/symposium	112	27.7
Tv	31	7.6
radio	17	4.2
no response	23	5.7
Total	404	100

Questions	Freq	%	Freq	%	Freq	%	Freq	%	Total Freq	%
Through textbook/journal	48	11.9	86	21.3	54	13.4	12	2.9	200	49.5
Someone told me			12	2.9	3	0.74	6	1.5	21	5.14
Seminars/symposium	16	3.9	63	15.6	25	6.2	8	1.9	112	27.7
TV	7	1.7	17	4.2	5	1.2	2	0.49	31	7.6
Radio	6	1.5	6	1.5	2	0.49	3	0.74	17	4.2
No Response	1	0.25	11	2.7	4	0.99	7	1.73	23	5.7
Total	78	19.3	195	48.2	93	23	389	9.3	404	100

	Doctors	Nurses	Lab scientists	Lab attendants	
Use of gown and protective apron	72 17.8	118 29.2	58 14.4	25 6.2	67.6
Recapping of used needles needles after use	38 8.4	121 29.9	57 14.1	14 3.5	55.9
Use of gloves	68 16.8	127 31.4	60 14.9	25 6.2	69.3
Surgical mask	61 15.1	89 22.0	45 11.1	13 3.2	51.4
Face shield	34 8.4	46 13.4	14 3.5	7 1.7	27
Goggle	31 7.7	46 11.3	22 5.4	9 2.2	26.6
Adequate hand-washing after each procedure	71 17.6	162 40.0	62 15.3	24 5.9	78.8
Re-use of used gloves	7 1.7	25 6.2	5 1.2	6 1.5	10.6
Total	382 93.5	734 183.4	323 79.9	123 30.4	387.2

Table 3. Knowledge of health-care providers of the route of transmission of blood-borne pathogens

	Doctors	Nurses	Lab scientists	Lab attendants	Total
	Freq Freq%	Freq Freq%	Freq Freq%	Freq Freq%	Freq %
Use of sharp objects	60 14.8	133 32.9	49 12.1	28 6.9	66.7
Not by staying in same room with person with pathogens	78 19.3	183 45.3	77 19.0	30 7.4	91
Sexual contact	56 13.8	113 27.9	56 13.8	22 5.4	60.9
Not by touching infected person	75 18.5	134 33.1	74 18.3	29 7.1	77
Skin abrasion	61 15.0	121 29.9	60 14.8	25 6.2	65.9

Table 4. Practice of standard precaution; practice of hand-washing

Questions	Doctors	Nurses	Lab Scientists	Lab attendants	Total
	Freq Freq%	Freq Freq%	Freq Freq%	Freq Freq%	Freq %
After the days work	52 12.8	85 21.0	77 19.0	13 3.2	56
Immediately you enter your office for the day	27 6.7	- -	- -	- -	7.7
After examining each patient	47 11.6	110 27.2			38.8
Only after examining patient with open wound	10 2.4	25 6.1			8.5
Before and after each procedure	35 8.6	16 3.9	58 14.3	11 2.7	29.5
No response	12 2.9	47 11.6	17 4.2	9 2.2	20.9

Practice of wearing/changing of hand glove

Questions	Doctors	Nurses	Lab Scientists	Lab attendants	Total
	Freq req%	Freq Freq%	Freq Freq%	Freq Freq%	Freq %
After each procedure	68 16.8	96 23.8	54 13.4	16 3.9	57.9
When it looks dirty or smells	10 2.4	79 19.5	35 8.7	16 3.9	34.5
When its torn		15 3.7	- -	7 1.7	5.4
After the days work	- -	28 6.9	18 4.5	21 5.2	16.6

Percentage of Health-care Providers that practiced Standard Precaution

Do you practice Standard Precaution in your daily patients care?	Doctors N(%)	Nurses N(%)	Lab Scientists N(%)	Lab attendants n(%)
Yes	69(89.3)	149(76.8)	69(74.9)	13(47.3)
No	-	-	-	-
Not always	9(10.7)	46(23.2)	24(25.1)	25(52.7)

Total number of Health care providers that always practice Standard Precautions were 300(74.3%).

Table 5. Immunization status of Health-care Providers

	Doctors %	Nurses %	Lab scientists %	Lab attendants %
Yes	93	91	53	44
No	1	6	29	15
No response	6	3	18	41

On the immunization status of health care providers: 313 (77.7%) had been immunized or had been vaccinated

Not by touching infected person: 311 (77%). Skin abrasion: 266(65.9%). Table 4 Practice of standard precaution; practice of hand-washing among the health care providers: Respondent's practice of hand washing after the day's work was done by 226(56%). The practice of hand-washing immediately on entrance to the office was practiced by 31(7.7%). After examining each patient 147 (38.8%), after examining patient with open wound 34(8.5%). Before and after each procedure 119(29.5%) respectively. in the wearing/changing of hand glove among all the Health care providers, 233(57.9%) change their gloves after each procedure, 139(34.5%) when it looks dirty or smells, 21(5.4%) when it is torn, 67(16.6%) after the day's work. The Health care providers that practiced Standard precaution were 300(74.3%). 69(89.3%) of the 78 doctors said yes, and 9(10.7%) said not always. 149(76.8%) of the Nurses said yes and 46(23.2%) said not always. Of the Lab scientists, 69(74.9%) said yes while 24(25.4%) said not always. 13(47.3%) of Lab attendants said yes while 25(52.7%) said not always. Table 5: on the immunization status of health care providers 313 (77.7%) had been immunized or had been vaccinated with BCG vaccine, hepatitis B vaccine: Of doctors 72(93%) had been immunized, 1(1%) had not, while 5(6%) did not respond. Of the Nurses 177(91%) were immunized 11(6%) were not, while 5 (3%) did not respond. On the other hand, Lab scientists 49(53%) had been immunized, 26(29%) were not, while 15(18%) did not respond. Lab attendant 16(44%) had been immunized, 5(15%) were not, 15(41%) did not respond.

DISCUSSION

The level of Knowledge of Standard Precaution among the health-care workers found in this study corroborates the findings of other researchers. In this study, 55.9% of respondents recapped used needles. The practice of recapping used needles has been identified as a contributor to incidence of needle stick injuries among health care workers (Wilson *et al.*, 2006; Oguamanam Okezie Enwere and Kelvin Diwe, 2004; Shuvankar, 2012; Hesse, 2006; Franklin Okechukwu Emeka, 2009; NPC, 2006; Local Government organization in Imo State, ?; About Imo State, ?; Nigeria zip code, ?; Reuben, *et al.*, 1983).

In the present study, compliance with non-recapping of used needles among the different cadres of health care workers was variable. The experienced nurses were more compliant than auxiliary nurses, perhaps because they were better trained. From this study, the doctors did not practice recapping of used needles unlike the nurses or laboratory scientists. This finding correlates with the work done by other researchers (Wilson *et al.*, 2006 ; Oguamanam Okezie Enwere and Kelvin Diwe, 2004; Shuvankar, 2012; Hesse, 2006; Franklin Okechukwu Emeka, 2009; NPC, 2006; Local Government organization in Imo State, ?; About Imo State, ?; Nigeria zip code, ?; Reuben, *et al.*, 1983 and Foster, 2010).

This study found that that there was good knowledge of use of gowns/ aprons and gloves among the health care providers (67.7%), this is in compliance with the use of personal protective equipment or barrier equipment during procedures with potential exposure to blood and other body fluids such as surgery and obstetrics procedures and seemed to depend on the type of Personal Protective Equipment and type of health-care facility. The use of scrubs, aprons and gloves were generally seen or observed as standard precaution. It was practiced at all levels in the health system. This is in line with findings in other studies (Eriksen, 2005; Aisien, 2005; Oguamanam Okezie Enwere and Kelvin Diwe, 2014 and Health Facilities Infection Control, 2002). This study revealed fair knowledge and practice of wearing of surgical mask (51.4%), this is because wearing of surgical mask is seen as standard precaution and it is enforced and used at all times. There was poor knowledge of use of goggles with only about (26.6%) using goggles under circumstances that promoted contact with body-fluid and face shield (27%). Protective glasses were more likely to be worn in the tertiary centres and least likely in the general hospitals and primary health-care centres. The tertiary centres, perhaps being more sophisticated, provided protective glasses for the health care workers, corresponding with other studies, (Aisien, 2005; Foster *et al.*, 2010 and Health Facilities Infection Control, 2002).

There was 78.8% compliance to hand-washing among the health care providers in this study. Adequate hand washing has been reported to be practiced as routine most especially in tertiary health care facilities than primary and secondary health

care facilities (Aisien, 2005 and Health Facilities Infection Control, 2006). The over-all practice of hand-washing among health-care providers in primary and secondary health care facilities was generally poor, only with a fairly good practice of hand-washing after the day's work (56%). The practice of hand-washing immediately on entry to the office is only practiced by 6.7% of the doctors, after examining each patient (38.8%), (8.5%) wash after examining patient with open wound, but (29.5%) do so before and after each procedure. In some other studies,^{16,29} the observance of hand washing by the health care workers after handling patients, a routine infection control measure, was high in several facilities. 10.6% still practice re-use of used gloves as precautionary measures in this study.

This study shows that health-care providers were aware of the possible routes of transmission of health-care associated infections. 55% of the respondent health care practitioners knew about blood-borne pathogens while (42%) know about body-fluid pathogens. So, 97% of the health-care providers have a good knowledge of blood and body fluid pathogens. Wearing/changing of hand glove among health care practitioners, Only (57.9%) changed their gloves after each procedure, (34.5%) when it looks dirty or smells, (5.4%) when it is torn, (16.6%) after the day's work. There is little or less awareness on wearing or changing hand gloves. From this study 97% of our respondents admitted to having been immunized against body fluid and blood borne pathogens. Doctors immunized 93%, Nurses 91%, compared to the Laboratory scientists 53% and Laboratory attendant 44%.

It is of great importance to highlight various factors militating against the practice of Standard Precautions. It has been noted that lack of provision of adequate personal protective equipment and insufficient basic social amenities militate against the practice of standard precaution. Other factors show significance difference among the Health care providers. Also, carelessness contributed (11%), insufficient water/light supply (34%), emergency nature of work (3%), patients perceived as low risk (6%). This study revealed a poor practice of Standard precaution which can be attributed to low level of awareness because of poor training or unequal training among Health care providers. Inadequate practice of Standard precaution could be due to lack of job satisfaction, inexperience or care-free attitude of workers.

Conclusion

From various reviews, it has been shown that Standard Precautionary measures are the effective means of minimizing the risk of acquiring infections from work place and health-care providers should be protected from exposure to these dangers. Protection can be achieved through adherence to work practices designed to minimize or eliminate exposure and using Personal protective equipment which provide a barrier between the worker and the source of exposure. From this study, there was sub-optimal knowledge of standard Precaution among health-care providers in primary health facilities in Imo state with an inadequate practice among them. It also showed that knowledge of Standard precaution was good among Health care providers in secondary health-care facilities in Imo state but with inadequate implementation of this practice

among them. Although knowledge and practice is generally good for both primary and secondary health-care facilities, practice is however better amongst the doctors than the nurses, followed by the laboratory attendants

Recommendations

Intense enlightenment of the Health care providers on various aspects of Standard Precaution. Ensuring consistent supply and use of protective materials or safety devices by healthcare providers. Consistent and adequate provision of basic amenities such as constant water and electricity supply. All patients should be handled like potential source of infection. Ensure that health workers are immunized as it is an essential method of protecting workers from some blood and body fluid pathogens. Institution of surveillance system for hospital acquired infection among the health-care providers. There should be cross ventilation to avoid spread of air-borne pathogen. Health-care officers should not take ward coats nor scrubs home to avoid infecting members of their households.

Competing interests

Authors have declared that there are no competing interests.

Author's contributions

Merenu IA, Uwakwe KA, Duru CB, Diwe KC, and Chineke HN designed the study. Data analysis was by Merenu IA. Merenu IA wrote the manuscript and Duru CO reviewed the manuscript. All the authors read and approved the final version of the manuscript.

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