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Knowledge, practice and correlates of compliance to safety precautions: A cross-sectional study

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Abstract

Background: Universal safety precaution (USP), a concept aimed at protecting health care workers (HCW) from acquiring infection following accidental exposures to infected blood and body products (BBP). Knowledge and practice have been a huge challenge to HCW despite the grave consequences of exposure.
Objective: The study aims to ascertain level of knowledge and practice and to determine correlates of compliance among Primary Health Care Workers in Rivers State.
Material and method: The study was a cross sectional observational study which involves HCW in selected primary Health care centers (PHCC) in Rivers State. It involves the use of semi structured self-administered pre tested questionnaire and an observational check list. A multistage sampling technique was used.
Data was analyzed using statistical package for social sciences (SPSS) version 17 statistical software. Categorical data was analyzed using chi square test while students T- test was used for quantitative data. Level of statistical significance was set at 0.05.
Result: A total of 366 respondents participated in the study with 108(29.5%) males and 258(70.5%) females, while 125(34.2%) of respondents were aged 30-39 years and 50(13.7%) respondents were ≥50 years. More doctors 38(76%) complied with safety practice than nurses 19(31.7%). Compliance was higher in female HCW than males 111(43.0%) and 34(31.5%) respectively.
Conclusion: knowledge and practice of USP among HCW was abysmal, several factors were highlighted as reasons for poor compliance. Measures therefore must be taken by responsible authority to address these shortfall.

Key words: Knowledge, practice, safety, universal, precaution, health, care.

Introduction

Protecting healthcare workers (HCW) from acquiring infection following accidental exposure to infected blood and body products from patients and clients came to focus in 1985-1988 with the introduction of universal safety precaution (USP). This envisages protecting HCW by wearing gadgets and apparels such as face mask, goggle, gowns, aprons, medical gloves, booths, etc.[1] Almost all Cadres of HCW, including clinical and non-clinical staff are affected. Most commonly affected are the clinical staff amongst which frequency and regularity differs. HCW involved in invasive procedures such as surgeons and laboratory staff top the list of commonly exposed clinicians.[2] Body fluids which come under this concept includes blood, vaginal secretion, urine, feces, pleural fluid, pericardial fluid, cerebrospinal fluid, amniotic fluid, synovial fluid, semen and sputum in dental setting(as it may contain contaminated blood).[3] This clearly distinguishes from the concept of body substances isolation (BSI) which aims to further

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protect the HCW and covers the lacuna not covered in USP.[4] BSI involves protecting against all body fluids and airborne particles. However both concept envisages assumption that all blood and body fluids (BBF) are potentially infectious until proven otherwise. Regrettably, HCW are exposed continuously to the dangers associated with accidental exposures of BBF from potentially infected patients and clients.[5] The number of blood borne pathogens (BBP) contained in blood and body fluids of patients and clients are over 20 including hepatitis C virus (HCV), hepatitis B virus (HBV) and HIV.[6,7] Estimated global annual exposure of HCW to contaminated BBF with HBV, HCV and HIV are 2.1 million, 929,000, and 327,000 respectively.[8] While annual infections arising from these exposure is estimated to be over 1000.[9] Documented evidence reveals a low risk of acquiring HIV infection than Hepatitis B and C following accidental needle stick exposure.[10] Also high viral load increases the chances of transmission rate of HCV by more than tenfold.[11]

HCW get exposed to contaminated BBF accidentally via either needle stick or other sharps injury or by subcutaneous exposure by means of splash or directly to non-intact skin.[12,13] Exposure via needle stick has been the most widely reported accounting for over 600,000 to 800,000 exposures annually in the US.[14] Severity of exposure to sharps was highlighted in a study which reveals 15 needle stick injury (NSI) accidents per month among HCW, which also confirms surgeon being the most at risk and physicians the least.[15] Study reveals a 0.3% risk of acquiring HIV following accidental exposure with contaminated sharp with a global estimate of over 1000 HIV infection attributed to sharp injury.[6] Reasonable percentage (20 to 38%) of all surgical procedure involved exposure to HIV, HBV, and HCV.[16] Inadvertently, all invasive procedures are at risk of exposure. [2]

Studies have revealed significant differences in knowledge level of USP between population groups.[17] Most studies gave an overwhelming view of poor knowledge by HCW in which over 85.6% of HCW were not aware of world health organization (WHO) guidelines on USP.[18] In Nigeria knowledge of USP varies despite little or no training whereby some studies have recorded good knowledge of USP as high as 75.4% and 88.7% respectively,[19,20] while others showed uninteresting result of 37.7%.[21] Remarkably there was commendable knowledge on the use of PPE by HCW.[22,23] The protective effects of these safety gadgets was highlighted in a study in Germany where 34% of all NSI could have been avoided by introduction of safety devices.[24] Studies have revealed the importance of training HCW to acquire knowledge useful in protecting themselves against infected BBF.[25] Most health care facilities do not engage HCW in regular educational program on infection control.[26,20] In a study in Kaduna state, only 14.5% of HCW acquired training,[19] while only 46% of HCW acquired training in a study in India.[25]

The concept of USP envisages HCW to assume all BBP from patients and clients as potentially infections, it therefore becomes worrisome that HCW do not comply with safety practices[27] The level of compliance to safety practices varies among cadre of HCW, sex, region, and types of safety gadgets used. Most studies record non-compliance to safety practices as high as 68% and 93% respectively.[28] However studies have revealed 70.4% and 70.1% compliance in Ugandan and northern Nigerian respectively.[29] Compliance to safety practices varies among the cadre of HCW. Some studies identified compliance to safety practices by Doctors more than Nurses and other cadre of HCW.[30] Some other studies reveals that nurses are more compliant than other cadre of HCW.[31] While a few others showed no differences. (20) PPE are essential component of USP, however when available compliance is dependent on various factors. Compliance on use of hand gloves was high (95-98%) while low for facemask (4-11%).[28] Females are more compliant to safety measures than their male counterpart. Compliance in females could be as high as 94% and 25% compared to 71% and 19% in male counterpart.[32]

Compliance requires requisite knowledge of safety procedures which comes by sustainable health education program. Most health care facilities do not engage their staff in routine health education program, especially the newly employed.[33] Studies have revealed negative effect of lack of training on safety compliance.[34] PPE are essential component of USP, however, as important as this factor, studies reveals that these items routinely are out of stock, often times irregular in supply.[34] Hospital management owes HCW an obligation to ensure

availability of PPE and safety equipment. However management often times cite paucity of funds as reason for non-availability of these consumables.[34] It was also shown that even with the availability of funds these safety devices are sometimes not made available to HCW due to management poor commitment to safety practice, procurement and provision of these items.[35] Also management's poor organizational structure desired for adequate compliance to safety practice puts a wedge in the wheel despite availability of PPE.[36] Compliance to safety precautions have been shown to be affected by personality, wherein personal characteristic such as conservative attitude, risk perception, preventive efficacy,[36] personality type[34] and forgetfulness[37] are contributory factors to compliance.

Further studies also reveals that work experience enhances compliance[36] which could have resulted from longer stay at work.[38] Studies also shows that previous exposure to BBF enhances compliance to safety practices.[34] Poor compliance in some HCW arise following emergency situation which gives them little or no time to prepare adequately before attending to patients.[39] Sometimes HCW noncompliance to safety practices are due to urgency to embark on clinical intervention which results from shortage of manpower in facilities,[33] this inadvertently leads to high patient load[40] with attendant overwork of HCW leading to compromise of compliance to USP. It was also reported that compliance to safety culture varies among facilities. Report shows that HCW working in high grade hospitals comply with safety practices than their counterpart in low grade hospitals, likewise bigger hospitals such as general Hospitals show higher compliance than smaller hospitals.[34] Also even within the same hospital, HCW compliance to safety practices varies among various units and wards. It was reported that HCW in surgical ward comply more with infection prevention principles than their colleagues in medical wards.[34] The aim of the study therefore is to have a cross sectional view of knowledge and practice of USP by HCW and ascertain factors which are correlates to compliance.

The importance of this study in public health cannot be overemphasized as it will serve as an advocacy tool to policy makers and health education tool for HCW.

Materials and methods

The study was carried out among HCW in primary Health care centers (PHCC) in Rivers state, in south-south geopolitical region of Nigeria. There are 23local Government Area (LGA) in the state. The study was a cross sectional descriptive study targeted at assessing HCW knowledge and practices of USP and factors which affects compliance.

The study population included PHCC workers randomly selected from PHCC especially those involved in clinical care of patients, notably medical and dental doctors, nurses, midwives, community health extension workers (CHEW), community health officers (CHO), ward maids, auxiliary and laboratory technicians. Total manpower strength of these categories of HCW in all PHCC in the State was two thousand five hundred and twenty eight (2,528). Sample size of three hundred and sixty six (366) HCW were derived after making adjustment for attrition, using formula for calculating sample size for cross sectional observational studies.[41] Non clinical staff e.g. drivers, health record officers, pharmacist, and administrative staff, security personnel etc. were excluded from the study. Also HCW who were not permanent staff of the facility and those who did not give written consent were excluded from the study.

A multistage sampling technique was used which involves drawing up a list of all 23 LGA. All functional PHCC (PHCC equipped with minimum staff strength, equipment and had operated for at least 3months before study) in each LGA was used as a sampling frame. Two PHCC were chosen (due to logistic challenge) from LGA with least number of PHCC (i.e. Opobo/Nkoro, with six PHCC) Sampling proportionate to size, some PHCC were selected from each LGA i.e. if a selected LGA has six (6) PHCC (ie Opobo/Nkoro) and another LGA twelve (12) PHCC and another has eighteen (18) then the PHCC were enlisted in the ratio of 2:4:6. Systematic random sampling was then used to enlist PHCC from each LGA. It involves using a list of all functional PHCC in each LGA as sampling frame, sampling interval calculated, first PHCC chosen by simple random sampling by way of ballot after which subsequent PHCC were chosen following sampling interval. The PHCC were stratified according to staff strength and total sample size shared among PHCC by proportionate allocation

using the formula:

Sample size taken from each PHCC=
Staff strength of each PHCC * Total sample size
Total number of staff in all selected PHCC

This then gives total number of respondent chosen from each PHCC. In selected PHCC, the list of all eligible staff was used as a sampling frame from which the required number of respondents was chosen for each PHCC by simple balloting. Enrollment of HCW in study was done with due consideration to the cadre of staff and was selected by sampling proportionate to size of staff in each cadre (i.e. if there were 2 doctors, 4 midwives, 8 nurses, 2 laboratory technicians etc. they were enlisted in the ratio of 1:2:4:1) this was done until the required sample size was attained.

Study instruments were research questionnaires and observational checklist adapted by researcher. Research questionnaire was a pretested semi structured and self-administered. The questionnaire was written, prepared and administered in English language after necessary amendments. The checklist was used by researcher and the research assistant to observe the performance of task and procedures of selected respondents. Checklist was used to assess respondent's practice of USP. For each health facility, 35% of respondents were chosen for observation. Observations of selected respondents were made by research assistants who acted as mystery clients and it was unobtrusive. The research assistants observe respondents carry out the task and then retire to a private room to complete the checklist. To assess respondent's knowledge and practice, questions in the questionnaire had weights attached to them to create a composite score of knowledge and practice.

Interpretation of score was based on an adapted grading scale. Points were awarded on a discrete basis using a Likert grading scale of 0-10 for knowledge, respondents whose score translates to seven and above were classified as having good knowledge. Those whose score were between four and six were classified as fair, while those score were three and below were classified as having poor knowledge.

For practice, a grading system of 0 and 1was used to classify respondents as having good or poor practice of USP. Respondents with good practice were given a score of 1 while those with poor practice were given 0.

Data were analyzed using statistical package of social sciences (SPSS) version 17 statistical software. Results on dependent and independent variables were presented in simple percentages on a frequency distribution table. Categorical data were analyzed using chi square test while students T- test was used for quantitative data. Level of statistical significance was set at 0.05. Ethical clearance was obtained from research and ethics committee of Rivers state hospital management board. Permission to carry out study was also obtained from Rivers state primary health care management board. Written consent was obtained from respondents.

Results

Table 1: Sociodemographic characteristics

Total 366 respondents participated in study with 108(29.5%) males and 258(70.5%) females, while 125(34.2%) of respondents were aged 30-39 and 50(13.7%) respondents were ≥50 years.

Table 2: Knowledge of universal safety precaution

Total composite score for good, fair and poor knowledge for USP among respondents were 660(25.8%), 643(25.1%) and 1259(49.1%) respectively.

Table 3: Socio-demographic characteristics and score for knowledge

Good knowledge score for Doctors on USP was 42(84.0%), while 27(45.0%) of nurses had good knowledge on USP. More females 149(57.8%) are knowledgeable than males on USP. HCW within the age bracket 40-49 are more knowledgeable than the rest of the age grades $p < 0.05$.

Table 4: Practice of usp among hcw (reported)

Total composite score for good and poor practice of USP among respondents were 792(24.4%) and 2452(75.6%) respectively.

Table 5: Socio-demographic characteristics and score for practice

Table 1: Sociodemographic data of respondents

CHARACTERISTICS	**b**
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MALE	108(29.5)
FEMALE	258(70.5)
RELIGION	
CHRISTIANITY	360(98.4)
OTHERS	6(1.6)
AGE	
20-29	104(28.4)
30-39	125(34.2)
40-49	87(23.7)
=50	50(13.7)
TRIBE	
IKWERRE	105(28.7)
KALABARI	101 (27.6)
OGONI	88(24.0)
ETCHE	4(11.2)
OTHERS	31(8.5)
MEAN YEARS OF WORK EXPERIENCE	
0-4	30(8.2)
5-9	120(32.8)
10-14	136(37.2)
15-19	33(9.0)
=20	47(12.8)
ACADEMIC QUALIFICATION	
FSLC(PRIMARY)	32 (8.7)
WAEC (SECONDARY)	53 (14.5)
DIPLOMA	182(49.7)
BACHELOR	84 (22.9)
HIGHER DEGREE	15 (4.2)
CATHEGORY OF HCW	
MEDICAL OFFICER	50 (13.7)
LAB.WORKER	94 (25.6)
NURSE/MIDWIFE	60 (16.4)
WARD MAID	47(12.8)
CHO/CHEW/JCHEW	115(31.5)

Good practice score for Doctors on USP was 76(76.0%), while 19(31.7%) of nurses had good practice of USP. Female HCW are more compliant to safety practice 111(43.0%) than their male counterpart. HCW within the Age grade 30-39 comply more to safety practice than other age grade. $p < 0.05$.

Table 6: Reason for non compliance to safety practice

Availability of PPE contributes greatly 201(54.8%) to compliance, while previous exposure encourages 89 (72.4%) of respondents to comply with safety practices.

Table 2: Knowledge of universal safety precaution among the respondents

VARIABLES	[illegible]		
	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible] policy on USP	[illegible]	[illegible]	[illegible]
[illegible] work	121(33.1)	62(16.9)	183(50.0)
[illegible] transmitted via BBF	95(26.0)	89(24.3)	182(49.7)
[illegible] organisms	101(27.6)	78(21.3)	187(51.1)
[illegible] infected BBF	19(5.2)	26(7.1)	321(87.7)
[illegible]	660(25.8)	643(25.1)	1259(49.1)

USP: universal safety precaution, HCW: Health care worker, BBF: Blood and body fluid.

Table 3: Socio-demographic characteristics and score for knowledge of the respondents

	SOCIO-DEMOGRAPHIC KNOWLEDGE				
P	**CADRE OF HCW**	**GOOD FREQ (%)**	**FAIR FREQ (%)**	**POOR FREQ (%)**	**X^2**
	DOCTORS	42(84.0)	5(10.0)	3(6.0)	
	NURSES/MIDWIFES	27(45.0)	9(15.0)	24(40.0)	
	CHO/CHEW/JCHEW	14(12.2)	18(15.7)	83(72.1)	96.9
<0.05					
	LAB WORKERS	33(35.1)	17(18.1)	44(46.8)	
	WARD MAID	8(17.2)	35(27.6)	26(55.2)	
	YEARS OF WORK EXPERIENCE	9(30.0)	6(20.0)	15(50.0)	
	0 – 4	9(30.0)	6(20.0)	15(50.0)	
	5 – 9	40(33.3)	19(16.7)	61(50.0)	
	10 – 14	64(47.1)	21(15.4)	51(37.5)	32.6
<0.05					
	15 – 19	16(48.5)	7(21.2)	10(30.3)	
	= 20	35(74.5)	8(17.0)	4(8.5)	
	SEX				
	MALE	47(43.5)	33(30.5)	28(26.0)	
	FEMALE	149(57.8)	18(6.9)	91(35.3)	35.3
<0.05	**AGE**				
	20 – 29	26(25.0)	21(20.2)	57(54.8)	
	30 – 39	53(42.4)	38(30.4)	34(27.2)	
	40 – 49	42(48.3)	15(17.2)	30(34.5)	24.5
<0.05					
	= 50	19(38.0)	14(28.0)	17(34.0)	
	ACADEMIC QUALIFICATION				
	FSLC (PRIMARY)	6(18.8)	8(25.0)	18(56.2)	
	WAEC(SECONDARY)	14(26.4)	11(20.8)	28(58.8)	
	DIPLOMA	104(57.1)	25(13.7)	53(29.2)	35.1
< 0.05					
	BACHELOR	51(60.7)	11(13.1)	22(26.2)	
	HIGHER DEGREE	10(66.7)	3(20.0)	2(13.3)	

CHO; community health officer, CHEW; community health extension officer, JCHEW; junior community health extension officer, FSLC; first school leaving certificate. WAEC; West African examination council

Table 4: Practice of USP among HCW

VARIABLES	CHARACTERISTICS	
	GOOD (FREQ/%)	POOR (FREQ/%)
Use of protective gear while carrying out invasive procedure	66(18.0)	300(82.0)
Washing with soap and water after contact with sweat	40(10.9)	326(89.1)
Washing with soap and water after contact with suspected BBF	9(2.5)	357(97.5)
Use of gloves following breach in skin before carrying for patients	353(96.4)	13(3.6)
Perception of USP while handling the patients with suspected infected BBF	89(24.3)	277(75.7)
Methods of disposal of sharps	65(17.8)	301(82.2)
Perception of measures taken before carrying out invasive procedure	66(18.0)	300(82.0)
perception of measures taken after exposure to BBF	67(18.3)	274(81.7)
Measures taken on exposure to BBF	37(17.0)	304(83.0)
Total composite score	**792(24.4)**	**2452(75.6)**

Table 5: Socio-demographic characteristics and score for practice of the respondents

SOCIO-DEMOGRAPHIC	PRACTICE			
	GOOD	POOR	X^2	P
CADRE OF HCW	**FREQ (%)**	**FREQ (%)**		
DOCTORS	38(76.0)	12(24.0)		
NURSES/MIDWIFES	19(31.7)	41(68.3)		
CHO/CHEW/JCHEW	32(27.8)	83(72.2)	68.2	<0.05
LAB WORKERS	31(33.0)	63(67.0)		
WARD MAID	12(25.5)	35(74.5)		
YEARS OF WORK EXPERIENCE				
0 – 4	9(30.0)	21(70.0)		
5 – 9	35(29.2)	85(70.8)		
10 – 14	85(62.5)	51(37.5)	42.7	<0.05
15 – 19	21(63.6)	12(36.4)		
= 20	32(68.1)	15(31.9)		
SEX				
MALE	34(31.5)	74(68.5)		
FEMALE	111(43.0)	147(57.0)	4.2	< 0.05
AGE				
20 – 29	35(33.7)	69(66.3)		
30 – 39	57(45.6)	68(54.4)		
40 – 49	36(41.4)	51(58.6)	3.5	0.3
= 50	19(38.0)	31(62.0)		
ACADEMIC QUALIFICATION				
FSLC (PRIMARY)	14(43.7)	18(56.3)		
WAEC (SECONDARY)	24(45.3)	29(54.7)		
DIPLOMA	99(54.4)	83(45.6)	3.3	0.4
BACHELOR	39(46.4)	45(53.6)		
HIGHER DEGREE	9(60.0)	6(40.0)		

Table 6: Compliance factors to safety practice among the respondents

VARIABLES	CHARACTERISTICS	N (%)
Effect of Knowledge on compliance	Yes	197(71.9)
	No	77(28.1)
Training on USP upon employment	Once every = 4 years	98 (26.8)
	Once every 2 – 3 years	109(29.8)
	Once every year	115(31.4)
	Twice every year	33(9.0)
	Thrice every year	11(3.0)
Reason for non-compliance to PPE	Non availability	148(84.6)
	Irritability/cumbersome	6(3.4)
	Emergency situation	4(2.3)
	Poor motivation by mgt	9(5.1)
	No reason	8(4.6)
Reason for paucity of PPE	Lack of fund	48(63.2)
	Wastages from staff	21(27.6)
	Inadequate supply from authority	7(9.2)
Factors which motivate use of PPE	Availability	201(54.8)
	Knowledge	106(28.9)
	Previous exposure experience	5(1.7)
	Hospital policy	28(7.5)
	Personality/self-efficacy	26(7.1)
Reason for non-use of sharps disposal bin	Poor placement	29(63.0)
	Lack of training	6(13.1)
	Inadequacy	7(15.2)
	No reason	4(8.7)
Compliance to safety measures now	Yes	297(81.1)
Compared to early years in practice	No	57(15.6)
	Nil	12(3.3)
Effect of patient load on compliance	Yes	37(10.1)
	No	329(89.9)

Discussion

In this study, the mean age of respondents was 35±2 years. This was similar to the study conducted by Agu et al in Enugu, in which mean age was 34± 2 years,[42] but contrasted with a study in Jamaica in which mean age was 25±2 years.[32] Geopolitical location and government policy could have been responsible for the similarities and differences in mean age.

The study also recorded more female than male respondents. This result also corroborates with findings from studies conducted by K.vas et al and Agu et al, whereby 65% and 87.3% of respondents in their various studies were females[32,42] In this study, there were more female workforce in the facilities where this study was carried out, therefore, the findings observed were a reflection of the corresponding proportion in the sample of respondents that participated in the study.

Results from this study reveal that 37.2% of respondents had worked for 10-14 years while 8.2%b had worked for 0-4 years. This result is in congruence with reports from previous studies.[32,42] This result reveals inconsistency in employment policy by government to state owned health institutions. It is expected that there would have been near equal percentages in staff cohort if employment were consistently regular over time. Compliance to safety practices were recorded more in females (43%) than their male counterparts (31.5%) the results obtained in this study concurs with results obtained in similar studies.[32,35] However Georgios et al in their study reveals the contrary.[43] Interestingly laying emphasis on the above, this study identified higher knowledge of safety precaution in females (57.8%) as responsible for

better compliance. Middle aged[30-49] HCW were found to comply with safety precautions than their counterparts at extremes of age. These findings correlates with result obtained from previous study.[44] Furthermore, more studies have revealed younger HCW as more compliant than older HCW.[45] However, giving credence to this study, middle aged HCW were identified as more knowledgeable in safety precaution and could explain differences in compliance between both age grades. This study identified doctors as more compliant to safety practices than HCW in other cadre. Some studies reviewed also share same opinion.[46] In contrast, some studies identified nurses and HCW in other cadre as more compliant to safety practices than doctors.[35,32] It is also noteworthy to mention that few studies reported no differences in safety compliance between doctors and nurses.[20] It is therefore logical given the evidence which identified doctors as significantly more knowledgeable in safety precaution, to accept that higher knowledge of safety precaution was responsible for greater safety compliance. Though in this study, nurses are more compliant than laboratory technicians even when the technicians are more knowledgeable. This could have been by chance as the differences in knowledge and also in practice are not statistically significant. Higher compliance to safety practice with longer years of work experiences was observed in the present study. These findings simulate results from other studies.[38] Interestingly, there was positive correlate between knowledge, longer years in service and age. Also findings from this study revealed that compliance to safety practice by HCW were better in later years of service than earlier years in service. It implies that more years at work improve compliance. This position was corroborated in a study conducted in Pakistan.[47] Furthermore, results from this study reveal that previous exposures influences subsequent compliance to safety practices, some studies also agree with the findings in this study.[34] It is therefore logical to believe that haven been exposed previously, HCW will comply with safety measures to avoid further exposures. Several studies have also justified the results found in this study which identified knowledge as an important factor with safety compliance.[39] It was also seen that training and retraining are important in acquiring knowledge to safety practice.[26] It was therefore regrettable that only 31.4% of HCW were trained once a year while 26.8% were trained once in four years or more. It was therefore evident that inadequate training and retraining of HCW ultimately resulted in poor compliance to safety practices. It was not surprising in this study to discover abysmal performances in total composite score for good knowledge and practices of USP so low as 29.7% and 25% respectively due to inadequate training. Note that studies have shown importance of training and retraining of HCW as important factor in acquiring knowledge on USP.[34]

Conclusion

Knowledge and practice of USP by HCW is an essential concept in health care, vital in preventing infection from infected BBP. However, compliance has been a major challenge, therefore, routine training of HCW and provision of essential materials and consumables for HCW is important in achieving USP.

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