

## Safety Practices and Occupational Health Hazards in Tertiary Hospitals in Rivers State

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### Abstract

*Safety practices in the hospitals predict health care workers exposure to occupational health hazards (OHHs). But most hospitals operate reactive rather than proactive practices which predict exposures to occupational hazards. The effect of reactive practices is overwhelming to health care workers, hospitals and the society. Thus, this study assessed the safety practices in tertiary hospitals in River State. Descriptive cross-sectional design and proportionate stratified random sampling method was adopted with a sample size of 361. The study relied on a structured questionnaire with a reliability of 0.87. Descriptive and inferential statistics was used with the aid of statistical package for social science (SPSS) software version 21. Results obtained show that the prevalence rate of occupational health hazards is 69.7% and there is no significant safety practices in the hospitals ( $p>0.05$ ). Also, biological and mechanical hazards are the most prevalent hazards in the hospitals. Consequently, there is significant negative relationship between safety practices and occurrence of OHHs in the hospitals ( $p<0.05$ ). Job category and gender are significantly associated with OHHs ( $p<0.05$ ). Thus, there is great need to reduce occupational health hazards in the hospitals with developed safety practice system, integrated policies, strategies and procedures consistent with global best practices.*

**Keywords:** Safety practices, Occupational health hazards, Prevalence, Hospitals

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### 1. Introduction

Hospitals operating globally (more precisely in the growing nations) are open to varying occupational health hazards (WHO, 2010). There are worries about the disregard of the practice of safety in hospitals and other health care facilities (HCFs). Thus, occupational health hazards (OHHs) are predominantly a recurring frequency in HCFs. As itemized by WHO (2010), a health care worker (HCW) is an individual who deliver services to the ailing population. HCWs branded as having heavy workload (Faber et al., 2010). This can expose them to risk of occupational health hazards. Yearly, around thirty-five (35) million HCWs internationally are affected by diverse hazards and more than ninety percent (90%) of these hazards emanate in countries that are financially constrained (Zaidi et al., 2010; Mbaisi et al., 2013). The health effects resulting from these hazards have led to psychosocial stress and extensive health consequences for HCWs, their extended relatives (Rampal et al., 2010). Certain transmissible ailments particularly blood-borne

infections (BBIs), which spring in health care facilities, lack cure or accessible vaccines and this will create unease amongst HCWs (Honda et al., 2011). The primary threats to HCWs comprise BBIs (Hepatitis B virus (HBV), Human Immunodeficiency Virus (HIV) and Hepatitis C virus (HCV)), burn-out stress, back ache, neck pain, chemicals spills, latex material allergy, assaults from patients, radiation exposure, amongst others (Amosun, et al., 2011). Blood borne pathogens (BBPs) exposure is of worry and consequence to HCWs who are at probable risk in the advancement of their everyday pursuit. BBIs is predicted to cost more than one million dollars for misplaced allotments, prescriptions, clinical assessment, subsequent laboratory tests, remuneration of debilities (Auta et al., 2017). The cost of the susceptibility to hazards is immeasurable as HCWs may well run into misery, irritability, nervousness, and doubts concerning their job option, difficulty concentrating, napping and relishing sexual connections, after experiencing these exposures (Oguntona, 2012;

Twitchell and Wachs, 2016). The well-being of health personnel is a key necessity for home income, proficiency and economic growth (WHO, 2017).

HCWs are an essential reserve in the health system of growing nations. In several countries, comprising those in Sub-Sahara Africa (SSA), workers are at considerable risk for avoidable, life-jeopardizing work-related exposures. Reports postulate that SSA accounts for the topmost incident of HIV-infected patients and ninety-percent (90%) of job-related vulnerability arise in these countries (WHO, 2012). Comprehending the several OHHs (like the chemical, biological, psychosocial and physical hazards etc.) is important in an attempt to safeguard the comprehensive conservation scheme for HCWs in hospitals operational within the growing countries. Furthermore, creating safety practices inside these hospitals, demands that a grasp of the OHHs by the health care employees themselves, alongside an appraisal of the amount of engagement and steadfastness from health care governing board, becomes hugely imperative. In some countries, over half of the workers have insufficient social safety and regulatory execution of OHS standards. The well-being of staff is vital for proficiency and capital growth. Hence, rebuilding and nourishing acceptable working environment is a key role of the health services (WHO, 2017).

Job-related risk exposure of hospital workers and the risk of diseases are on the rise. The incessant vulnerability to threats from transmissible ailments has given rise to numerous HCWs suffering from divergent illnesses contracted by handling of patients infested with diverse transmissible diseases. Also, nonexistence of solid and noticeable safety practices through the hospitals is a concern to health care exponents, executive bodies and the public. This is undeniably a grave issue in the health domain. The outcome comprises patient vulnerability to infections, scarcity of healthcare employees, HCWs' apathy and cost outcome, even with standard precautionary actions and reaction to occupational health hazards and safety practices in hospitals. This study is aimed to assess the safety practices and occupational health hazards in tertiary hospitals in River State.

## 2. Materials and methods

The research was limited to identity card holding health care workers (HCWs) who have worked in the hospital facility for at least 6 months

and above. This includes doctors, nurses, pharmacists, clinical laboratory attendants, mortuary attendants, cleaners/porters, security personnel, administrative workers and radiographers. HCWs who are on contract, brief internship training, students, those in maternity leave, as well as those who have worked for less than 6 months were excluded from the study. All participants are aged 20 to 60 years. Their typical work day starts from 8am to 4pm after which the call duty starts till 8am the following day. The study was conducted in the two tertiary hospitals in Rivers State namely Rivers State University Teaching Hospital (RSUTH) and University of Port Harcourt Teaching Hospital (UPTH) both situated in Port Harcourt city Local Government Area and Obio-Akpor local Government Areas of Rivers State respectively.

The study employed the descriptive cross-sectional design and proportionate stratified random sampling method with the use of table of random numbers was adopted for the sample selection. The population of the study was 3,516 HCWs and a sample size of 361, which includes 10% non-response rate, was used by applying Taro-Yamane formula (1967):

$$n = \frac{N}{1 + N(e)^2} \quad (1)$$

where n is the sample size, e is tolerance error (0.05) and N is the study population.

Primary data were gathered using closed ended structured 4-likert scale questionnaire which was self and interviewer administered, while secondary data was obtained via hospital records of the management of UPTH and RSUTH. The questionnaire copies were administered with the help of a research assistant. The data obtained were subjected to statistical analyses such as descriptive (mean and percentages) and inferential statistics (chi-square, correlation and simple regression) using Microsoft excel and SPSS (statistical package for social sciences version 21). A test retest using Pearson Product Moment of Correlation Coefficient was carried. Content validation was done by supervisors and experts in the field.

Finally, this study adopted the simple linear model to predict the relationship between OHHs and SPs in the hospital.

$$y = b_0 + b_1x_1 + e \quad (2)$$

where y is the dependent variable (OHHs);  $x_1$  is

the independent variables (SPs);  $b_0, b_1$  are the coefficient and  $e$  is the error term.

**3. Results**

**3.1 Socio-demographic data**

Table 1a shows that 164 (45.4%) male and 197 (54.6%) female participated in the study. The mean age of respondents was  $37.0 \pm 8.7$  years, however 105 (29.1%) out of 361 respondents were aged less or equal 30 years, while 155 (42.9%) were aged between 31-40 years and 72 (19.9%), 25 (6.9%) and 4 (1.1%) respondents were aged between 41-50 years, 51 and 60 years, 61 years and above respectively. One-hundred and twenty (33.2%) out of 361 respondents were single while 202 (56%) respondents were married, 15 (4.2%) respondents also indicated that they were separated or divorced, 3 (0.8%) were co-habiting and 21 (5.8%) indicated that they were widow/widower. One hundred and fifteen (31.9%) earned post graduate degree, 177

(49.0%) had earned tertiary education, while 60 (16.6%) and 9 (2.5%) had earned secondary and primary education, respectively. Table 1b shows that 66 (18.3%) respondents were doctors and 84 (23.3%) were nurses, while 41 (11.4%), 31 (8.6%), 37 (10.2%) and 35 (9.7%) respondents were pharmacist, radiographer, administrators and cleaners/porters, respectively. Thirty-six (10.0%), 11 (3.0%) and 20 (5.5%) respondents were clinical laboratory workers, mortuary attendant and security/drivers, respectively. Eighty-eight (24.4%) out of 361 respondents indicated that they have work experience between 0-5 years, 149 (41.3%) respondents had worked between 6-10 years; while 77 (21.3%) indicated that they have work experience between 11 and 15 years. Also, 15 (4.2%) respondents had worked between 16 and 20 years, 18 (5.0%) and 14 (3.9%) respondents had worked between 21-25 years and 26 years and above, respectively.

**Table 1a:** Socio-demographic data

Demographic Variables	Frequency (n=361)	Percentage (%)
<b>Sex</b>		
Male	164	45.4
Female	197	54.6
<b>Marital Status</b>		
Single	120	33.2
Married	202	56.0
Separated/Divorced	15	4.2
Co-habiting	3	0.8
Widow/Widower	21	5.8
<b>Educational Level</b>		
Post Graduate	115	31.9
Tertiary	177	49.0
Secondary	60	16.6
Primary	9	2.5
<b>Age (Years) Mean =37.03±8.69 (CI: Upper:36.13 and Lower: 37.93)</b>		
≤ 30.0	105	29.1
31.0 - 40.0	155	42.9
41.0 - 50.0	72	19.9
51.0 - 60.0	25	6.9
≥61.0	4	1.1

**Table 1b:** Occupational status/history

Occupational status	Frequency (n=361)	Percentage (%)
<b>Job Category</b>		
Doctor	66	18.3
Nurse	84	23.3
Pharmacist	41	11.4
Radiographer	31	8.6
Administration	37	10.2
Cleaners/Porters	35	9.7
Clinical Lab. Workers	36	10.0
Mortuary Attendant	11	3.0

Security/Driver	20	5.5
<b>Work Experience (Years)</b>		
≤5	88	24.4
6-10	149	41.3
11-15	77	21.3
16-20	15	4.2
21-25	18	5.0
≥26	14	3.9

**3.2 Occurrence of occupational health hazards**

Table 2 revealed that biological hazards such as splashes with blood or body fluids of patients ( $\bar{x}=2.90$ ) is the most prevalent followed by mechanical hazards such as needle prick injury and allergic reactions to latex materials ( $\bar{x}=2.83$ ). Physical hazards like working in spaces with poor ventilation, poor light source and exposure to any form of radiation is the third prevalent hazard ( $\bar{x}=2.79$ ), while WR-MSDS like back, neck or waist pain ( $\bar{x}=2.76$ ), chemical hazards such as chemical

spill exposure ( $\bar{x}=2.75$ ) and psychosocial hazards such as verbal or physical abuse by colleagues or patients, sexual harassment from any co-worker, depression and trouble sleeping or concentrating ( $\bar{x}=2.75$ ) respectively, are less prevalent hazards in the hospital. The grand total showed that 25.6% of respondents strongly agreed, 38.5% agreed, 24.8% disagreed and 11.0% strongly disagreed that HCWs are not victims of OHHs, thus there is high prevalence of occupational health hazards in the hospitals.

**Table 2:** Responses on occurrence of occupational health hazards

Items	F(%)	O(%)	R(%)	N(%)	T(%)	M	D
<b>Mechanical hazards</b>	111	138	88	24	361	2.93	Agreed
Experienced or observed needle stick injury on colleagues.	(30.7)	(38.2)	(24.4)	(6.6)	(100)		
You experience Allergic reaction to latex materials.	82	148	82	49	361	2.73	Agreed
	(22.7)	(41)	(22.7)	(13.6)	(100)		
<b>Biological hazards</b>	104	139	95	23	361	2.90	Agreed
Experienced or observed colleague being splashed with blood or body fluids of patients.	(28.8)	(38.5)	(26.3)	(6.4)	(100)		
<b>WR-MSDS</b>	99	127	85	50	361	2.76	Agreed
Noticed back, waist or neck pain.	(27.4)	(35.2)	(23.5)	(13.9)	(100)		
<b>Physical hazards</b>	105	130	88	38	361	2.84	Agreed
Perform duties in spaces with poor light source & ventilation.	(29.1)	(36)	(24.4)	(10.5)	(100)		
Vulnerable to radiation.	73	154	97	37	361	2.73	Agreed
	(20.2)	(42.7)	(26.9)	(10.2)	(100)		
<b>Chemical hazards</b>	85	139	99	38	361	2.75	Agreed
Vulnerable to chemical spill at work.	(23.5)	(38.5)	(27.4)	(10.5)	(100)		
<b>Psychosocial hazards</b>	81	136	85	59	361	2.66	Agreed
Experienced physical or verbal abuse by colleagues or patients.	(22.4)	(37.7)	(23.5)	(16.3)	(100)		
Been sexually harassed by any co-worker.	78	140	89	54	361	2.67	Agreed
	(21.6)	(38.8)	(24.7)	(15)	(100)		
Observed trouble sleeping, concentrating or even depression.	107	140	89	25	361	2.91	Agreed
	(29.6)	(38.8)	(24.7)	(6.9)	(100)		
<b>Grand total</b>	925	1391	897	397	3610	2.79	Agreed
	(25.6)	(38.5)	(24.8)	(11)	(100)		

F=Frequently, O=Occasionally, R=Rarely, N=Never, T=Total, M=Mean, and D=Decision

**3.3 Safety practices**

Table 3 revealed that chief medical director (CMD) of the hospital sees staff as major priority ( $\bar{x}=2.74$ ) and team spirit work is being practiced in

the work place ( $\bar{x}=2.83$ ). But respondents disagreed that there is a visible and well communicated emergency evacuation plan in the hospital ( $\bar{x}=1.69$ ). Hospital has a scheme that

integrates occupational safety and health administration (OSHA) standards, and best practice guidelines ( $\bar{x}=1.70$ ). It is also not compulsory that all health care workers take necessary vaccination especially hepatitis B vaccine as the hospital does not make it available ( $\bar{x}=1.86$ ) and the reporting process is not visibly transmitted in the hospital ( $\bar{x}=1.92$ ). In the past two years, the hospitals have not organized training

sections on prevention of hospital hazards and standard precautions at least once ( $\bar{x}=2.27$ ). The CMD does not motivate staff to report incidents/accidents as it occurs in the workplace ( $\bar{x}=2.32$ ). The grand total showed that 9.2% of HCWs strongly agreed, 22.6% agreed, 43.9% disagreed and 24.3% strongly disagreed to safety practices, thus there are no significant safety practices (SPs) in the hospitals.

**Table 3:** Responses on safety practices

Item (s)	SA (%)	A (%)	D (%)	SD (%)	T (%)	M	D
There is a visible & well communicated emergency evacuation procedure plan in this hospital.	9 (2.5)	7 (1.9)	209 (57.9)	136 (37.7)	361 (100)	1.69	Disagreed
The staff of this hospital is seen as major priority by the chief medical director (CMD).	55 (15.2)	167 (46.3)	129 (35.7)	10 (2.8)	361 (100)	2.74	Agreed
It is compulsory that all health care workers take necessary vaccination especially hepatitis B vaccine as the hospital makes it available.	16 (4.4)	16 (4.4)	230 (63.7)	99 (27.4)	361 (100)	1.86	Disagreed
This hospital practices team work.	41 (11.4)	237 (65.7)	65 (18)	18 (5)	361 (100)	2.83	Agreed
The CMD motivates staff to report incidents/accidents as it occurs in the workplace.	25 (6.9)	133 (36.8)	137 (38)	66 (18.3)	361 (100)	2.32	Disagreed
The reporting process is visibly transmitted in this hospital.	40 (11.1)	18 (5)	176 (48.8)	127 (35.2)	361 (100)	1.92	Disagreed
In the past 2 years, this hospital organized training sections on prevention of hospital hazards & standard precautions at least once.	59 (16.3)	62 (17.2)	158 (43.8)	82 (22.7)	361 (100)	2.27	Disagreed
This hospital has a scheme that integrates occupational safety & health administration (OSHA) standards and best practice guidelines	21 (5.8)	13 (3.6)	163 (45.2)	164 (45.4)	361 (100)	1.70	Disagreed
<b>Grand total</b>	266 (9.2)	653 (22.6)	1267 (43.9)	702 (24.3)	2888 (100)	2.17	Disagreed

T=Total, M=Mean, and D=Decision

**3.4 Relationship between safety practices and occupational health hazards**

Tables 4, 5 and 6 showed that occupational health hazards have negative significant relationship with safety practices ( $p<0.05$ ), with a correlation coefficient of 0.842. More so, the coefficient of determination ( $R^2$ ) showed that 70.8% of the occurrence of occupational health hazards (OHHs) is determined by the safety practices in the hospitals. This implies that improved safety practices will result to 71% decrease in the occurrence of occupational health hazards in the hospitals. Thus, the lineal model is given as:

$$OHHs = 4.88 - 0.863 (SPs) \tag{3}$$

**3.5 Association between socio-demographic and occupational health hazards**

Table 7 revealed the associative distribution of job categories, gender and OHHs. Results shows that HCWs job category is significantly associated with OHHs ( $p<0.05$ ). Mortuary attendants, cleaners/porters, clinical lab workers and nurses are mostly exposed to occupational health hazards. Also, gender is significantly associated with OHHs ( $p<0.05$ ). Females HCWs are more exposed to occupational health hazards than their male colleagues.

**Table 4:** Correlations of variables

		Occupational Health Hazards	Safety Practices
Pearson Correlation	Occupational Health Hazards	1.000	-.842
	Safety Practices	-.842	1.000
Sig. (1-tailed)	Occupational Health Hazards	.	.000
	Safety Practices	.000	.
N	Occupational Health Hazards	361	361
	Safety Practices	361	361

**Table 5:** Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.842 <sup>a</sup>	.708	.708	.48246	.708	872.547	1	359	.000

a. Predictors: (Constant), Safety practices

**Table 6:** Model coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.880	.067		73.263	.000
	Safety Practices	-.863	.029	-.842	-29.539	.000

a. Dependent variable: occupational health hazards

**Table 7:** Association between socio-demographic and occupation health hazards (OHHs)

Job Category	Occupational health hazards (OHHs)					Chi-Square (p-value)	
	Frequently (%)	Occasionally (%)	Rarely (%)	Never (%)	Total (%)		
Doctor	28(42.4)	24(36.4)	9(13.6)	5(7.6)	66(100)	11.257 (0.010) Significant	
Nurse	38(45.2)	36(42.9)	7(8.3)	3(3.6)	84(100)		
Pharmacist	5(12.2)	17(41.5)	19(46.3)	0(0)	41(100)		
Radiographer	7(22.6)	13(41.9)	5(16.1)	6(19.4)	31(100)		
Administration	12(32.4)	11(29.7)	11(29.7)	3(8.1)	37(100)		
Cleaners/Porters	14(40)	17(48.6)	1(2.9)	3(8.6)	35(100)		
Clinical Lab. Workers	19(52.8)	16(44.4)	1(2.8)	0(0)	36(100)		
Mortuary Attendant	2(18.2)	9(81.8)	0(0)	0(0)	11(100)		
Security/Driver	5(25)	5(25)	5(25)	5(25)	20(100)		
<b>Gender</b>							
Male	45(27.4)	72(43.9)	34(20.7)	13(7.9)	164(100)		89.015 (0.000) Significant
Female	85(43.1)	76(38.6)	24(12.2)	12(6.1)	197(100)		
<b>Total</b>	130(36)	148(41)	58(16.1)	25(6.9)	361(100)		

#### 4. Discussion

This study revealed that there is significant occurrence of occupational health hazards (OHHs) in tertiary hospitals in Rivers State. This is not surprising as safety practices were also poor and staff exhibit unsafe acts and behaviours as they usually work unsupervised. The respondents also agreed that periodic training/retraining and compulsory provision of vaccine and vaccination of all HCWs are not being practiced by the hospital management. These findings agree with Murallidharar et al. (2010) who reported a high

prevalence of 78% MSDS in India. Also, Ndejjo et al. (2015) reported that 50% of respondents agreed to have experienced occupational health hazard. Among these, 39.5% experienced biological hazards while 31.5% experienced non-biological hazards. This study also revealed that biological hazard ( $\bar{x}=2.90$ ) is the most prevalent followed by mechanical hazard ( $\bar{x}=2.83$ ). This finding agrees with Rampal et al. (2010) who opined that susceptibility to biological hazards such as susceptibility to blood and body fluids (BBFs), and mechanical hazards such as needle stick injuries

(NSIs) are common OHHs among HCWs. Zhang et al. (2009) also opined that the total rate and mean amount of BBFs exposure events was 66.3/100 HCWs and 7.5 per person per year. Furthermore, WHO evaluates that roughly 3 million cases of NSIs occur among HCWs yearly, and 90% of these ensue in developing countries (WHO, 2013). Consequently, this study revealed that there is no significant safety practice in the hospitals which was also the opinion of scholars who stated that safety practice was inadequate in their hospitals (Manyele et al., 2008; Bahrami et al., 2014; Alguwez et al., 2018). Furthermore, there is significant relationship between safety practices and occurrence of OHHs. This study agrees with findings that high rates of NSIs and low compliance with infection-control procedures by HCWs highly contributed to the chance of getting a blood-borne pathogen infection (Pruss-Ustun et al., 2005; Smith et al., 2006). This study also revealed that job-category was significantly associated with occupational health hazards ( $p < 0.05$ ). Mortuary attendants, cleaners/porters, clinical lab workers and nurses are mostly exposed to occupational health hazards compared to their other colleagues. Also, gender was found to be significantly associated with OHHs ( $p < 0.05$ ). Female HCWs were more exposed to OHHs than their male counterparts, this may be due to the fact that women have conflicts trying to balance family and job life. Also, majority of HCWs are females and the bulk of the nurses, who are the primary caregivers are also females, hence they are more prone to OHHs. This is in agreement with findings by Javed and Yaqoob (2011), who opined that females are more exposed to OHHs than males. Also, Ghaziri et al. (2019) opined that females had higher burnout stress at work than males. But this finding disagrees with Durlach et al. (2012), who reported higher prevalence of healthcare acquired infections (HCAIs) in males (13.6%) than female (9.0%). This discrepancy may be due to the type of research design (survey design) applied and their study covered more hospitals.

## 5. Conclusions

This study revealed that there is high prevalence of occupational health hazards (OHHs) in the tertiary hospitals (69.75%) which is due to poor safety practices. As the correlation result revealed that 71% of OHHs are due to safety practices. Thus, improved safety practices will reduce OHHs and consequently boost the confidence and job satisfaction among HCWs, reduce HCWs' apathy towards their job. It will

also enhance the socio-economic life of HCWs, reduce morbidity and mortality associated with hospital acquired infections, and bring about sustainable development and growth in the health sector as well as a healthy society at large. Thus, the study recommends the following:

- i. The executive and hospital administration through lawmaking should endorse decrees and guidelines on safety practices in the health domain.
- ii. Authorities in the health sector have a duty to develop scheme that integrate Occupational Safety and Health Administration (OSHA) standard and top practice guidelines.
- iii. Governance should authorize pre and post-employment obligatory immunization against vaccine avertible illnesses, intermittent training/retraining and safety drills for HCWs.

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