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## Awareness, and Knowledge on Diseases Contraction From Work Place and Perceived Risk of Health Issues Associated With Mortuary Operations in Ibadan Metropolis, Oyo State

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**Abstract:** Mortuary workers face various hazards in course of carrying out their duties. These hazards may be ignored by employers and employees alike. Identifying these hazards in time before they become risks that cause accidents and even death is recognized mode of prevention and control. This study was to assess the workplace hazards in mortuaries Ibadan metropolis. This study therefore, aimed at assessing level of awareness, knowledge on diseases contraction from work place and perceived risk of health issues associated with mortuary operations. A descriptive cross-sectional survey was conducted among public and private mortuary workers in Ibadan metropolis, using total sampling method. A semi-structured questionnaire was used to gather the data. The questionnaire was used to gather information on respondents' sociodemographic traits, level of health awareness, exposure to chemical dangers, knowledge of and use of personal protective equipment, symptoms of musculoskeletal diseases, and frequency of injuries. The average age of the responders was  $38.6 \pm 12.1$ , and 85.5% of them were men. They are permanent employees (63.8%) and had no prior training in mortuary-related fields. A third (33.3%) and 44.9% of the respondents, respectively, had received hepatitis and tetanus vaccinations. One third of respondents had good understanding of diseases that can be transmitted at work, and the majority of respondents (81.2%) were very aware of health risks related to their jobs. Among respondents exposed to body fluid or blood splash on open cut and eye, 33.3% and 45% had been vaccinated against hepatitis. As a results of chemical exposure, 85.5% and 53.6% had experienced eye irritation and breathing difficult respectively while 14.5 and 10.1 had also experienced hyposmia and nose bleeding. Respondents (81.2%) had a good knowledge of PPE and its use while only 44.9% had good PPE usage practice. Respondents (81.2%) feel pain after each day's

work while two thirds feel pain in their back region compared to other parts. Repetitive movements, awkward positions and carrying of loads heavier than 20 kg were statistically significant with pains felt after each day's work. Respondents (73.9%) had been injured from their work routine. The most causes of injury reported were burns from chemical splash and needle stick injury. Mortuary workers (58.8%) had experienced injury more than three times in the last six months. To lessen the risks, workshops and training sessions about the health and safety issues related to mortuary staff' daily tasks should be organized.

**Keywords:** Awareness, Knowledge, Health and safety, Mortuary workers, blood borne pathogen, and personal protective equipment

## Introduction

Workers in mortuaries are potentially exposed to a range of health hazards, including infectious diseases, chemical exposures, and physical hazards. Therefore, it is essential to have a good understanding of the risks and proper safety protocols to minimize the risk of disease transmission (Samuel Babatunde, et al 2023). Awareness and knowledge of diseases that can be contracted in the workplace are crucial for identifying potential hazards and taking the necessary preventive measures. Workers in mortuaries should have a good understanding of infectious diseases, including their mode of transmission and ways to prevent exposure. Some of the common diseases that mortuary workers may be exposed to include tuberculosis, hepatitis B and C, HIV, and COVID-19 (Samuel Babatunde, et al 2023). In addition to disease awareness, workers in mortuaries should also be knowledgeable about safety procedures, such as the proper use of personal protective equipment (PPE), handling of hazardous materials, and proper disposal of contaminated materials. They should also receive regular training on safety practices and protocols to ensure that they can identify potential hazards and take appropriate actions to minimize risk. Overall, the perceived risk of health issues associated with mortuary operations is high, given the potential exposure to infectious diseases and other hazards. Therefore, it is essential for workers in mortuaries to be well-informed and trained to minimize the risk of disease transmission and other health hazards.

Environmental effects can be associated with improper mortuary waste management. These include contamination of ground water owing to leachate of wastewater components, surface water contamination due to run-off chemicals, inflammable gases (methane) generated from waste dump, bad odour, windblown litter in and around waste dump site, acidity to the encircling soil, greenhouse gas emission, pest and rodents breeding sites (IPHI, 2005).

Infectious pathological waste from mortuaries can cause serious health problems such as tuberculosis (when *Mycobacterium tuberculosis* is present in the lungs and chest cavity of the deceased) and nosocomial Infections (urinary tract infections, gastroenteritis and puerperal fever among others) arising from health care facilities (Coker *a*, 2009 and Adegbite *et al.*, 2010). Other diseases include hepatitis B, hepatitis C, Human immune-deficiency virus (Mallon *et al.*, 1992), Ebola fever (Global alert response, 2014) and Lassa fever (Frequently asked questions on Lassa fever, 2014). Exposure to these infectious wastes by waste collectors/ handlers, hospitals patients and health care workers can be as a result of contact with blood, body fluids and sharps.

Mortuary workers are usually exposed to embalming chemicals, disinfectant and sanitiser. These embalming chemicals range from formaldehyde, phenol, glycerol, alcohols, and glutaraldehyde to colouring agents. They can cause cancers, respiratory irritation and sensitization and skin problems. Various reports exist that individuals working with, or who regularly come in contact with dead bodies are exposed to potential hazards due to infectious agents. Mold spores present in embalming areas such as slabs pose a higher risk to those involved in exhumation of dead bodies compared to other mortuary workers (Healing *et al.*, 1995). According to Meel (2001), mortuary staffs are also prone to hazards like exposure to chemicals like formalin and alcohol, substances whose real chemical nature and concentration may be unknown to staffs handling them (such as poisons and pesticides) and other gases released due from decomposition of body tissue. The safety of mortuary workers has not been extensively studied in Africa, though there are a few research works that can be built on. This study therefore will enlighten stakeholders and workers on potential neglected hazards associated with the job and also come up with guidelines that will reduce these identified hazards to the barest minimum. Also, findings from this study will be useful to government, policy makers, occupational health and safety officials, individual mortuary owners and

workers, health care officials and other related stakeholders.

## **OBJECTIVES OF THE STUDY**

### **Broad objective**

The broad objective is to determine the level of awareness, knowledge on diseases contraction from work place and perceived risk of health issues associated with mortuary operations. And the specific objectives were to:

- 1) assess the level of awareness of health issues associated with mortuary operations.
- 2) assess workers' knowledge and practices towards personal protective equipment in the mortuary.
- 3) describe the waste management and hygiene practices of workers in the mortuary.
- 4) determine the prevalence of injuries among workers in the mortuary.
- 5) assess ergonomics, symptoms of musculoskeletal disorders and level of exposure of workers to chemicals used in the mortuary.

### **RESEARCH QUESTIONS**

- 1) What is the level of awareness of health issues associated with mortuary operations.
- 2) What is the workers' knowledge and practices towards personal protective equipment in the mortuary.
- 3) What is the the waste management and hygiene practices of workers in the mortuary.
- 4) What is the the prevalence of injuries among workers in the mortuary.
- 5) What is the ergonomics, symptoms of musculoskeletal disorders and level of exposure of workers to chemicals used in the mortuary.

### **Research Hypothesis**

H<sub>0</sub>; There is no relationship between socio-demographic characteristic of the respondents and their awareness and knowledge of disease contraction at work place

H<sub>0</sub>; There is no association between levels of awareness of health issues associated with mortuary operations and selected variables

H<sub>0</sub>; There is no association between PPE practices and selected socio demographic variables.

## **MATERIALS AND METHODS**

### **STUDY AREA**

The study was carried out in Oyo State's capital city of Ibadan. Ibadan, the third-most populous city in Nigeria after Lagos and Kano, serves as the state capital of Oyo State. Additionally, it has the greatest urban area in the nation. Ibadan was the biggest and most populous city in Nigeria at the time of its independence, ranking third in Africa behind Cairo and Johannesburg. The study's focus was on mortuary employees in Nigeria's Oyo State's Ibadan Metropolis. A descriptive cross-sectional design to determine the level of awareness, knowledge on diseases contraction from work place and perceived risk of health issues associated with mortuary operations. with a 10% allowance for non-response. Inclusion criteria were workers of selected mortuaries who were at least 18 years and had worked for at least 1 year.

For this study, sixteen morgues were chosen, of which three were public and thirteen private. The majority of the private morgues in the Ibadan city were not registered with the state ministry of health, thus they were chosen using the snowball sampling technique.

Total enumeration sampling method for all consenting mortuary workers in Ibadan metropolis was used for this study because the target population is very small. As a result of this, all consenting workers that fit into the inclusion criterion of the study were recruited. Data was collected using semi - structured questionnaire, The semi - structured questionnaire was pretested.

### **DATA INSTRUMENT**

The questionnaire was sectioned into 5 parts. These were; Socio-demographic data on participants,

Awareness on health issues associated with mortuary workers,

Exposure to chemical hazards in mortuaries,

Knowledge and practices of PPE among mortuary workers,

Ergonomics assessment and symptoms of musculoskeletal disorder and prevalence of injuries among respondents.

### **DATA MANAGEMENT AND STATISTICAL ANALYSIS**

Following data collection, it was cleaned, sorted, and coded before being used in an SPSS version 20 analysis. Data were presented as percentages and frequency tables, and descriptive analysis was used. The association between selected independent and dependent variables was examined in this study using inferential statistics, such as chi-square, at p-values less than 0.05. The confounders were corrected using binary logistic regression.

### ETHICAL CONSIDERATIONS

Before this study began, it received ethical approval from the University of Ibadan/University College Hospital Ethical Review Committee. To facilitate simple permission from the Mortuaries, permission was also secured from the Oyo State Government Ministry of Health. While a workable date for data collecting was agreed upon, the survey was previously told to the chosen morgue.

### RESULT

#### Socio-demographic characteristics of respondents

This study revealed the mean age and standard deviation of the respondents to be  $38.6 \pm 12.1$ . Majority (52.2%) of the respondents were 36 years and above while more than half of the respondents (85.5%) were male. About three quarter (71.0%) of the respondents were married while 29.0% were single. Most of the respondents (46.4%) had tertiary education while very few (4.3%) had no form of formal education. More than half (52.2%) work in a private mortuary although, two third (63.8%) were permanent staff in their work place. Few (24.6%) had more than ten years of working experience in a mortuary while 43.5% had working experience of one to four years. More than two thirds (68.1%) had no prior training related to working in a mortuary. Training had never been organized for less than half of the respondents (42.0%).

#### Socio-demographic characteristics of respondents

Variables	Frequency	Percentage
<b>Age in years</b>		
35 and below	33	47.8
36 and above	36	52.2
<b>Sex</b>		
Male	59	85.5
Female	10	14.5
<b>Marital status</b>		
Single	20	29.0
Married	49	71.0
<b>Level of education</b>		
No formal	3	4.3
Primary	8	11.6
Secondary	26	37.7
Tertiary	32	46.4
<b>Ethnicity</b>		
Yoruba	60	92.8
Non-Yoruba	9	7.2
<b>Type of health facility</b>		
Public	33	47.8
Private	36	52.2
<b>Employment status</b>		
Temporary	25	36.2
Permanent	44	63.8
<b>Working experience in years</b>		
1-4	30	43.5
5-10	22	31.9
>10	17	24.6

#### Had prior training before working in the Mortuary

Yes	22	31.9
No	47	68.1
<b>Staff training</b>		
Always	22	31.9
Sometimes	18	26.1
Never	29	42.0

### Respondents Level of awareness, knowledge on diseases contraction from work place and perceived risk of health issues associated with mortuary operations.

More than half of the respondents (81.2%) are aware of the health issues associated with mortuary operations. Most respondents (97.1%) have heard about tuberculosis while only about 78.3% have heard about Hepatitis B. About 81.2% of the respondents reported the mortuary operations predisposes them to Ebola Virus, this was followed by HIV (79.7%), Tetanus (60.9%), Tuberculosis (58.0%) and Hepatitis B (43.5%). (Table 4.2, Fig 4.1). Most of the respondents (66.7%) have poor knowledge on some diseases which can be contracted from their work place (Fig 4.2). It was observed that more than half of the respondents answered correctly on how HIV (60.9%) and Ebola (58.0%) can be contracted while the least poor knowledge was observed on tuberculosis (17.4%) and Lassa fever (29.0%) contraction.

Variables	Frequency	Percentage
Ever heard of Hepatitis B	54	78.3
Predisposed by your work to Hepatitis B	30	43.5
Ever heard of tetanus	66	95.7
Predisposed by your work to Tetanus	42	60.9
Ever heard of tuberculosis	67	97.1
Predisposed by your work to tuberculosis	40	58.0
Predisposed by your work to HIV	55	79.7
Ever had of Ebola virus	67	97.1
Predisposed by your work to Ebola virus	56	81.2
Ever heard of Lassa fever	64	92.8
Predisposed by your work to Lassa fever	42	60.9

### Respondents knowledge of disease contraction at work place

Variable	Right knowledge	
	Frequency	Percentage
Tuberculosis	12	17.4

HIV	42	60.9
Ebola	40	58.0
Lassa	20	29.0
Tetanus	32	46.4
Hepatitis	24	34.8

### Health practices of the respondents

Majority (59.4%) of the respondents have been tested for HIV. About one third (33.3%) have been vaccinated against Hepatitis B; while only 23.2% had completed the three stages of the hepatitis B vaccination. Respondents (44.9%) had been vaccinated against tetanus. Respondents (37.7%) and 40.6% reported the availability of Hepatitis B and Tetanus vaccines in their work place respectively.

Variable	Frequency	Percentage
Ever been vaccinated against Hepatitis B	23	33.3
Completed the three stages of Hepatitis B vaccination	16	23.2
Ever been vaccinated against tetanus	31	44.9
Ever been tested for HIV	41	59.4
Availability of Hepatitis B vaccination in your work place	26	37.7
Availability of tetanus vaccines in your work place	28	40.6

### Hygiene practices and observed conditions in the mortuary

About one thirds had practiced good hygiene. About 84.1% of the respondents mentioned the correct names of chemical used for disinfection of mortuary while about 60.9% used the chemicals correctly. The least hygiene practiced by respondent was correct use of chemicals for sterilization of reusable equipment. In the observed Mortuaries, (53.3%) and (40%) lack shower and wash hand basin respectively while 60% and 40.7% of waste bin and cloak room respectively were in bad in condition. Only 6.7% of the observed Mortuary had a covered waste bin.

Variables	N (%)
Used of correct chemicals for disinfection of mortuary	58 (84.1)



Frequent times of disinfecting mortuary in a day	42 (60.9)
Use of correct chemicals for sterilization of reusable equipment	16 (23.2)
Use of correct chemicals for removing blood spills	45 (65.2)
Non-use of already mixed chemicals for disinfecting mortuary environment	43 (62.3)
<b>Level of hygiene practice</b>	
Good hygiene ( $\leq 2/5$ )	21 (30.4)
Poor hygiene ( $> 2/5$ )	48 (69.6)

### Waste management activities and environmental conditions in the mortuary

About two thirds of the mortuary workers reported bad practices as it relates to discarding and managing solid waste generated from mortuary such as disposable protective clothing, soiled linen, dressing, sharps and human tissue. Use of dedicated waste bin, waste management and incinerator was identified as good practice (30.4%) in this study. Dedicated waste bin and burning (44.9%), dedicated waste bin and dumpsite (21.7%), dedicated waste bin and canal (1.4%) and wash and reuse (1.4%) were no standard practice reported by respondents in this study. Table 4.9 shows the details of the results.

Majority (73.3%) of the observed mortuaries had a dumpsite that was in bad condition while none had a color coded waste bin. Wastes were sighted littering around 40% of Mortuaries' surroundings. Proper solid waste and waste water disposal systems were lacking in 86.7% and 60% of the observed mortuaries respectively. Sharps were littered around the surrounding of 6.7% of the mortuaries while no sharps were found in the surrounding of majority (93.3%) of the mortuaries observed

### Waste management activities in mortuary environment

Variables	Frequency	Percentages
<b>Means of discarding solid waste including human tissue</b>		
Dedicated waste bin and burning	31	44.9
Wash and reuse	1	1.4
Dedicated waste bin and dumpsite	15	21.7
Dedicated waste bin, waste management and incinerator	21	30.4
Dedicated waste bin and canal	1	1.4
<b>Means of discarding solid waste including human tissue</b>		
Good practice	21	30.4

Bad practice	48	69.6
<b>Waste management system</b>	<b>Condition</b>	
	<b>Absent</b>	<b>Present in bad condition</b>
Refuse dump site	4 (26.7)	11 (73.3)
		<b>Total</b>
		15 (100)

### Knowledge of Personal Protective Equipment (PPE) among mortuary workers

The knowledge of PPE and its use by respondents in this study was high. The total population of the respondents had heard of PPE. Majority (91.3%) affirmed PPE's availability in their work place, although only three-quarter of the respondents (76.8%) feel comfortable using it. Majority (81.2%) had good knowledge of PPE use. All the respondents (100%) identified hand glove and nose mask while (89.9%) and (73.9%) stated their correct use respectively. Most of the respondents (94.2%) also identified protective/ isolation gown and protective boot (87.7%) and also stated their correct uses. Two thirds (66.7%) could identify the eye goggle and (79.7%) stated the correct use

Variables	Frequency	Percentages
Ever heard of PPE	69	100.0
PPE available at work place	63	91.3
Feels comfortable using PPE	53	76.8
<b>PPE knowledge questions</b>		
Identified protective/ isolation gown	65	94.2
Identified eye goggle	46	66.7
Identified hand glove	69	100.0
Identified nose mask	69	100.0
Identified protective boot	60	87.7
Stated correct use of protective/ isolation gown	63	91.3
Stated correct use of eye goggle	55	79.7
Stated correct use of glove	62	89.9
Stated correct use of nose mask	51	73.9
Stated correct use of protective boot	68	98.6
<b>Knowledge score for PPE</b>		
Good (> 7/10)	56	81.2
Poor ( $\leq$ 7/10)	13	18.8

### Use and practices of PPE among mortuary workers



Majority of the respondents (72.5%) always use protective glove while only few 3 (4.3%) reported that they never use glove whenever they carry out their work routines. Half of the respondents (55.1%) reported that they always use the nose mask, less than half (42.0%) rarely use it while 2.9% reported they never use it. When necessary, protective boot is always used by less than half (43.5%), rarely used by 20.3% but has never been used by 36.2% of the respondents. Eye goggle has never been used by less than half (47.8%) of the respondents, only few (15.7%) reported they always use it. Less than half of the respondents (44.9%) in this study rarely use the protective gown when working while about one third (36.2%) always use it. Generally, it was observed that less than half (44.9%) of the respondents adhere to PPE use.

Variables	Always n (%)	Rarely n (%)	Never n (%)
Protective gown	25 (36.2)	31 (44.9)	13 (18.8)
Eye goggle	11 (15.9)	25 (36.2)	33 (47.8)
Protective glove	50 (72.5)	16 (23.2)	3 (4.3)
Nose mask	38 (55.1)	29 (42.0)	2 (2.9)
Protective boot	30 (43.5)	14 (20.3)	25 (36.2)
PPE Practice score	Frequency	Percentage	
Good practice (>2/5)	31	44.9	
Poor practice ( $\leq$ 2/5)	38	55.1	

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Good practice (>2/5)	31	44.9	
Poor practice ( $\leq$ 2/5)	38	55.1	

### Prevalence of injury among respondents and actions taken by mortuary management

Majority of the respondents (73.9%) had ever been injured from their work routine as a mortuary worker. In the last six months, 41.2% were injured more than three times while more than half (58.8%) experienced injury three times or less. Not all cases of injury experienced by respondents were reported to the appropriate authorities. Respondents (37.3%) among those injured reported immediately while less than half (45.1%) continued their work without reporting the case. Among those who reported to the management, two thirds (67.9%) were provided health care while one thirds (32.1%) were asked to take care of it personally. Among the respondents (45.1%) who continued without reporting the injury, (56.5%) decided not to report the incident because the management in their work place do not respond when such cases are reported. Less than half (43.5%) of those who were injured and did not report the case as a result of their nonchalant attitude.

**Prevalence of injury among respondents and actions taken by mortuary management**

Variables	Frequency	Percentage
<b>Ever been injured from work routine n = 69</b>		
Yes	51	73.9
No	18	26.1
<b>Frequency of injury in the last six months n = 51</b>		
1– 3 times	30	58.8
>3 times	21	41.2
<b>Action taken after injury occurred n = 51</b>		
Reported immediately	19	37.3
Continued and reported later	9	17.6
Continued without reporting	23	45.1
<b>Management's response after reporting n = 28</b>		
Provided health care	19	67.9
Asked to take care of it personally	9	32.1
<b>Reason why injury was not reported n = 23</b>		
No response	13	56.5
Nonchalant attitude of respondent	10	43.5
<b>Causes of injuries</b>		
Sharps	20	29.0
Chemical splash	42	60.9
Slip, trip and falls	13	18.8

**Ergonomic conditions in the mortuary environment**

More than half of the respondents (60.9%) work for seven hours or more. Although, 56.5% had break of 30 minutes and above daily. Majority undergo activities hazardous to their health such as working in bent, twisted or awkward positions, repetitive movement during work and carrying loads heavier than 20 kg reported by 87.0%, 88.4% and 78.3% respectively. Various means of conveying bodies into the mortuary were reported. The most dominant means of conveying bodies into the mortuary was by trolley (76.8%). Other forms of conveying bodies include use of stretcher (34.8%), hand lifting (24.6%). The least form of conveying body by workers were wheel barrow and body bag at 4.3% each. After each day's work, 81.2% of the respondents feel pain in various parts of their body. Majority (68.1%) feel pain in their back compared to other parts. About half feel pain in the leg (49.3) and arm (55.1%).

Variables	Frequency	Percentage
<b>Work hours in a day</b>		
Less than 7 hours	27	39.1
7 hours and above	42	60.9
<b>Duration of break in a day</b>		
No definite time	30	43.5
30 minutes and above	39	56.5
<b>Ergonomic hazards n = 69</b>		
		<b>Correct responses</b>
Work in bent, twisted or awkward positions	60	87.0
Work involve repetitive movements	61	88.4
Carry loads heavier than 20kg	54	78.3

**Means of conveying bodies into the mortuary n = 69**

Wheel barrow	3	4.3
Hand lifting	17	24.6
Trolley	53	76.8
Stretcher	24	34.8
Body bag	3	4.3
<b>Pain after each day's work n = 69</b>	56	81.2
<b>Location of pain n = 69</b>		
Neck	26	37.7
Arm	38	55.1
Back	47	68.1
Leg	34	49.3

**BIVARATE ANALYSIS****Association between knowledge of disease contraction at work place and selected variables**

Married mortuary workers (40.8%) had more knowledge of disease contraction at work- place than single respondents (15.0%). The association was statistically significant ( $p= 0.039$ ). Respondents (40.6%) who have tertiary education had better knowledge of disease contraction at their work place compared to respondents (38.5%) who had secondary education. This association was statistically significant ( $p= 0.037$ ). Statistically significant association exists between level of awareness and knowledge of disease contraction ( $p= 0.005$ ). Respondents (41.1%) who have high awareness of health practises had more knowledge of disease contraction at their workplace while those with low awareness had no knowledge of disease contraction at their work place.

Variables	Knowledge of disease contraction at work place					
	Good	Poor	Total			
<b>Sex</b>						
Male	22 (37.3)	37 (62.7)	59 (100)	2.865	1	0.091
Female	1 (10.0)	9 (90.0)	10 (100)			
<b>Marital status</b>						
Married	20 (40.8)	29 (59.2)	49 (100)	4.260	1	0.039
Single	3 (15.0)	17 (85.0)	20 (100)			
<b>Educational status</b>						
At most primary	0 (0.0)	11 (100)	11 (100)			
Secondary	10 (38.5)	16 (61.5)	26 (100)	6.573	2	0.037
Tertiary	13(40.6)	19 (59.4)	32 (100)			
<b>Awareness on health practice</b>						
Low awareness	0 (0.0)	13 (100)	13 (100)	8.009	1	0.005*
High awareness	23 (41.1)	33 (58.9)	56 (100)			

### Association between levels of awareness of health issues associated with mortuary operations and selected variables

There was a statistically significant association between respondents' marital status and awareness of health issues associated with mortuary operation ( $p < 0.05$ ). Married mortuary staff (87.8%) had a high awareness than single respondents (65.0%). Respondents (90.6%) who had tertiary education expressed a higher level of awareness of health issues associated with mortuary operation than those who had secondary (80.8%) and primary education (54.5%) ( $p < 0.05$ ). Respondents (92.9%) working in facilities where Tetanus (92.9%) and Hepatitis (100%) vaccines were made available had a higher level of awareness than those whose facilities do not have Tetanus (73.2%) and Hepatitis (71.1%) vaccines. Respondents (100%) who had been vaccinated against Hepatitis showed a higher level of awareness of health issues associated with operations in the mortuary than unvaccinated respondents (71.1%) ( $p < 0.05$ ).

Variable	Awareness of health issues associated with Mortuary operations			X <sup>2</sup>	df	P-value
	GOOD	POOR	Total			
<b>Marital status</b>						
Single	13 (65.0)	7 (35.0)	20 (100)	4.810	1	0.028*
Married	43 (87.8)	6 (12.2)	49 (100)			
<b>Facility type</b>						
Public	26 (78.8)	7 (21.2)	33 (100)	0.233	1	0.630
Private	30 (83.3)	6 (16.7)	36 (100)			
<b>Educational status</b>						
At most primary	6 (54.5)	5 (45.5)	11 (100)	6.973	2	0.031*
Secondary	21 (80.8)	5 (19.2)	26 (100)			
Tertiary	29 (90.6)	3 (9.4)	32 (100)			
<b>Availability of Tetanus vaccine</b>						
Yes	26 (92.9)	2 (7.1)	28 (100)	4.217	1	0.040*
No	30 (73.2)	11 (26.8)	41 (100)			
<b>Availability of Hepatitis vaccine</b>						
Yes	26 (100)	0 (0)	26 (100)	9.685	1	0.020*
No	30 (69.8)	13 (30.2)	43 (100)			
<b>Tetanus vaccination status</b>						
Yes	28 (90.3)	3 (9.7)	31 (100)	3.091	1	0.079
No	28 (73.7)	10 (26.3)	38 (100)			
<b>Hepatitis vaccination status</b>						
Yes	23 (100)	0 (0)	23 (100)	8.009	1	0.005*
No	33 (71.7)	13 (28.3)	46 (100)			
<b>Prior training</b>						
Yes	37 (78.7)	10 (21.3)	47 (100)	0.572	1	0.449
No	19 (86.4)	3 (13.6)	22 (100)			
<b>Staff training</b>						
Never	19 (65.5)	10 (34.5)	29 (100)	8.086	1	0.018*
Sometimes	17 (94.4)	1 (5.6)	18 (100)			
Always	20 (90.9)	2 (9.1)	22 (100)			

### Association between PPE practices and selected variables

Male respondents (50.8%) exhibit better PPE practise than female respondents (10%). This association was statistically significant ( $p = 0.016$ ). Respondents (63.5%) who always attend staff training showed good PPE practise than those who sometimes (55.6%) and never (24.1%) attend training. This association was statistically

significant ( $p = 0.011$ ). Mortuary workers (62.5%) with tertiary education showed more PPE practise than respondents (42.3%) with secondary education. This relationship was statistically significant ( $p = 0.001$ ). Majority (54.7%) of respondents who reported that they feel comfortable using PPE while working showed good PPE practise than those who do not feel comfortable using PPE. This relationship was statistically significant ( $p = 0.003$ ).

Variable	PPE PRACTICE			$X^2$	df	P-value
	GOOD	POOR	Total			
<b>Sex</b>						
Male	30 (50.8)	29 (49.2)	59 (100)	5.766	1	0.016
Female	1 (10.0)	9 (90.0)	10 (100)			
<b>Prior training</b>						
Yes	24 (51.1)	23 (48.9)	47 (100)	2.243	1	0.134
No	7 (31.8)	15 (68.2)	22 (100)			
<b>Staff training</b>						
Always	14 (63.6)	8 (36.4)	22 (100)	9.000	2	0.011
Sometimes	10 (55.6)	8 (44.4)	18 (100)			
Never	7 (24.1)	22 (75.9)	29 (100)			
<b>Educational status</b>						
Tertiary	20 (62.5)	12 (37.5)	32 (100)	13.039	2	0.001
Secondary	11 (42.3)	15 (57.7)	26 (100)			
At most primary	0 (0.0)	11 (100)	11 (100)			
<b>Comfortable using PPE</b>						
Yes	29 (54.7)	24 (45.3)	53 (100)	8.853	1	0.003
No	2 (12.5)	14 (87.5)	16 (100)			

## DISCUSSION, CONCLUSION AND RECOMMENDATIONS

### Discussion

Mortuary workers are one of the neglected workers in the health sector, because most of them do not receive the necessary attentions that they required or entitled to. Respondents in this study showed high level of awareness of health and safety issues associated with working in a mortuary and proper use of personal protective equipment. Only one-third of the mortuary workers were vaccinated against infectious diseases associated to their work practises. High levels of microbial load were detected in the selected areas of the mortuary environment.

### Awareness of health issues associated with mortuary workers

Respondents in this study were highly aware of the health and safety issues, route of transmission of various diseases and perceived risks associated with their work place. This is in agreement with a study conducted by Kelly and Reid (2011), which stated that the mortuary workers similarly perceived the risk of infectious diseases related to the health and safety conditions associated with their work place. These conditions identified in both studies were blood exposure from sharps and splash, chemical exposure etc. Although, perceived risks associated with working in a mortuary were stated by Kelly and Reid (2011), but there was no report on whether the respondent's level of awareness was low or high, which



was reported in this study.

Majority of the mortuary workers have heard of hepatitis B infection while less than half of the respondents think their work can predispose them to hepatitis B infections, this is in line with the study conducted by Shankargouda *et al.* (2013), Okwara *et al.* (2012) and Majolagbe *et al.* (2014). According to Shankargouda *et al.* (2013), majority of the health auxiliary health care workers have heard of hepatitis B infection which is also similar to the findings of Okwara *et al.* (2012). Few of the mortuary workers think their work can predisposes them to hepatitis B infection, this is in contrast to the study conducted by Shankargouda *et al.* (2013), which reported a higher proportion among auxiliary health care workers. The reasons for this enormous difference could be as a result of level of education of the respondents and location where the study was conducted.

Few of the mortuary workers have a right knowledge of the disease transmission which is in contrast with the study of Majolagbe *et al.* (2014), Shankargouda *et al.* (2013). Majolagbe *et al.* (2014), reported that majority of the blood donors know at least one route of hepatitis transmission. Shankargouda *et al.* (2013), also reported that majority of the auxiliary health care workers know that hepatitis B infection can be transmitted through blood and its products and it could be spread through contaminated needles and syringes. This could be as a results of differences in the characteristics of the study group and location where the study was conducted.

Majority of mortuary workers have heard of Ebola virus, this is in agreement with the study conducted by Toure *et al.* (2016), which reported that majority of the health care workers recruited were aware that Ebola disease can be contracted from the hospital ward. The reasons for the similarity could be attributed to location where the study was conducted because both Nigeria and Guinea have experienced Ebola virus in the recent past.

This study also revealed that majority of the mortuary workers have heard of Lassa fever, which is line with the study conducted by Tobin *et al.* (2013), Reuben and Gyar (2016). Tobin *et al.* (2013), which reported that majority of primary health care provider had previously heard of Lassa fever while Reuben and Gyar (2016) also reported similar proportion on Lassa fever awareness. But the level of awareness does not reflects on their knowledge of Lassa fever transmission as only few of the mortuary workers have a good knowledge on Lassa fever transmission from their work routine. This findings is in line with the community based study conducted by Olalekan (2015). The reason for the similarity could be associated with educational status of the respondents in both studies.

Overall, one third of the mortuary workers have the right knowledge of how they can be infected with these diseases (Hepatitis, HIV, Ebola, Tuberculosis and Lassa fever) associated with their work routine. This is in line with a similar study conducted by Kelly and Reid (2011), among embalmers and non-embalmers. Few of the respondents had the right knowledge on route of transmission of the diseases associated with their work place. Although, this study documented a high level of awareness on diseases which can be contracted from their work place. The similarity observed in both studies could be as a results of study group and level of education. Level of awareness of health issues associated with working in a mortuary among respondents who had tertiary education was higher compared to those with lower educational status as documented by this study which is in concordance with the report of Okwara *et al.* (2012).

### **Knowledge and use of Personal Protective Equipment among mortuary workers.**

Knowledge on Personal Protective Equipment among respondents in this study was good as all the respondents in this study were able to identify PPE specific to their work place while majority possessed the right knowledge on functions of various PPE at their work place. This is in concordance with the

findings of Eljedi (2015), who reported that majority of the respondents in his study were fully aware of using Personal Protective Equipment and safety conditions attached to it. However, the use of PPE among mortuary workers was poor which is in line with the study conducted by Patwary *et al.* (2012), which reported that individuals working in the mortuaries usually did not wear adequate personal protective equipment (PPE) during autopsy. A hospital-based study conducted among doctors by Hakim *et al.* (2016) in Egypt, reported that doctors tends to adhere to PPE use. Use of PPE by health workers can differ with respect to the differences in their work routine. Hand glove was the commonest PPE used by respondents in this study which was also reported by with Hakim *et al.* (2016). Few respondents reported use of protective gown and eye goggle always in this study. This shows that knowledge of safety precautions of PPE does not inevitably lead to its compliance.

This study documented a high level of awareness of PPE and its use, although majority of the mortuary workers claimed that some and not all the PPE were made available for them. A study conducted by Khan *et al.* (2006), reported lower awareness of PPE among workers in chemical industry. Khan *et al.* (2006), also documented that when PPEs were made available, they were poorly maintained and not utilised appropriately.

### **Hygiene practices in mortuary**

It has been established in this study that bacterial and fungi can survive on the surface of inanimate objects in the mortuary environment. It was documented in this study that majority of the mortuary workers identify the chemical for proper disinfection of mortuary environment. These were chlorine based chemicals (hypochlorite), phenols, alcohols, quaternary ammonium compounds and aldehydes (USACHPPM TG, 2001, HSE, 2010). Two thirds of the respondents reported that they disinfect the Mortuary environment more than once a day which in line with HSE (2010) standard. HSE (2010) which reported that Mortuary must be disinfected at least once a day. The remaining one third reported disinfecting once a week, thrice a week while few do not disinfect in a month. Majority of mortuaries practice dry embalment (without the use of freezer) which is a bad practise of embalment. OSHA fact sheet (2005), stated that a mortuary should have freezers or chillers.

Malavaud (2016) and HSE (2010), reported that the best way to sterilize these reusable equipment in the absence of autoclave and other electrical sterilizers is washing in warm water with detergent, dry and wipe with alcohols. This is in contrast with this study as majority reported the use of water alone to clean their equipment while others do not sterilise their equipment. It has been established by Ogunnowo *et al.* (2010), that blood and body fluid are critical ways of transmitting blood pathogen in the mortuaries. Interestingly, two thirds of the respondents use correct chemicals for removing blood or body fluid spills in the mortuary environment which is in line with the guideline of USACHPPM TG (2001). Chlorine releasing products and phenols are very good in disinfecting Mortuary environment because they are very active against bacterial, virus, spores forming fungi and mycobacterium (USACHPPM TG, 2001).

About half of the mortuaries in this study had cloakrooms but they were in bad condition. Where present, cloakrooms and office corridors were used as storage for bodies when mortuary is filled with bodies or freezer is not working. Stench in the office of some of the mortuaries was similar to that of the body storage. Some of the workers reported that embalming chemicals were not adequately supplied by the management. Disinfection and proper hygiene practice should be adhered to by the mortuaries workers to avoid cross-transmission and strengthening of antimicrobial resistant and disease outbreaks.

### **Microbial load within mortuary environment**

Different micro flora of bacteria and fungi were isolated in this study such as *Bacillus species*, *Staphylococcus aureus*, *Acinetobacter haemolyticus*, *Coagulase negative staphylococcus (CNS)*, *Pseudomonas aeruginosa* and *Pseudomonas putida* for bacteria and *Aspergillus flavus* as the only isolated fungi were obtained. This is in line with the study conducted by Sonmez *et al.* (2011), Garcia-cruz *et al.* (2012) and Hailemariam *et al.* (2016). The similarities in these studies may be due to similarities in the environment and the season when the study was conducted. The most predominant bacteria in this study are *Bacillus species*, *Staphylococcus aureus* and *Coagulase negative staphylococcus (CNS)* which is in agreements with the findings of Hailemariam *et al.* (2016), which reported that *Bacillus species*, *Staphylococcus aureus* and *Coagulase negative staphylococcus (CNS)* as the most predominant bacteria in an operating room.

Most contaminated area of the Mortuary identified in this study was tray / trolley while door knob of the rear door of ambulance was the most contaminated area reported by Alrazeeni and Al Sufi, (2014). The least contaminated surface swabbed in this study were door knob and wash hand basin while Gracias-Cruz *et al.* (2012), reported that the least contaminated surface in an hospital in Mexico based on their study was armrest bed surface. The armrest of the bed are usually touched most often which could be responsible for the level of contamination.

One of the least predominant bacteria in this study was *Pseudomonas aeruginosa*, which is in contrast to the study conducted by Hailemariam *et al.* (2016). The study reported that *Pseudomonas aeruginosa* was the second prevailing isolate in their examination. The reason for the disagreement could be as a result of method both study were conducted. Sample were taken using swab on an inanimate surface while Hailemariam *et al.* (2016), collected their sample using air sampler.

Predominant and only fungi isolated in the samples of this study was *Aspergillus species* which was also reported as predominant and isolated by Gracias-Cruz *et al.* (2012) and Sonmez *et al.* (2011). *Aspergillus species* were identified in selected areas of the Mortuary (*Aspergillus flavus*). Similarly, washed reusable towels for cleaning the hospital environment used in some hospitals in Arizona harbour growth of *Aspergillus niger* (Sifuentes *et al.*, 2013).

### **Prevalence of injuries (sharp and splash and other forms of injuries) among mortuary workers**

This study reported a high prevalence of injury among mortuary workers which is in contrast to the few reported by Kelly and Reid (2011), who had injuries related to work in the neck, back, fractured hand as a result of fall, splash, and sharp injuries. This huge disparity could be as a result of difference in location and respondent's characteristics. A lower prevalence of needle stick injury (29.0%) was reported in this study compared to another study carried out among Mortuary workers in South-West teaching hospitals in Nigeria by Ogunnowo *et al.* (2012), which reported that 85% and 73.5% of the respondents in their study were exposed to blood splash and needle stick injuries respectively. A hospital-based study conducted in Tanzania also reported a contrasting prevalence of needle stick injury among health care workers (Chayla *et al.*, 2015). The observed difference could be traced to the fact that the study was conducted in tertiary hospitals while the present study included private and public mortuaries.

In addition, few of the respondents in this study were exposed to three forms of injuries (slip, trip and fall, needle stick and chemical injuries) while in similar study by Ogunnowo *et al.* (2012), reported that half of the respondents were exposed to three forms of injury (needle stick injury, blood splash and cut on skin). Eljedi (2015), reported a similar prevalence of needle stick injury in a study conducted among nursing students in Palestine. Ogunnowo *et al.* (2012), recruited workers from teaching hospitals only,

while this study was a mixture of public and private mortuary workers in Ibadan metropolis.

About two thirds of mortuary workers in this study were victims of chemical burns / injury. This is in contrast to the study conducted by Chayla *et al.* (2015) and Eljedi (2015). These studies reported a lower prevalence of chemical burns/injury by their respondents. This could be due to the fact that mortuary workers are more exposed to chemicals among health care workers.

### **Mucocutaneous exposure and Hepatitis vaccination among mortuary workers**

This study showed that less than half of the respondents exposed to blood or body fluid splash had been vaccinated against hepatitis or even completed the three stages of the vaccine. This is in contrast, with Ogunnowo *et al.* (2012), who stated that more than half of the respondents exposed to body fluid in their study had been vaccinated against hepatitis. Although, correlation exist between the prevalence of respondents who had completed the three stages of hepatitis vaccination in both studies. Eye mucosa was the most common site for blood or body fluid splash in this study which corroborate with the report of Chalya *et al.* (2015).

### **Injury management at work place and training**

Respondents who attended training in this study experienced less injury while Amira *et al.* (2013), reported that respondents with work experience of six to ten years experienced more needle stick injury than other respondents. After injury occurrence, some of the injured respondents in this study continued with their work routine without reporting the injury which is in concordance with the study conducted by Chalya *et al.* (2015). The reasons for not reporting the incident by some respondents identified in both studies were respondents did not know who to report to, ignorance of the hazards associated with needle stick injury while few gave no reason.

A large proportion of the respondents in this study indicated at least a work related injury. About half of the respondents who refused to report the incidents claimed they do not get response from the management when incidents are reported while about two out of five were nonchalant towards the injury as they see it as part of their work routine. This is similar to study conducted by De castro *et al.* (2009) among nurses, who also reported the same reason for not reporting injuries. This study also revealed that respondents with tertiary education experienced less injury than those with secondary education. In concordance with our study, Khan *et al.* (2006), observed that unskilled workers (who had no formal education or with lower educational attainment) were mostly injured.

### **Back pain**

In this study, about two third of the mortuary workers complained majorly of back pain after each day's work which is similar to the study of Yasobant and Rajkumar (2015) and Ilesanmi *et al.* (2014). Yasobant and Rajkumar (2015), reported similar back pains (upper back and lower back) among health professionals while Ilesanmi *et al.* (2014), reported low back pain in a study conducted among cleaners in tertiary health facility. In contrast to the present study among ophthalmologist, Dabholkar *et al.* (2015) reported that less than half of workers experienced back pain after work. Another study reported that about one third of nursing students felt back injury due to the process of lifting and moving patients by hand (Eljedi, 2015). Back pain injury reported by respondents in this study can be as a result of lifting bodies especially in mortuaries where appropriate equipment were not made available for conveying



bodies.

Majority of respondents in this study who worked for more than 7 hours, with 11 years or more and those that are single have experienced more back pain compare to those who worked for lesser years, lesser working hours and are married. All these could be risk factors for back pain because statistically significant association exists between these variables.

### **Neck pain**

This study showed that neck pain was felt by about one third of the mortuary workers which is consonance to findings in a study conducted by Yasobant and Rajkumar (2015), which reported 28.5% prevalence of neck pain among health professionals. In contrast to our findings, Dabholkar *et al.* (2015) and Das and Gosh (2010) reported higher prevalence of neck injuries and pain. The reasons for the huge difference could be as a results of characteristics of the study population and locations where the study was conducted.

Pain in the neck after each day's work was reported more among respondents who work in awkward postures and those who carry loads more than 20kg, although the association was not statistically significant which could be due to the limited sample size. Respondents whose highest education attainment is primary education experienced neck pain more than those with tertiary education. Work cadre might be responsible for this association as respondents with only primary education were junior staff.

### **Arm pain**

More than half of the mortuary workers in this study complained of pain at the arm/ shoulder region. In contrast to this findings, a comparative study conducted by Das and Gosh (2010) reported a lower prevalence of arm pain among male and female respondents. In addition, Akodu *et al.* (2015) also reported that less than half of secretaries feel pain in their arm after each day job. Respondents who work in bent, twisted and awkward position and those who carry loads more than 20 kg experienced pain in the arm region than those who do not involve such activities. This could also be a risk factor for arm pain because statistical significant association exist between the variables.

It was also observed that most private mortuaries do not have enough staff, therefore, work that is meant for about 6 staff was being carried out by two or one staff. Shift was not observed in the privates' mortuaries, therefore workers work all day round to achieve company's goals and target. Arm pain was also experienced more by workers who had worked for more than 11 years than those who had worked for lesser years. This could be as a result of continuous lifting of heavy loads for a very long time without consulting a specialist when necessary.

### **Leg pain**

This study reported that leg pain was felt by half of the mortuary workers, similarly, Yasobant and Rajkumar (2015) reported that about half of health professionals complained of leg pain after their work routine. This could be as a result of manual handling of patients and bodies in both studies. In discordant study conducted by Munabi *et al.* (2014) among nurses in Uganda, it was revealed that about one third of the respondents experienced pain at feet, ankle and knee region of their body. In addition, Dahholkar *et al.* (2015) reported lower prevalence of arm pain among ophthalmologist during surgery hours.

Awkward, bent and twisted position and long working hours without break could be a reason for the leg pains. Pushing trolley almost every day over long distance can also be attributed to leg pain. Statistical significant association exist between leg pain and working in awkward postures, mortuary facility type and methods of conveying bodies.

### **Waste management system and conditions in the observed mortuaries**

About two third of the mortuary workers reported no standard practices as it relate to discarding and managing solid waste generated from mortuary such as disposable protective clothing, soiled linen, dressing, sharps and human tissue in this study. Abah and Ohumain (2011) in its findings among mortuary workers in a hospital based study, reported that waste generated was been disposed by open burning and burying on facility sites. Open burning of health waste can lead to the release of harmful gases that can be hazardous to the environment and people residing closer to the facility. Use of dedicated waste bin, private or public waste management and incinerator were identified as a good practices in this study which was observed among one third of the respondents working in the mortuary.

Sharps were littered in the surroundings of few of the observed mortuaries which can predispose the workers to health issues such as Hepatitis, Tetanus and Human Immunodeficiency virus (HIV) as reported by Patwary and Sarker (2012). Similarly, WHO (2002), also reported that improper disposal of hazardous waste (such as syringe, needles, human tissue among others) can cause infection such as hepatitis B, C and HIV and poses indirect risk to human through direct environmental effects by contaminating soil and groundwater.

Colour coding indicate the type of waste to be deposited in a particular waste bin. This was not observed in sampled mortuaries in this survey. Body tissue, soiled linen, dressing, sharps and disposable protective cloth were dump into one waste bin before disposal. In the findings of Abah and Ohumain (2011) and Ogbonna *et al.* (2012), it was observed that there were no colour coded waste bin in their hospital based studies. Non-separation of health care waste endangers scavengers, waste handlers and wild animals such as birds, flies and rodents. This can facilitate the spread of germs from infectious medical waste to nearby environments (Ogbonna *et al.*, 2012). Patwary and Sarker (2012), reported that improper waste disposal of hazardous mortuary waste may cause contamination of air through volatilisation, dust emission, surface water through surface runoff, groundwater seepage, groundwater through leaching and infiltration, soil erosion and biota due to biological uptake and bioaccumulation.

About two third of the visited mortuary did not have a proper way of disposing waste water generated from their routine such as body fluid, water used in cleaning the remains etc. One of the mortuaries dispose their waste into nearby canal and drainage while others dispose it directly into the environment where it could potentiate diseases to those residing close to the mortuary environment. Patwary and Sarker (2012), reported that this can disturb the natural ecosystem due to the toxic effects of substances released and also pose risk to aquatic species.

### **Symptoms of chemical exposure among Mortuary workers**

Exposure to toxic chemicals especially formaldehyde which is used in preserving remains has resulted in the development of sensory symptoms (such as eye irritation, skin irritation, hyposmia, epistaxis, chest tightness and breathing difficulties among others) among mortuary workers.

This is in line with a study conducted among medical students during cadaver dissections by Hisamitsu



*et al.* (2011). It was reported that majority of the students complained of eye irritation, ocular pain and burning in the throat. In contrast to the present study, only two third of the students complained of headache and heavy headedness while few were reported to have experienced skin symptoms such as itching. About half of the mortuary workers experienced headache and skin irritation. The similarity that was observed could be owing to the chemicals they were exposed to in both studies while the difference could be as a results of duration of exposure.

In a similar study conducted by Ajao *et al.* (2011) among health science students, who are exposed to formaldehyde in Nigeria. It was revealed that majority of the respondents suffers respiratory symptoms ranging from breathing difficulty to severe chest tightness, most of the respondents have also experienced eye irritation which are all in accordance to the present study.

Agreement exists between this present study and Abdullahi *et al.* (2014), based on other symptoms, although, differences between the prevalence of hypsomnia and cough reported by respondents in both studies. In contrast, majority of the mortuary workers reported excessive sneezing and coughing in this study while few reported excessive sneezing alone in a study conducted by Abdullahi *et al.* (2014). Furthermore, eye irritation was the most common effect while nose bleeding was the least common effect identified in both studies. In contrast to the present study, Eljedi (2015) reported a lower prevalence of skin, eye and nose irritation by respondents exposed to chemicals. Although, formaldehyde is an effective preservative, its health implications of long term exposures is of public health importance.

## Conclusion

Workers in the healthcare industry are a vital component of any economy's labor force. Sadly, health professionals in developing nations like Nigeria face a significant risk of getting illnesses from blood-borne pathogens. Blood-borne pathogens taken into account in this study include Hepatitis B, tetanus, and HIV infection. If effective treatments are not put in place, the prevalence of bloodborne diseases will continue to rise because mortuary staff lack or utilize PPE improperly. Mortuary employees, including health care professionals, have been warned that they run the risk of becoming hurt, especially from chemicals, bodily fluids like blood, and sharp objects like needles. Therefore, prevention and management of such injuries is necessary by taking proper precautions to avoid infection contraction. Formalin exposure is an important hazard mortuary workers are exposed to which can hinder their health and productivity rate. Majority of the mortuary workers were exposed poor ergonomic conditions and various musculoskeletal disorders resulted from poor working conditions and use of manual equipment. Microbial load of the mortuary environment was very high which can lead to transmission of nosocomial infections among mortuary workers, visiting relatives who deposit bodies at mortuary, family members and individuals within the society.

## Recommendations

1. Trainings and workshops should be organized for mortuary workers on awareness, safety and hygiene conditions related to their work place especially as it relates to infectious diseases risks and control measures.
2. Mortuary workers are at high risk of blood borne diseases due to the high incidence of percutaneous and mucocutaneous injuries. Therefore, mortuary workers immunization against vaccine preventable diseases (Hepatitis B and Tetanus) should be emphasized.

3. Providing suitable hand washing facilities such as running water, liquid soap, disposable paper towels and alcohol-based hand sanitizers to reduce transmission of microbes, likewise hand washing basin should be positioned close to waste bin for latex gloves removed to promote hand washing practices.
4. PPE should be provided to health care workers while proper use should be encouraged and promoted by introducing measures that can promote positive behavioral changes toward the use of PPE. Reusable PPEs should be properly decontaminated after use and stored in a clean area.

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