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*Research Article*

# **Knowledge, Attitudes and Perceptions about Occupational Hazards and The Use of Safety Measures among Healthcare Workers in a Teaching Hospital in Rwanda**

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## **ABSTRACT**

Healthcare workplaces are unsafe environments due to inherent sources of hazards. This study was conducted to assess healthcare workers' knowledge, attitudes and perceptions of workplace hazards and availability of safety measures at a teaching hospital in Rwanda. A descriptive, cross-sectional, prospective study design with mixed method approach was used. Healthcare workers of a teaching hospital were selected by stratified sampling and asked to complete a structured self-administered questionnaire. Information was collected from the participants about the socio-demographic characteristics as well as the knowledge, attitude and perceptions of occupational hazards and the presence of safety measures. A total of 290 staff responded to the questionnaire, of which 163(56.2%) were males. The mean age was 35.81 years (SD:  $\pm 7.528$  years). Most of the participants (n=151; 52.1%) reported that they met patients with highly contagious diseases 12 months before data collection; 155 (53.3%) participants had needle stick injuries. Overall, 143 (49.3%) participants had knowledge deemed adequate; with the majority being males who are married, have a bachelor's degree and are aged above 30 years. The results show that 154 (53.1%) participants had a good attitude. Bad attitude was associated with being aged 26 or younger, female, divorced, widowed, or only completed secondary education. Over the course of the year, half of hospital staff are exposed to workplace hazards. There are gaps in knowledge about workplace hazards and proper safety practices. Healthcare workers' attitudes also put them at risk. Workplace health education and policy need to be strengthened to create a safe working environment.

**Keywords:** *Occupational hazards, healthcare workers, safety measures, contagious diseases*

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## **INTRODUCTION**

Occupational health is the health related to work and work environment. According to the National Institute for Occupational Safety and Health (NIOSH), every year 100 000 people die from occupational diseases and about 400 000 new cases are identified among workers each year (Nwaekpe *et al.*, 2018). Workers in various occupations are exposed to different types and degrees of occupational hazards. Occupational health injuries are mostly prevalent in developing countries, particularly due to a lot of work, absence of task monitoring and role ambiguity (Kim *et al.* 2016; Ford and Tetric, 2011).

Healthcare workers account 12% of the global workforce (Ndejjo *et al.*, 2015; McDiarmid, 2014). Moreover, the work environment of healthcare workers is among the most hazardous occupational settings. Every year, 1 in 10 healthcare workers are seriously injured (Nwaekpe *et al.*, 2018; Mossburg *et al.*, 2019). Sharp accidents to healthcare providers caused 16 000 cases of hepatitis C virus (HCV) infections, while 1 000 and 66 000 cases of human immunodeficiency virus (HIV) and hepatitis B virus (HBV) infections were reported respectively (Senthil *et al.*, 2015; Prüss-Üstün *et al.*, 2005). These infections have significant consequence in health care delivery especially in developing

countries, where already the qualified work force is limited with respect to the disease burden in the population.

Health safety and management system identifies and eliminates environmental hazards, thereby reducing workers' accidents. The knowledge of potential occupational hazards and safety measures in healthcare facilities is essential for development of positive attitude that leads to action (Bhargava *et al.*, 2013). The study by Aluko *et al.* (2016) investigating the skills, attitudes and perceptions of occupational health injuries and safety practices among Nigerian healthcare providers found that most of the participants (89%) had skills about the injuries in healthcare environment.

Healthcare professionals in Rwanda are exposed to a wide range of chemicals, including those that are used to clean and disinfect the patients (Nwankwo *et al.*, 2017). A 2010 study conducted in Kigali, Rwanda found that backache and injuries experienced while working contributed to the majority of occupational hazards with 151 (60.6%) and 139 (55.8%) cases respectively; while health hazards from violence and molestation contributed 3.2% of the cases (Nwankwo *et al.*, 2017).

Despite global, national and regional initiatives to develop skilled healthcare workers to improve health efforts to reduce occupational safety and health (OSH) risks in developing countries are insufficient to protect health. Rwanda, like many other developing countries, does not have a good tracking system for occupational exposure to health hazards in healthcare institutions making it difficult to estimate the true extend of such hazards. However, there is no recent study in Rwanda about the attitudes, perception, and knowledge of occupational hazards and use of preventive measures among healthcare workers. Therefore, in this study the aim was to capture and describe the attitudes, perceptions and knowledge of occupational hazards and use of precautions among healthcare workers at a teaching hospital in Rwanda.

## MATERIALS AND METHODS

**Study design and setting:** This was a descriptive, cross-sectional, prospective study utilising both quantitative and qualitative approaches conducted at a teaching hospital in Rwanda. The teaching hospital provides quality healthcare to the population, and is also used for training of students in healthcare professions, as well as clinical research and technical support to district hospitals.

**Study population:** At the time of study, 800 workers were employed at the hospital with 87 doctors including 51 specialist doctors, 397 permanent nurses, 200 paramedical healthcare providers, and 100 administrative staff. The target population consisted of healthcare workers including both male and female older than 18 years, employed at the teaching hospital and provide different types of healthcare services. This study included a sample size of 267 healthcare workers calculated by using the Taro Yamane's formula. In this study, participants included all healthcare workers (nurses, doctors, anesthetist technicians, laboratory technicians, office workers, physiotherapist, pharmacists, radiologic technologists, mental health professionals, social workers, and nutritionists) at the

teaching hospital in Rwanda who gave consent by signing an informed consent form.

**Pilot study:** Before the study was undertaken, a pilot study was conducted to test the reliability and validity of the questionnaire. Moreover, the questionnaire was piloted among 10 participants before it was administered to the entire sample to test for its relevance, validity, and reliability. Participants of the pilot study were not included in the main study.

**Data collection:** To work out the sample size of the study, stratification sampling by weight was used to calculate specific sample sizes of healthcare workers. A well-structured interviewer-administered questionnaire was developed and used in data collection from 22<sup>nd</sup> March to 30<sup>th</sup> April 2021 using weight stratification sampling. Informed consent was obtained from each participant before completion of the questionnaire.

The questionnaire was used to obtain information on the participants' socio-demographic characteristics. The knowledge about occupational hazards among participants in health care facilities and their attitudes towards occupational hazards and safety practices were assessed. The perceived risks of occupational hazards, as well as the healthcare workers' perception about the contributing factors of occupational hazards were also evaluated. Prior to the completion of the questionnaire, an informed consent form was completed by each participant. The questionnaires were administered to the participants and collected immediately after completion on the same day. The questionnaire included both close-ended and open-ended questions.

**Ethical considerations:** In this study, permission was obtained from the managers at the teaching hospital. Participation in the study was voluntarily, confidentiality was maintained, and an informed consent was obtained from the participants. This study was approved by the Research Ethics Committee of the Faculty of Health Sciences, University of Johannesburg (Clearance number: REC-803-2020). It was also approved by the Ethics Committee of University Teaching Hospital of Kigali (Reference number: EC/CHUK/091/2020) before collecting the data.

**Data analysis:** Data obtained from the questionnaire were captured in Microsoft Excel and further analysis was performed using STATA 13/MP. The descriptive statistics was used whereby frequencies and percentages were calculated for categorical data.

## RESULTS

Participants' socio-demographic characteristics: The socio-demographic characteristics of participants are shown in Table 1. Of the 290 participants that participated in the study, the mean age was 35.81 (SD= 7.528), ranging from 22 to 60 years of age. The majority of participants were married (n=189; 65.2%), followed by those who were single (n=83; 28.6%). In terms of educational background, the majority holds bachelors (A0) degree (n=106; 36.6%) followed by postgraduate students (n=72; 24.8%) and then those with A1 nursing degree (n=68; 23.4%).

**Knowledge, attitudes and perception about occupational hazards by socio-demographic characteristics of the participants:** Overall, 143 (49.3%) participants had knowledge deemed adequate as shown in Table 2. Healthcare workers who were aged above 30 years or had a bachelor's degree had more knowledge than their peers. Furthermore, 154 (53.1%) had what can be defined as a good attitude with respect to occupational hazards and safety. The participants with the worst attitude were either aged 26 or younger (9.1%) or only completed secondary education (0.6%). Moreover, 175 (60.3%) participants had negative perceptions towards occupational hazards and safety. This negative perception was mostly among participants aged from 31 to 40 years (54.9%) and those who have bachelor's degree or are postgraduate students (64%).

**Job status of participants:** The job status of participants is displayed in Table 3. Overall, 163(56.2%) out of 290 participants were males. Among these participants, majority of males were anesthetists (73.3%), and doctors (73%); 66.7% participants who worked night shift were males. Of the 290 participants, 68.2% who had a working experience of 11 to 15 years were males. Furthermore, 56.2% of participants who did not receive occupational health and safety training were males.

**Participants' knowledge, attitudes and perception about occupational hazards:** As shown in Table 4, the participants had low scores on adequate knowledge (n=143; 49.3%), and perception (n= 115; 39.7%), with a borderline low score on positive attitude (n=153; 53.1%). Adequate knowledge was observed on category of the occupational hazards in the healthcare facilities (71.3%), procedures which increased the risk of needle stick injuries (70.6%) and on whether the healthcare facility have an occupational health and safety

policy (69.2%). Knowledge below average was observed on practices which violate the standards operating procedures (48.7%), and whether safety measures are available in healthcare facility (38.5%).

**Table 1:**  
Socio-demographic characteristics of participants

Characteristics	Total		Male		Female	
	n	%	n	%	n	%
<b>Total</b>	290	100%	163	56.2%	127	43.8%
<b>Age (years)</b>						
22-25	16	5.5%	3	18.8%	13	81.3%
26-30	63	21.7%	36	57.1%	27	42.9%
31-35	78	26.9%	38	48.7%	40	51.3%
36-40	71	24.5%	45	63.4%	26	36.6%
41-60	62	21.4%	41	66.1%	21	33.9%
<b>Marital Status</b>						
Single	83	28.6%	51	61.5%	32	38.5%
Married	189	65.2%	102	53.9%	87	46.1%
Divorced	12	4.1%	9	75%	3	25%
Widowed	6	2.1%	1	16.7%	5	83.3%
<b>Education Background</b>						
Bachelor (A0)	106	36.6%	51	48.1%	55	51.9%
Masters	41	14.1%	29	70.7%	12	29.3%
Nursing A1	68	23.4%	30	44.1%	38	55.9%
PGD Student	72	24.8%	52	72.2%	20	27.8%
Secondary-A2	3	1%	1	33.4%	2	66.6%

**Table 2.**  
Distribution of knowledge, attitudes and perception by socio-demographic characteristics of respondents

Characteristic	Total		Knowledge				Attitude				Perception			
	N	%	No		Yes		No		Yes		No		Yes	
			n	%	n	%	n	%	N	%	n	%	n	%
<b>Total</b>	290	100%	147	50.7%	143	49.3%	136	46.9%	154	53.1%	175	60.3%	115	39.7%
<b>Age of the respondent</b>														
22-26 years	22	7.6%	15	10.2%	7	4.9%	8	5.9%	14	9.1%	16	9.1%	6	5.2%
27-30 years	57	19.7%	26	17.7%	31	21.7%	23	16.9%	34	22.1%	31	17.7%	26	22.6%
31-35 years	78	26.9%	39	26.5%	39	27.3%	42	30.9%	36	23.4%	54	30.9%	24	20.9%
36-40 years	71	24.5%	38	25.9%	33	23.1%	37	27.2%	34	22.1%	42	24%	29	25.2%
41-60 years	62	21.4%	29	19.7%	33	23.1%	26	19.1%	36	23.4%	32	18.3%	30	26.1%
<b>Education Background</b>														
Bachelor (A0)	106	36.6%	43	29.3%	63	44.1%	33	24.3%	73	47.4%	57	32.6%	49	42.6%
Masters	41	14.1%	25	17.0%	16	11.2%	22	16.2%	19	12.3%	34	19.4%	7	6.1%
Nursing A1	68	23.4%	39	26.5%	29	20.3%	40	29.4%	28	18.2%	27	15.4%	41	35.7%
PGD Student	72	24.8%	38	25.9%	34	23.8%	39	28.7%	33	21.4%	55	31.4%	17	14.8%
Secondary-A2	3	1.0%	2	1.4%	1	0.7%	2	1.5%	1	0.6%	2	1.1%	1	0.9%

**Table 3.**

Participants' work-related information by gender

Characteristic	Total		Males		Females	
	N	%	n	%	n	%
Total	290	100%	163	56.2%	127	43.8%
<b>Job Title</b>						
Administrative	23	7.9%	13	56.5%	10	43.5%
Anesthetist	15	5.2%	11	73.3%	4	26.7%
Doctor	100	34.5%	73	73%	27	27%
Laboratory	26	9%	13	50%	13	50%
Nurse/Midwife	90	31%	35	38.9%	55	61.1%
Pharmacist	15	5.2%	10	66.7%	5	33.3%
Other	21	7.2%	8	38%	13	62%
<b>Working Shift</b>						
Day and night	217	74.8%	123	56.7%	94	43.3%
Day shift only	70	24.1%	38	54.3%	32	45.7%
Night shift only	3	1%	2	66.7%	1	33.3%
<b>Working experience</b>						
<1year	14	4.8%	6	42.8%	8	57.2%
1-5 years	112	38.6%	64	57.1%	48	42.9%
6-10 years	99	34.1%	53	53.5%	46	46.5%
11-15 years	44	15.2%	30	68.2%	14	31.8%
16-20 years	15	5.2%	7	46.7%	8	53.3%
>20years	6	2.1%	3	50%	3	50%
<b>Received occupational health safety training</b>						
No	192	66.2%	108	56.2%	84	43.8%
Yes	98	33.8%	55	56.1%	43	43.9%

Positive attitude was observed towards practice which violates the standards operating procedures (51.3%), category of the occupational hazards in the healthcare facilities (64.3%), whether safety measures are available in healthcare facility (54.5%), procedures which increase the risk of needle stick injuries (79.9%), and whether healthcare facility have an occupational health and safety policy (64.3%). The participants had a better perception on category of the

occupational hazards in the healthcare facilities (53.9%), procedures which increase the risk of needle stick injuries (52.2%), and whether healthcare facility have an occupational health and safety policy (64.3%). Otherwise, they had a worse perception on practice which violates the standards operating procedures (39.1%), and whether safety measures are available in healthcare facility (34.8%).

**Table 4:**

Knowledge, attitudes and perception by situation of occupational hazards in the healthcare facility

Characteristic	Total		Knowledge				Attitudes				Perception			
	N	%	No		Yes		No		Yes		No		Yes	
			n	%	n	%	n	%	n	%	n	%	n	%
Total	290	100%	147	50.7%	143	49.3%	136	46.9%	154	53.1%	175	60.3%	115	39.7%
<b>Practice which violates the standards operating procedures</b>														
No	202	69.7%	128	87.1%	74	51.7%	127	93.4%	75	48.7%	132	75.4%	70	60.9%
Yes	88	30.3%	19	12.9%	69	48.3%	9	6.6%	79	51.3%	43	24.6%	45	39.1%
<b>Category of the occupational hazards in the healthcare facilities</b>														
No	170	58.6%	129	87.8%	41	28.7%	115	84.6%	55	35.7%	117	66.9%	53	46.1%
Yes	120	41.4%	18	12.2%	102	71.3%	21	15.4%	99	64.3%	58	33.1%	62	53.9%
<b>Do safety measures available in your healthcare facility?</b>														
No	152	52.4%	64	43.5%	88	61.5%	82	60.3%	70	45.5%	77	44.0%	75	65.2%
Yes	138	47.6%	83	56.5%	55	38.5%	54	39.7%	84	54.5%	98	56.0%	40	34.8%
<b>Procedures which increase the risk of needle stick injuries</b>														
No	142	49.0%	100	68.0%	42	29.4%	111	81.6%	31	20.1%	87	49.7%	55	47.8%
Yes	148	51.0%	47	32.0%	101	70.6%	25	18.4%	123	79.9%	88	50.3%	60	52.2%
<b>Does your healthcare facility have an occupational health and safety policy?</b>														
No	29	10.0%	14	9.5%	15	10.5%	17	12.5%	12	7.8%	25	14.3%	4	3.5%
Yes	159	54.8%	60	40.8%	99	69.2%	60	44.1%	99	64.3%	71	40.6%	88	76.5%
I don't know	102	35.2%	73	49.7%	29	20.3%	59	43.4%	43	27.9%	79	45.1%	23	20.0%

**Table 5.**

Occupational hazards experienced during the past 12 months by gender

Characteristic	Total		Males		Females		Crude Odds ratios	95% CI
	N	%	n	%	n	%		
<b>Total</b>	290	100%	163	56.2%	127	43.8%		
<b>Needle stick injury</b>								
No	135	46.6%	75	55.5%	60	44.5%	1.05	0.66 – 1.67
Yes	155	53.4%	88	56.8%	67	43.2%	Reference	Reference
<b>Contact with patients with highly contagious diseases</b>								
No	139	47.9%	76	54.6%	63	45.4%	1.01	0.63 – 1.62
Yes	151	52.1%	87	57.6%	64	42.4%	Reference	Reference
<b>Excessive exposure to ionizing radiation</b>								
No	234	80.7%	122	52.1%	112	47.9%	<b>2.51</b>	<b>1.32 – 4.78</b>
Yes	56	19.3%	41	73.2%	15	26.8%	Reference	Reference
<b>Assault from Patients</b>								
No	229	79%	124	54.1%	105	45.9%	1.50	0.84 – 2.69
Yes	61	21%	39	63.9%	22	36.1%	Reference	Reference
<b>Assault from co-workers</b>								
No	229	79%	124	54.1%	105	45.9%	1.50	0.84 – 2.69
Yes	61	21%	39	63.9%	22	36.1%	Reference	Reference
<b>Direct contact with patients' body fluids on the skin</b>								
No	146	50.3%	76	52%	70	48%	1.41	0.88 - 2.24
Yes	144	49.7%	87	60.4%	57	39.6%	Reference	Reference
<b>Burns</b>								
No	249	85.9%	135	54.2%	114	45.8%	1.82	0.90 – 3.68
Yes	41	14.1%	28	68.3%	13	31.7%	Reference	Reference
<b>Splashes of body fluids from patients into the mouth</b>								
No	190	65.5%	103	54.2%	87	45.8%	1.27	0.78 – 2.07
Yes	100	34.5%	60	60%	40	40%	Reference	Reference
<b>Pain on the muscles</b>								
No	168	57.9%	94	55.9%	74	44.1%	1.02	0.64 – 1.54
Yes	122	42.1%	69	56.5%	53	43.5%	Reference	Reference
<b>Allergies on the skin</b>								
No	169	58.3%	92	54.4%	77	45.6%	1.18	0.74 – 1.91
Yes	121	41.7%	71	58.6%	50	41.4%	Reference	Reference

\* CI is the 95% Confidence Intervals

\*\* Adjusted for age, marital status and educational level

**Table 6:**

Attitudes of practice characteristics of research participants

Characteristics		Total		Males		Females	
		n	%	n	%	n	%
<b>Total</b>		<b>290</b>	<b>100%</b>	<b>163</b>	<b>56.2%</b>	<b>127</b>	<b>43.8%</b>
<b>How often do you wear hand gloves when handling patients</b>	Always	163	56.2%	81	49.7%	81	50.3%
	Sometimes	104	35.9%	68	65.3%	36	34.7%
	Never	23	7.9%	14	60.8%	9	39.2%
<b>Does your healthcare facility have an occupational health and safety policy?</b>	No	29	10%	17	58.6%	12	41.4%
	Yes	159	54.8%	82	51.5%	77	48.5%
	I don't know	102	35.2%	64	62.7%	38	37.3%
<b>Are safety measures available in your health facility?</b>	No	152	52.4%	84	55.2%	68	44.8%
	Yes	138	47.6%	79	57.2%	59	42.8%
<b>Personal protective equipment is readily available in the hospital</b>	Strong Disagree	4	1.4%	4	100%	0	0%
	Disagree	26	9%	16	61.5%	10	38.5%
	Neutral	32	11%	19	59.3%	13	40.7%
	Agree	89	30.7%	54	60.6%	35	39.4%
	Strong agree	139	47.9%	70	50.3%	69	49.7%

**Occupational hazards during the past 12 months:** The results for occupational hazard experienced by the participants during the past 12 months by gender are shown in Table 5. Most participants (n=155; 53.4%) have experienced needle stick injuries, 151(52.1%) have been in contact with a patient with a highly infectious disease, almost half of the participants (n=144; 49.7%) had direct contact with patients' body fluids on the skin. Furthermore, 61(21%) participants reported having been assaulted by either a coworker or patient. Moreover, 100(34.5%) participants have had patients' bodily fluids splashed in their mouth, 41(14.1%) had burns, 122(42.1%) experienced muscle pain, while 121(41.7%) experienced allergic symptoms. The gender differences in excessive exposure to ionizing radiation was observed, as male (COR: 2.51, 95 CI: 1.32 – 4.78) were more affected.

**Attitudes of practice characteristics of research participants:** Table 6 summarises the attitudes of participants that may predispose them to occupational hazards. Fifty-six percent of participants reported always using hand gloves when handling patients, while 23(7.9%) never used hand gloves while handling patients. Furthermore, 104(35.9%) wear them sometimes when handling patients with highly contagious diseases. Moreover, 138(47.6%) participants reported that there are safety measures available at their health facility. Most of the participants (n=228; 78.6%) agreed that personal protective equipment is readily available at the hospital.

## DISCUSSION

In this study the knowledge, attitudes and perceptions of occupational hazards and the use of safety measures among healthcare workers were investigated. Based on our knowledge, this was the first study conducted in Rwanda at a teaching hospital exploring occupational hazards and the use of safety measures among healthcare workers. The research was conducted within the framework of Rwanda public health system where hospital occupational health and safety faces several challenges.

The participants reported that they have, in previous 12 months, experienced needle stick injuries (53.4%), had been in contact with patients with highly infectious diseases (52.1%) and had direct contact with patients' body fluids on the skin or mucous membranes (49.7%). Other hazards reported were muscle pains (42.1%), allergies (41.7%), assault by either a coworker or a patient (21.0%), exposure to ionising radiation (19.3%), and burns (14.1%). The needle stick injuries experienced by the participants fall within the 39–91% one-year incidence range reported in a systematic review carried out in Africa (Mossburg *et al.*, 2019). Lower exposures to biological and non-biological hazards were reported by Ndejjo and colleagues in Uganda (Ndejjo *et al.*, 2015) and in Kenya (Mbaisi *et al.*, 2010). Nwankwo and colleagues found higher prevalence of backaches and other ergonomic hazards in district hospitals in Kigali (Nwankwo *et al.*, 2017). A systematic review found that 16.3 to 19.1% of healthcare workers have experienced latex allergies, but also reported a higher rate of physical violence (Osaretin *et al.*, 2013).

The contributing factors for exposure to injuries perceived by participants were not using hand gloves, lack of policies and procedures for occupational safety in the unit, lack of educational and developmental programs for healthcare providers in the unit, and lack of information regarding the use of modern tools and equipment. Male gender was associated with exposure to ionising radiation, this can be attributed to the male gender dominance in the radiology and imaging services. In the present study, the participants perceived that lack of protective equipment and transportation equipment, improper preparation of healthcare providers, work overload, lack of regular medical examination, ineffective supervision and lack of medical immunisation or vaccination are contributing factors for exposure to occupational hazards. The study conducted in Uganda among healthcare workers reported that factors associated with exposure to hazards were working overtime, experiencing work-related pressures, working in multiple facilities and not wearing all necessary protective equipment (Ndejjo *et al.*, 2015)

The studies have consistently found that knowledge reduces the risk of exposure to occupational hazards (Mbaisi *et al.*, 2010). However, in the present study only 49.3% of participants had knowledge deemed adequate. This lower knowledge scores might be attributed to novelty of occupational health and safety standards in Rwandan healthcare system, and lack of proper enforcement of their implementation. The most knowledgeable staff were doctors (35.7%), nurses/midwives (31.5%), health workers with work experience between 1 and 10 years (74.2%), and those who received occupational health safety training (55.9%). Studies carried out in Nigeria (Aluko *et al.* 2016) and India (Bhargava *et al.*, 2013) found higher knowledge scores on occupational hazards among the participants.

The high knowledge scores were observed on the category of occupational hazards in the healthcare facilities (71.3%), procedures which increase the risk of needle stick injuries (70.6%), and existence of an occupational health and safety policy in healthcare facilities (69.2%). The knowledge that was below average was observed on practices which violate the standard operating procedures (48.7%), and availability of safety measures in healthcare services (38.5%). Unlike the previous study (Bhargava *et al.*, 2013) no significant association was found between knowledge and level of education. This difference can be attributed to a more practical approach used during on-site trainings, which emphasizes contextual knowledge and experience sharing.

Forty percent of the study participants had a good perception towards occupational hazards and the use of safety measures. These perception scores were much lower than what was found by Nigerian researchers (Obono *et al.*, 2019; Abiodun *et al.*, 2018). A study carried out in India (Bhargava *et al.*, 2013) showed that doctors and nurses had lower scores on practices, despite this high perceptions and attitude scores. Otherwise, they had worse perceptions on practices which violate the standard operating procedures (39.1%), and availability of safety measures in healthcare facility (34.8%). A good perception was observed among 99 respondents (77.4%) who received an occupational health and safety training.

A positive attitude towards prevention of occupational hazards and safety practices was observed among 53.1% of participants. A study by Obono *et al.*, (2019) reported higher knowledge and attitude scores of participants regarding safety practice. This positive attitude was displayed mostly towards procedures which increase the risk of needle stick injuries (79.9%). Fifty-six percent of all participants reported always using hand gloves when handling patients while 35.9% stated that they occasionally wear hand gloves. This disengagement was observed despite a good availability of personal protective equipment (PPEs) at the hospital, as reported by 78.6% of participants. Significant gender differences on the usage of gloves were observed.

The participants perceive the following as what can be done to reduce occupational hazards and increase compliance with these policies and practices: adequate staffing, punitive actions against healthcare workers who violate standard safety precautions and practices, training employees to increase awareness about identifying and preventing occupation health hazards, break time during work, reducing congestion at workplaces, counseling services to workers exposed to occupational hazards, emergency exits, color coded waste containers readily accessible the hospital, availability of a safety manual at workplaces. The findings of this study show an unsatisfactory level of the knowledge, attitude, and perception and brings to light gaps, challenges, and motivation of the teaching hospital staff in Rwanda to perform their lifesaving duties in a safe environment.

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