

KNOWLEDGE, ATTITUDE AND INFECTION CONTROL PRACTICES AMONG HEALTHCARE PROFESSIONALS IN SELECTED PRIMARY HEALTHCARE CENTRES IN URBAN AREAS OF LAGOS STATE.

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Abstract

Background: Infection is a serious issue encountered in healthcare delivery services worldwide. Healthcare workers are exposed to the risk of occupational infection following accidental exposure to blood or body fluids. Studies have shown disparity in knowledge of infection transmission and control, its interpretation and application among healthcare workers at the primary healthcare level in particular. This study determined the knowledge, attitude and practice of infection control among healthcare workers in primary healthcare (PHCs) centers in Surulere LGA.

Methods: A cross-sectional study carried out among PHCs in Surulere LGA using a simple random sampling technique. The PHCs are composed of doctors, pharmacy technicians, nurses, community health officers, community extension workers, junior community health extension workers and laboratory technologists. The questionnaires consisting of participants demography, working experience, professions, presence of infection control committee, exposure to training on infection control, knowledge and practice of infection control, were analyzed. Data entry and analysis was done using Epi info software version 7.2.3.1

Results: Most of the respondents (77.3%) were females and female to male ratio was 3:1. Close to half of the respondents (43.6%) have less than 5 years of working experience. Among the professions, the nurses constituted a predominant proportion (27.3%) while among all the professions combined, 97.3% of them had good knowledge of infection control. All the respondents had above average positive attitude towards infection control. A total of 86.4% of the respondents had good infection control practice. A high proportion of the respondents (75.5%) have training on infection control while 95.5% of the respondents are aware about infection control guidelines. There was a significant association between knowledge and practice of infection control ($p < 0.001$). There was a statistically significant association between age, years of work experience, occupation and overall knowledge. There was a statistically significant association between the level of education, occupation and overall practice of infection control.

Conclusion: Majority of the respondents had good knowledge of infection control and positive attitude. Adequate provision of appropriate safety kits and their timely replacement should be made.

It was recommended Health workers should regularly update their knowledge and practice regarding infection prevention activities during continuous professional development, to be coupled with adequate provision and timely replacement of appropriate safety kits when worn-out to all cadres of staff based on their job schedule

Keywords: Knowledge, Attitude, Infection control, Practice, Primary Healthcare workers

Introduction

Infections are serious issues encountered in healthcare delivery services worldwide.¹ Healthcare workers are exposed to the risk of occupational infection following accidental exposure to air to blood or body fluids contaminated with a virus, bacteria, a parasite or yeast.²

According to the National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention (CDC), the infectious agents that affects health workers include blood, other body fluids and air borne pathogens (HIV/AIDS, Hepatitis B, Hepatitis C), Influenza (Seasonal, Pandemic, Avian, Swine), Ebola, Viral hemorrhagic fever, Methicillin-resistant Staphylococcus aureus, Tuberculosis (TB), Corona Virus Disease

(COVID-19), Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome.³

During the past two decades, occupationally acquired hepatitis B (HBV), hepatitis C (HCV), human immunodeficiency virus (HIV) infection, multidrug-resistant tuberculosis, viral hemorrhagic fevers (VHFs) and more recently coronavirus disease 2019 (COVID-19) killed

healthcare workers.² Barriers to optimal infection control practices in low and middle income countries are lack of financial support, inadequate numbers of trained personnel working in infection control, understaffed healthcare units and insufficient equipment and supplies.⁴ HCWs are at increased risk of acquiring infections in their places of work with the pathogens of primary concern for the

healthcare workforce as HIV, HBV, HCV, VHF and COVID-19.⁵ According to WHO daily situation report, after the coronavirus disease 2019 (COVID-19) outbreak, 22,073 COVID-19 cases among healthcare workers were reported to the WHO as at Wednesday, 8 April 2020.⁶ Substantial morbidity and mortality among HCWs inevitably leads to loss of skilled personnel, adverse impact on healthcare services that are already strained in many low and middle income countries.⁷ The main preventive and control measures for healthcare associated infections are: Identifying the local determinants of the healthcare associated infection burden, improving staff education and accountability, implementing standard precautions, including best hand hygiene practices at bedside, improving reporting and surveillance systems at the local and national levels and ensuring that core components for infection control are in place at healthcare setting at all levels.⁴ A study carried out in the North Eastern Nigeria revealed that 13% of healthcare workers had good knowledge of infection control practices.⁸

To guide the development and implementation of infection prevention and control activities in health facilities in Nigeria, this study sought to determine the knowledge, attitude and practice of components of standard precautions among healthcare workers of primary health care centres

MATERIALS AND METHODS

DESCRIPTION OF STUDY AREA

Lagos state is one of the states located in South-Western Nigeria, with a total territorial land area of 358,862 hectares.⁹ In 2015, UN Habitat and development agencies estimate Lagos State to have about 24.6million people. It is bounded in the North and East by Ogun state of Nigeria, in the West by the Republic of Benin and in the South by the Atlantic Ocean.⁹ There are 20 local government areas in Lagos state which include: Agege, Ajeromi-Ifelodun, Alimosho, Amuwo-Odofin, Apapa, Badagry, Epe, Eti-Osa, Ibeju/Lekki, Ifako-Ijaye, Ikeja, Ikorodu, Kosofe, Lagos Island, Lagos Mainland, Mushin, Ojo, Oshodi-Isolo, Shomolu and Surulere.⁹

Surulere local government area is one of the twenty local government areas in Lagos state with an area of 27.05sqkm. The estimated population of Surulere LGA as at 2017 is 1,802,061.¹⁰ It is bordered by Yaba, Mushin and Ebute-Metta,¹¹ has three Local Council Development Areas [Coker Aguda, Itire-Ikate, and Surulere] and 15 wards with nine PHCs viz: Akerele PHC, Femi Gbajabiamila PHC, Iponri PHC, Coker PHC, Orile PHC, Ejire PHC, Baruwa PHC, Airways PHC, Anjorin PHC.¹⁰⁻¹²

STUDY DESIGN

A descriptive cross-sectional study to determine the knowledge, attitude and practice of infection control among healthcare workers in 5 randomly selected primary healthcare centres in Surulere LGA, Lagos state.

STUDY POPULATION

This study was carried out among healthcare workers in selected

primary healthcare workers that are in full-time employment with the local government and also have direct contact with patients, specimens and chemicals during their routine clinical duties. Five primary healthcare centres within Surulere LGA, Lagos state (Akerele PHC, Coker PHC, Orile PHC, Anjorin PHC, and Baruwa PHC) were randomly selected for the study. The healthcare workers included 16 doctors, 12 pharmacists, 30 nurses, 21 community health workers, 16 laboratory technologists and 15 others who consisted of cleaners and records staff. The study was carried out over a period of 11 months from November 2019 to September 2020.

SAMPLE SIZE DETERMINATION

The Cochran formula for descriptive study was used, which is

$n = Z^2 pq / d^2$. where

n = minimum sample size

Z = confidence interval, set at 1.96 for 95% confidence rate

p = estimate of proportion of healthcare workers who had good knowledge of infection control practices. This was 13% (0.13) as adapted from a similar study carried out in North Eastern Nigeria⁸

q = 1-P; 1-0.13 = 0.87

d = acceptable margin of sampling error = 0.05

Therefore, $n = \frac{(1.96)^2 (0.13)(0.87)}{0.05^2}$

0.05 * 0.05

n = 174

N = Total population of HCWs in PHCs in Surulere LGA = 161n

$= \frac{174}{1 + (174 - 1)}$

161

n = 84

A total of 110 participants were recruited for the study

SAMPLING METHOD

A simple random sampling technique using balloting method was used to select 5 primary healthcare centers in Surulere LGA. A total of 110 questionnaires were completely filled and analyzed.

DATA COLLECTION TOOLS

Data was collected using a self-administered structured questionnaire developed from reviewed literatures for relevant items.¹³⁻¹⁶ A descriptive cross-sectional study carried out among Five primary healthcare workers (PHCs) in Surulere LGA using a simple random sampling technique. The questionnaires consisted of participants demography, working experience, professions, presence of infection control committee, exposure to training on infection control, knowledge, attitude towards and practice of infection control, were analyzed.

DATA MANAGEMENT

Scoring and grading system

A scoring system was used to assess the knowledge, attitude and practice of the respondents towards infection control. In assessing

knowledge of infection control, the raw score system was used. For every correct answer, 1 point was awarded and for every incorrect answer no point was awarded. The total score for each respondent was converted to percentage and graded as poor knowledge if $\leq 50\%$ (≤ 9 points) and good knowledge if $> 50\%$ (> 9 points) where total knowledge score was 18 points.

In assessing attitude towards infection control, the Likert scale was used to grade into: Strongly agree-5marks, Agree-4marks, Not sure-3marks, Disagree-2marks, Strongly disagree-1mark, making the range score for attitude to be 14-70. Therefore, a score of ≤ 42 was rated as poor attitude and a score of > 42 was rated as good attitude presented in tables and in assessing practice of infection control, the raw score system was used. For every correct answer, 1 point was awarded and for every incorrect answer no point was awarded. The total score for each respondent was converted to percentage and graded as poor practice if $\leq 50\%$ (≤ 10 points), good practice if $> 50\%$ (> 10 points). Total practice score was 20 points.

Data Analysis

Data collected was checked manually for corrections and completion after collection and thereafter coded for data entry. Data collected was analyzed using Epi-Info 7.2.3.1 software program. Quantitative data was analysed and presented in tables, descriptive frequencies and percentages. Descriptive statistics was used to describe all variables. Association between the variables was tested using chi square with p-value of < 0.05 considered statistically significant.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Lagos University Teaching Hospital Idi-Araba Health Research and Ethics committee with assigned no: ADM/DCST/HREC/APP/474. Verbal informed consent was obtained from each respondent before administering the questionnaire. The nature of the study was properly communicated to the participants and their right to withdraw from the study at any point in time was made voluntary. They were assured of confidentiality as their names were not required for the study.

RESULTS

Table 1 shows the socio-demographic characteristics of the respondents. The participants within age group 21 and 30 years constituted the highest proportion of respondents (42.6%). Most of the respondents were female (77.3%) with a female to male ratio of 3:1. Less than half of the respondents (43.6%) have less than 5 years of working experience. However, predominant proportion of the respondents (89.1%) have post-secondary level of education.

TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS (n=110)

Variable	Frequency (n)	Percentage (%)
Age group		
(Years)	47	42.6
21-30	40	36.4
31-40	17	15.5
41-50	6	5.5
>50		
Gender		
Male	25	22.7
Female	85	77.3
Religion		
Christianity	95	86.4
Islam	15	13.6
Level of education		
1		0.9
Primary	6	5.5
Secondary	5	4.5
Vocational	98	89.1
Post-secondary		
Ethnic group		
Yoruba	74	67.3
Igbo	30	27.3
Hausa	3	2.7
Others	3	2.7
Marital status		
Single	50	45.5
Married	60	54.5
Working experience		
48		43.6
<5	23	20.9
5-10	39	35.5
>10		
Occupation		
Doctor	16	14.5
Nurse	30	27.3
Pharmacist	12	10.9
Community	21	19.1
health worker	16	14.5
Lab technician	15	13.6
Others		

Table 2 shows that most of the respondents (75.5%) have training on infection control and 95.5% of the respondents are aware about infection control guidelines in the primary healthcare facilities.

TABLE 2: INFECTION CONTROL TRAINING AND GUIDELINES (n=110)

Variable	Frequency (n)	Percentage (%)
Training on infection control	83	75.5
Yes	27	24.5
No		
Infection control guidelines available		
Yes	105	95.5
No	5	4.5

This study also revealed that majority of the participants (98.2%) knew that hand hygiene is an effective method to prevent infection and 95.5% agreed that hand is the most common vehicle of infection transmission. A large percentage (96.4%) agree that hand washing is necessary before performing invasive procedures and between susceptible patients (94.5%) and 49.1% of the respondents stated that hand washing is not necessary when gloved.

Table 3 shows that most of the respondents (92.7%) agree that there is evidence that aprons, gowns and masks are effective in preventing infection. More than half of the respondents (54.5%) stated that wearing gloves while handling sharp instruments protects against needle stick accident. Majority (90.9%) know that it is necessary to categorize hospital waste before disposal and 83.6% of respondents agree that disinfectant should be applied for the specified contact time.

This study revealed that majority of the respondents (97.3%) had an overall good knowledge of infection control while only 2.7% had poor knowledge. All the respondents (100%) had an average positive attitude towards infection control.

TABLE 3: KNOWLEDGE OF PPE, BIOMEDICAL WASTE MANAGEMENT AND STERILIZATION/DISINFECTION OFEQUIPMENTS

Variable	True (%)	False (%)
There is evidence that aprons, gowns and masks are effective in preventing infection.	102(92.7)	8(7.3)
Use of sterile gloves is the most effective method to prevent infection.	18(16.4)	92(83.6)
Gloves reduce the contamination of the hands, but do not prevent it completely.	97(88.2)	13(11.8)
Wearing gloves while handling sharp instruments protects against needle stick accident.	60(54.5)	50(45.5)
It is necessary to categorize hospital waste before disposal.	100(90.9)	10(9.1)
Disinfectant should be applied for the specified contact time.	92(83.6)	18(16.4)

Table 4 shows that 91.8% and 100% of respondents wash hands with soap before and after patient care and contact with fluid respectively. Majority of the respondents use PPEs in patient care like gloves (90.9%), gown (89.1%), mask (85.5%), goggles (72.7%), and 71.8% had no history of contact of blood, fluid or needle stick injury.

TABLE 4: PRACTICE OF INFECTION CONTROL (n=110)

Variable	Yes Freq (%)	No Freq (%)
Wash hands with soap before patient care	101(91.8)	9(8.2)
Wash hands with soap after patient care/contact with fluid	110(100.0)	0(0.0)
Wash hands without soap before and after patient care	77(77.0)	33(30.0)
Used all type of personal protective equipment (PPE)	89(80.9)	21(19.1)
Types of PPE in patient care: Gloves	100(90.9)	10(9.1)
Types of PPE in patient care: Goggles	80(72.7)	30(27.3)
Types of PPE in patient care: Mask	94(85.5)	16(14.5)
Types of PPE in patient care: Gown	98(89.1)	12(10.9)
Used infection prevention guideline/evidence	99(90.0)	11(10.0)
Recap needle before disposing	43(39.1)	67(60.9)
History of contact of blood, fluid or needle stick injury	31(28.2)	79(71.8)

Also, this study revealed that 86.4% of the respondents had good infection control practice while only 13.6% had poor infection control practice.

Table 5 revealed that above two-third (67.3%) take post exposure prophylaxis, 59.1% wash with water and 82.7% do not clean affected area with alcohol after exposure to blood or needle stick injury. Majority of the respondents cover wounds on the skin (86.4%) and are vaccinated against common pathogens (90%).

TABLE 5: MEASURES USED AFTER EXPOSED TO BLOOD/NEEDLE STICK INJURY (n=110)

	Yes Freq (%)	No Freq (%)
Taking Post exposure prophylaxis	74(67.3)	36(32.7)
Clean by alcohol	19(17.3)	91(82.7)
Washing with water	65(59.1)	45(40.9)
Cover wounds on the skin before you start your work	95(86.4)	15(13.6)
Vaccinated against common pathogens	99(90.0)	11(10.0)
Used needles or sharps put in containers	61(55.5)	49(44.5)

Table 6 shows the association between the sociodemographic characteristics and overall knowledge of infection control. There is a statistically significant association between age ($p<0.001$), duration of work experience ($p=0.041$) and occupation of the respondents ($p=0.002$) and the overall knowledge. Respondents that are between the ages 21 and 40 as well as respondents that have worked for 5 years and above are more likely to have good knowledge regarding infection control. However gender is not significantly associated with overall knowledge.

TABLE 6: ASSOCIATION BETWEEN SOCIODEMOGRAPHIC CHARACTERISTICS AND OVERALL KNOWLEDGE OF INFECTION CONTROL

VARIABLE	GOOD(n=107)	POOR (n=3)	X ²	p-value
Age group (Years)			24.263	<0.001*
21-30	47(100.0)	0(0.0)		
31-40	40(100.0)	0(0.0)		
41-50	16(94.1)	1(5.9)		
>50	4(66.7)	2(33.3)		
Gender			0.904	0.341
Male	25(100.0)	0(0.0)		
Female	82(96.5)	3(3.5)		
Level of education			53.458	53.458
Primary	1(100.0)	0(0.0)		
Secondary	3(50.0)	3(50.0)		
Vocational	5(100.0)	0(0.0)		
Post-secondary	98(100.0)	0(0.0)		
Marital status			2.570	0.09
Single	50(100.0)	0(0.0)		
Married	57(95.0)	3(5.0)		
Working experience			5.615	0.041*
<5	48(100.0)	0(0.0)		
5-10	23(100.0)	0(0.0)		
>10	36(100.0)	3(7.7)		
Training on infection control			0.603	0.437
Yes	89(96.7)	3(3.3)		
No	18(100.0)	0(0.0)		
Infection control guidelines available			1.003	0.317
Yes	80(96.4)	3(3.6)		
No	27(100.0)	0(0.0)		
Occupation			19.533	0.002*
Doctor	16(100.0)	0(0.0)		
Nurse	30(100.0)	0(0.0)		
Pharmacist	12(100.0)	0(0.0)		
Community health worker	21(100.0)	0(0.0)		
Lab technician	16(100.0)	0(0.0)		
Others	12(100.0)	3(20.0)		

Table 7 revealed association between the sociodemographic characteristics and overall practice of infection control. There is a statistically significant association between the level of education (p=0.049), occupation (p=0.011) and overall practice of infection control.

TABLE 7: ASSOCIATION BETWEEN SOCIODEMOGRAPHIC CHARACTERISTICS AND OVERALL PRACTICE OF INFECTION CONTROL

	Good (n=95)	Poor(n=15)	X ²	p-value
Age group (Years)				
21-30	39(83.0)	8(17.0)	3.763	0.288
31-40	37(92.5)	3(7.5)		
41-50	15(88.2)	2(11.8)		
>50	4(66.7)	2(33.3)		
Gender				
Male	22(88.0)	3(12.0)	0.074	0.786
Female	75(85.9)	12(14.1)		
Level of education			7.845	0.049*
Primary	1(100.0)	0(0.0)		
Secondary	3(50.0)	3(50.0)		
Vocational	5(50.0)	0(0.0)		
Post-secondary	86(87.8)	12(12.2)		
Marital status				
Single	43(86.0)	7(14.0)	0.010	0.919
Married	52(86.7)	8(13.3)		

Working experience				
<5	43(89.6)	5(10.4)	5.059	0.080
5-10	22(95.7)	1(4.3)		
>10	30(76.9)	9(23.1)		
Training on infection control				
Yes	80(87.0)	12(13.0)	0.168	0.682
No	15(83.3)	3(16.7)		
Infection control guidelines available				
Yes	74(89.2)	9(10.8)	2.240	0.134
No	21(77.8)	6(22.2)		
Occupation				
Doctor	13(81.2)	3(18.8)	14.782	0.011*
Nurse	29(96.7)	1(3.3)		
Pharmacist	8(66.7%)	4(33.3)		
Community health worker	19(90.5%)	2(9.5)		
Lab technician	16(100.0%)	0(0.0)		
Others	10(66.7%)	5(33.3)		

Table 8 shows a statistically significant association between knowledge and practice of infection control (p<0.001).

TABLE 8: ASSOCIATION BETWEEN KNOWLEDGE OF AND PRACTICE OF INFECTION CONTROL

VARIABLE	PRACTICE GOOD(n=95)	POOR (n=15)	X ²	p-value
KNOWLEDGE				
Good	95(88.8)	12(11.2)	19.533	<0.001*
Poor	0(0.0)	3(100.0)		

DISCUSSION

Healthcare workers are at risk for infection and severe disease. COVID-19 pandemic has further exposed the weakness in the strategies for infection prevention and control activities. Sources of available data on knowledge, attitude towards and practice of infection prevention and control are predominantly from secondary and tertiary hospitals, necessitating the conduct of this study in primary healthcare centres. This study shows that significant proportion of health workers in primary healthcare centres have good knowledge, positive attitude and practice of infection prevention and control. There was significant association between age, years of work experience, occupation and the overall knowledge of the respondents. Association between the level of education, occupation and overall practice of infection Control has been established A total of 134 questionnaires were rolled out and 110 were properly and completely filled giving a response rate of 82%. This is higher than a similar study carried out in two tertiary hospitals in Nigeria with a response rate of 76%.⁸¹ Majority of the respondents were within the ages of 21 and 30 years. This is very similar to a study in Vietnam where 49.3% of the respondents were between the age of 20 and 30 years.¹⁷ This congruence may be because this age group constitutes a significant proportion of the health workforce. There was a higher female to male gender distribution of the respondents was ratio 3 to 1. This aligns with the

studies carried out in Northwest Ethiopia and Uganda where females were also more predominant.^{18,19} This is also comparable to studies carried out in Nepal where two-third of the respondents were females.²⁰ This is probably because there are more females in the health professions. Findings from this study are dissimilar to the studies in Yemen and Ethiopia where respondents were predominantly males.^{21,22} This contrast may arise from the fact that males account the great number of the workforce in these Muslim nations. Among the respondents, majority were nurses followed by community health workers. This is synonymous to a study carried out in Southeast Ethiopia where 34.1% of the respondents were nurses.¹⁵ This may be a pointer that health workers are mostly composed of nurses in Africa. This differs from a study carried out in Nepal where majority (42.1%) of the respondents were community health workers.²⁰ This may be as a result of large population of Nepal and easier access to primary Healthcare services composed primarily of community health workers in Asia. About half of the respondents had a work experience of less than 5 years. This is similar to the estimate (47%) obtained in a study in Northern Nigeria.²³ The young adult age-group category of the participants may be responsible for the lower duration of work experience. However, this contrasts the study in Ethiopia where majority (57%) had work experience between 5 to 10 years.²⁴ This discordance in duration work of work experience may be as a result of male gender predominance of the work force in Ethiopia Majority (97.3%) of respondents have good knowledge of infection control. The findings from this study is much higher compared to the study carried out in Northwest Ethiopia where only 74.4% of the respondents have good knowledge on infection control.¹⁸ This is likely due to the fact that the percentage of respondents who did not receive training in infection control in Northwest Ethiopia is high (81.2%) compared to this study (24.5%).

Majority of the respondents in this study (98.2%) knew that hand hygiene is an effective method to prevent infection. This is similar to a study carried out in Addis Ababa, Ethiopia where 97% of the respondents are aware that washing your hands with soap or an alcohol based antiseptic decreases the risk of transmission of hospital acquired pathogens.²¹ This is also in line with the study in Tripura and New Delhi, India where 66.5% and 89.2% of the respondents knew that hand washing is the most effective method to prevent hospital acquired infections respectively.^{25,26} Majority of the respondents in this study (95.5%) are aware that hand is the most common vehicle of infection transmission. This is similar to the 86.3% in a study in Ilorin, Nigeria.¹ This also corresponds to the 93.2% obtained in another study in Northeast Ethiopia.²⁷ Their high level of knowledge of hand hygiene and awareness of hand washing may be as a result of their level of education. However the findings from this study contrasts with that of a study in Saudi Arabia where only 34.48% of the respondents are aware that hand is the most source of healthcare associated infections.²⁸ This study also differs from a study in Southwest Nigeria where 32.2% was obtained.²⁹ This may be attributed to lack of training in infection control in these other study populations. A large percentage of respondents agree

that hand washing is necessary before performing invasive procedures. This is distinctively higher than data obtained in North central Nigeria.³⁰ This study also showed that most of the respondents agree that there is evidence that aprons, gowns and masks are effective in preventing infection. This is more compared to a study in Enugu, Nigeria where 75.8% of the respondents stated that the use of PPE prevents infection.³¹ This may be ascribable to duration of work experience. In addition, majority of the respondents in this study (90.9%) know that it is necessary to categorize hospital waste before disposal. This is similar to a study in Eastern Ethiopia where 93.3% was obtained.³² This may be related to their prior exposure to infection control training and guidelines.

Majority of the respondents in this study strongly agreed that sharps should be disposed in sharps' boxes. This is similar to a study in Northwest Ethiopia where 98.6% of the respondents agreed that sharp materials should be discarded in a safety box.³³ This may be a pointer to their background knowledge on infection control. Less than half of the respondents in this study strongly agreed that punitive actions should be taken against HCWs who violate standard safety precautions and practices. This differs to the study in Cape Town where 89% of the respondents agreed that staff members who do not perform hand hygiene or ignore infection control recommendations should be reprimanded.³⁴ The discrepancy in actions to take for defaulters may be due to differing socio-economic development between Nigeria and South Africa

This study shows that majority of the respondents strongly agreed that gloves should always be worn when administering injections, starting IVs and drawing blood. This corresponds with a study in Kampala, Uganda where 97.5% of the respondents agreed that it is important to wear gloves when contact with bodily fluids, mucous membranes, or non-intact skin is anticipated.³⁵ This congruence in results may be attributable to their background knowledge of intravenous transmissible infections and prevalence of HIV. Majority of the respondents in this study (81.8%) strongly agreed that hands should be properly washed after each contact with a patient. This is much higher than that of the study in Ethiopia where 54% of the respondents strongly agreed to wash hands before and after contact with patients.³⁶ This is likely due to sinks not readily accessible, and soap at sinks being uncommon.³⁶

About half of the respondents in this study strongly agreed that used needles should never be recapped. This is low compared to a study in Cairo where 91.2% agreed that syringes should not be recapped.³⁷ This divergence may be ascribable to the fact that Cairo, Egypt is of a higher income status. However, the result of this study is high compared to a study in Ethiopia where only 8.9% of the respondents agreed that needles should not be recapped after use.³⁶

This conflicting result may be due to the fact that Ethiopia is of a low socio-economic status. From this study majority of the respondents strongly agree that training of staff is necessary to reduce the risk of exposure to occupational hazard. This is low compared to a study in Eastern Ethiopia where 93.3% of the respondents agree on the need for on job training.³² This may be attributable to greater awareness of hospital acquired infections from HIV in that region In this study

majority of the respondents have used gloves, goggles, mask and gown in patient care. This study finding is quite different from that carried out in Northwestern Nigeria.¹³

This may be due to lower level of education and economic status of the participants in the North. Concerning this study and the measures used after exposed for blood and needle stick injury, more than two third of the respondents take post exposure prophylaxis, about one-fifth clean by alcohol and three-fifth wash with water. This is low compared to a study in Northwest Ethiopia where three-fifth take post exposure prophylaxis, three-quatre clean by alcohol and four-fifth wash with water.¹⁶ This study showed that most of the respondents have no history of contact of blood, fluid or needle stick injury. This is in agreement with a study in Northern Nigeria where respondents have not been exposed to blood and body fluid.²³ This may be related to their training and guidelines in infection control. It was shown in this study that all the respondents wash hands with soap after contact with body fluid of patient. This is conforms with the study in New Delhi, India where four-fifth of the respondents wash hands after contact with excretion and secretions of patients.²⁶ More than half of the respondents put used needles or sharps in containers. However, this study is incongruent with to the findings in the study carried out in Southeast Ethiopia where two-third of respondents dispose non reusable sharp material waste in a safety box.³⁸ This may be attributable to their background knowledge and training on infection control. Majority of the respondents (86.4%) cover wounds on the skin before start of work. This differs from a study in Ethiopia where two-third of respondents always cover wounds or cuts on the skin before start of work.²⁴

This study showed a statistically significant association between age ($p < 0.001$), duration of work experience ($p = 0.041$) and occupation of the respondents ($p = 0.002$) and the overall knowledge of infection control. There is a statistically significant association between the level of education ($p = 0.049$), occupation ($p = 0.011$) and overall practice of infection control as well as significant association between knowledge and practice of infection control ($p < 0.001$).

CONCLUSION

Majority of this study participants had good knowledge and positive attitude towards infection control. The major factors affecting the good practice of infection control include lack of functional infection control committee, lack of adequate facilities /resources and excess workload. There is a significant association between age, years of work experience, occupation and the overall knowledge as well as significant association between the level of education, occupation and overall practice of infection control.

RECOMMENDATIONS

Health workers should regularly update their knowledge and practice regarding infection prevention activities during continuous professional development, to be coupled with adequate provision and timely replacement of appropriate safety kits when worn-out to all cadres of staff based on their job schedule

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