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Original Research Article

Knowledge and practice of standard precautions among healthcare workers in primary and tertiary health facilities in Enugu state, Nigeria; a qualitative study

Hope O. Nwoga[1]*, Miriam O. Ajuba[1], Babatunde Omotowo[2]

[1]Department of Community Medicine, Enugu State University Teaching Hospital Park Lane Enugu, Nigeria
[2]Department of Community Medicine, College of Medicine, University of Nigeria Enugu Campus, Nigeria

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***Correspondence:**
Dr. Hope O. Nwoga,
E-mail: nwogahope @gmail.com

ABSTRACT

Background: Standard precautions (SP) is a broad concept involving measures that should be applied in hospital setting to reduce infection transmission. Most hospital acquired infections occur due to breach in SP practices. The objective was to determine the knowledge and practice of SP among HCWs in primary and tertiary health facilities in Enugu State Nigeria.
Methods: The study used a qualitative design with case study in primary and tertiary health care workers (HCWs) in Enugu Metropolis, Enugu State Nigeria. A total of 74 HCWs; 24 from the primary and 50 from the tertiary health facilities were observed while 37; 12 from primary and 25 from the tertiary health facility were interviewed. The qualitative study used in-depth interview and triangulation with observational checklist.
Results: The HCWs had good knowledge but poor practice of SP. Higher proportion of the tertiary HCWs had better practice of hand hygiene than those in the primary health facilities (OR=17.637, p<0.001). Also, the tertiary HCWs used personal protective equipment (PPE) more adequately (OR=11.417, p=0.001) and practiced injection safety better than the primary HCWs (OR=22.369, p<0.001) except in detaching of needles from syringes where higher proportion of the tertiary HCWs were involved in such practice (tertiary =40.0%, primary =29.2%).
Conclusions: There was good knowledge of SP among the HCWs but their practice was poor.

Keywords: Healthcare workers, Nigeria, Primary health facilities, Standard precautions, Tertiary health facility

INTRODUCTION

Standard precautions (SP) was proposed by the Centre for Disease Control and Prevention (CDC) in the year 1996. It came after the review of the already existing concept of universal precautions (UP) defined as a set of precautionary measures designed to prevent transmission of HIV, HBV and other blood borne pathogens when providing first aid or healthcare services.[1-3] However, the aim of SP is to protect both the health care worker (HCW) from being infected and the uninfected patient from getting infected by the HCW.[1] The components of SP includes; (1) proper hand hygiene after touching blood, body fluids, secretions, excretions, contaminated items, immediately after removing gloves and between patient contacts; (2) use of personal protective equipment (PPEs) such as (a) gloves (For touching blood, body fluids, secretions, excretions, contaminated items; for touching mucous membranes and non-intact skin.), (b) gowns (during procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions and excretions is anticipated.), (c) masks, (d) goggles, (e) face shield (during procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions, especially suctioning and endotracheal intubation); (3) soiled patient care equipment (to be handled in a manner that prevents transfer of micro-organisms to others and to the

environment; wear gloves if visibly contaminated; perform hand hygiene); (4) environmental control (develop procedure for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas); (5) textiles and laundry (handle in a manner that prevents transfer of micro-organisms to others and to the environment); (6) needles and other sharps (do not recap, bend, break, or hand-manipulate used needles; use safety features when available; place used sharps in puncture-resistant container); (7) patient resuscitation (use mouthpiece, resuscitation bag, other ventilation devices to prevent contact with mouth and oral secretions); (8) patient placement (inpatient setting) (prioritize for single-patient room if patient is at increased risk of transmission, is likely to contaminate the environment, does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection); (9) respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter, e.g. reception areas and waiting rooms in offices) (symptomatic persons should be instructed to cover mouth/nose when sneezing/coughing; use tissues and dispose in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask or maintain spatial separation greater than 3 feet).[2,3] SP is applied to blood and every other body fluid and secretions except sweat, non-intact skin, mucous membrane, any unfixed tissue from human, HIV, HBV or other blood pathogens containing culture media.

HCWs particularly in developing countries are at a serious risk of infection from blood borne pathogens because of the high prevalence of pathogens in their environment and the increased risk of occupational injuries.[4,5] Approximately 3 million healthcare workers receive an injury with an occupational instrument annually, with around 2 million exposures to hepatitis B virus (HBV) and 1 million to hepatitis C virus (HCV).[6] Another study has also noted transmissions from patients to HCWs of 0.42 HBV infections, 0.05 until 1.30 HCV infections and 0.04 until 0.32 HIV infections per 100 sharps injuries annually.[7]

Most studies done on SP used quantitative method but the present study used qualitative method in order to get an in-depth view of the topic. The objective of the study was to determine the knowledge and practice of SP among HCWs in primary and tertiary government health facilities in Enugu State, Nigeria.

METHODS

Study design

The study was a qualitative study conducted among primary and tertiary HCWs in Enugu Metropolis Enugu State, Nigeria.

Study population and sample

The study included medical doctors, nurses, community health extension workers (CHEWs) and ward orderlies directly involved in patient care and had spent at least 12 months in hospital practice. There were about 526 HCWs in the tertiary health facility and about 237 HCWs in the primary health facilities in Enugu Metropolis as at the time of the study. A sample of 10% of the HCWs were selected from each group for observation while 5% were selected for in-depth interview (IDI). They were selected using convenience sampling technique. Thus, a total of 74 HCWs; 24 from the primary and 50 from the tertiary health facilities were observed while 37; 12 from primary and 25 from the tertiary health facility were interviewed. The HCWs that were observed were excluded from the IDI in both groups.

Data collection

Data was collected over a 12-week period; March to May 2018. The data was collected using an observation checklist formulated according to the CDC guidelines and an IDI guide formulated by the principal investigator. The HCWs were passively observed while they do their routine daily activities. The observed practices were based on the major components of SP that are encountered every day at work (hand washing, handling of sharps, use of PPEs like gloves, face masks/shields, caps and boots, gowns and aprons). Seventeen observations were made on each HCW. A good observation was scored 1 while a wrong one was scored 0. The IDI was conducted by the principal investigator assisted by the research assistants. It was conducted at a time and place that was convenient for the interviewee. Their opinions on the knowledge and practice of SP and possible reasons for non-adherence to SP practices were elicited.

Statistical analysis

The records of the IDI were transcribed on the day of data collection to avoid loss of data and responses were categorized into domains representing the common themes. Representative quotes were used to summarize key findings for each theme. The results of the observations were analysed using SPSS version 25 with the significance level placed at $p<0.5$.

RESULTS

In-depth interview result

Knowledge of SP

Almost all the interviewed HCWs had good knowledge of SP and were able to give reasonable explanation of the term. Some of their explanations were;

"*SP is a measure put in place in health facilities to make sure that both the patients and the HCWs are protected from infections within the hospital environment*" (a doctor in the tertiary health facility).

"*SP are precautions that all HCWs must take to avoid infections like HIV and others and it involves regular hand washing, wearing of PPEs like gloves and others*" (a nurse in the primary health facility).

"*SP are those measures you take to protect both yourself and your patient like proper hand washing, wearing of gloves and screening blood before transfusion*" (a nurse in the tertiary health facility).

Moreover, in contrast to the above assertions a few of the HCWs do not have good knowledge of SP as expected. Their major reason for poor knowledge of SP was lack of training on SP. Some of their responses were;

"*I only heard about SP from a colleague and do not have good knowledge of it. Moreover, I have not had any formal training on SP*" (a nurse in the primary health facility).

"*SP is meant for HCWs to protect themselves from infections and diseases*" (a CHEW in a primary health facility).

Reasons for poor practice of SP

The major reason given by majority of the HCWs why they do not practice or poorly practice SP was non availability of infection control materials. Some of their responses are;

"*In this health facility we try to provide for ourselves some of the things we need for infection control but we cannot be able to provide everything for ourselves. If these things are provided for us it will make it easier for us and we will use them*" (officer in charge of a primary health facility).

"*Our practice of hand washing is poor here because of lack of water. Sometimes when you finish procedures you may have to go and buy sachet water before you can wash your hands*" (a nurse in a primary health facility).

Some of the HCWs believe that lack of adequate number of staff and many patients to attend to also contributes to poor practice of SP. They had this to say;

"*Because there are few of us in this place you find out that you may not be able to adequately practice SP especially when you are taking deliveries*" (a nurse in a primary health facility).

Lack of knowledge on SP and ignorance was also pointed out as reasons for poor practice of SP.

"*Some of us do not know the importance of SP and hence do not practice it. So I will say that ignorance is also part of the problem*" (a nurse in the tertiary health facility).

"*Even though most HCWs do not have enough PPEs for use but the available ones are not even used by the HCWs due to ignorance*" (a doctor in the tertiary health facility).

Table 1: Observational checklist on HCWs in primary and tertiary health facilities in Enugu State, Nigeria.

Variable	Primary health facilities (n=24) N (%)	Tertiary health facility (n=50) N (%)	χ^2	P value
Washes hands before contacting a patient				
Yes	0 (0.0)	8 (16.0)	4.305	0.038*
No	24 (100.0)	42 (84.0)		
Washes hands before carrying out an aseptic procedure				
Yes	4 (16.7)	18 (36.0)	2.901	0.089
No	20 (83.3)	32 (64.0)		
Washes hands after patient contact				
Yes	2 (8.3)	30 (60.0)	17.637	<0.001*
No	22 (91.7)	20 (40.0)		
Washes hands immediately after contact with patients' BBF				
Yes	16 (66.7)	44 (88.0)	4.811	0.028*
No	8 (33.3)	6 (12.0)		
Washes hands after contact with patients surrounding				
Yes	2 (8.3)	10 (20.0)	1.625	0.202
No	22 (91.7)	40 (80.0)		
Washes hands in-between patients				
Yes	4 (16.7)	12 (24.0)	2.621	0.106
No	20 (83.3)	38 (76.0)		

Continued.

Variable	Primary health facilities (n=24) N (%)	Tertiary health facility (n=50) N (%)	χ^2	P value
Washes hands after removal of gloves				
Yes	14 (58.3)	32 (64.0)	0.661	0.416
No	10 (41.7)	18 (36.0)		
Changes gloves between different procedures on same patient				
Yes	2 (8.3)	17 (34.0)	11.417	0.001*
No	22 (91.7)	33 (66.0)		
Changes gloves in between patients				
Yes	20 (83.3)	46 (92.0)	0.226	0.634
No	4 (16.7)	4 (8.0)		
Changes gloves after touching patient care materials				
Yes	2 (8.3)	36 (72.0)	26.312	<0.001*
No	22 (91.7)	14 (28.0)		
Wears gown/apron when there is suspicion of splash of BBFs				
Yes	16 (66.7)	42 (84.0)	2.275	0.131
No	8 (33.3)	8 (16.0)		
Wears goggles when splash of BBFs is suspected				
Yes	0 (0.0)	2 (4.0)	0.987	0.321
No	24 (100.0)	48 (96.0)		
Wears cap/boots when splashes of BBFs is suspected				
Yes	6 (25.0)	15 (30.0)	1.566	0.211
No	18 (75.0)	35 (70.0)		
Disposes sharps in a puncture resistant container				
Yes	18 (75.0)	47 (94.0)	22.369	<0.001*
No	6 (25.0)	3 (6.0)		
Recap needles after use				
Yes	22 (91.7)	36 (72.0)	9.799	0.002*
No	2 (8.3)	14 (28.0)		
Bend or break needles after use				
Yes	8 (33.3)	4 (8.0)	28.249	<0.001*
No	16 (66.7)	46 (92.0)		
Detach needles from the disposable syringes after use				
Yes	7 (29.2)	20 (40.0)	2.489	0.115
No	17 (70.8)	30 (60.0)		

BBF=blood and body fluids, *p≤0.05 is statistically significant.

Analysis of the observational checklist can be seen in Table 1. There was a statistically significant difference between the HCWs in the primary and tertiary health facilities that washed their hands; before patient contact (χ^2=4.305, p=0.038), after patient contact (χ^2=17.637, p<0.001) and immediately after contact with patients' blood/ body fluids (χ^2=4.811, p=0.028). Higher proportion of the observed HCWs in the tertiary health facility when compared to the HCWs in the primary health facilities washed hands; after contact with patients surrounding (primary=8.3%, tertiary=20.0%), in between patients (primary=16.7%, tertiary=24.0%), and after removal of gloves (primary=58.3%, tertiary=64.0%).

There was a statistically significant difference between HCWs in primary and tertiary health facilities that changed gloves between different procedures on the same patient (χ^2=11.417, p=0.001) and after touching patient care materials like catheters and soiled linens (χ^2=26.312, p<0.001). There was no statistical difference in the proportion of HCWs in both study groups that wore apron, goggles, cap or boots when splash of blood/body fluid is suspected. A statistically significant higher proportion of observed HCWs in the tertiary health facility when compared to those in the primary health facilities; disposed sharps in puncture resistant container (χ^2=22.369, p<0.001), did not recap needles (χ^2=9.799, p=0.002) and did not bend or break needles (χ^2=28.249, p<0.001).

DISCUSSION

Seven aspects of hand washing were observed and this practice was generally poor in both the primary and tertiary health facilities. A statistically significant higher proportion of the tertiary HCWs washed their hands before and after patient contact and after contact with patients' blood and body fluid. This was not surprising as majority of the interviewed HCWs asserted to poor availability of hand washing facilities and water in their

health facilities. A Nigerian study reported a similar finding.[8] This may be due to a similar study population. An Ethiopian study however reported a higher finding.[9] Proper hand hygiene by HCWs is one most effective means of preventing Hospital Acquired Infections (HAIs) and most HAI are spread directly through contact, especially involving the hands of HCWs.[10,11] Another study from Botswana on hand hygiene practices among HCWs showed that more than 60% of HCWs reported failure to remember to perform hand hygiene and a similar study confirms a direct relationship between increased workload and reduced hand hygiene.[12,13]

Higher proportion of HCWs from the tertiary health facilities also washed their hands in between patients and after removal of gloves though the difference was not statistically significant. The finding in this study was lower than what was reported in other studies in Nigeria and Northern Ethiopia where 68.5% and 61.5% of the HCWs wash their hands in between patients respectively.[14,15] Moreover, these studies were quantitative studies where the respondents reported their perceived practice unlike the present study which was qualitative in nature and the HCWs were observed directly to ascertain their practice of SP. So, the higher practice of hand washing reported in the quantitative studies may be due to social desirability bias.

A statistically significant higher proportion of HCWs in the tertiary health facility used gloves more adequately than those in the primary health facilities. This may be due to lack of gloves or ignorance on the part of the HCWs as reported by some of the interviewed HCWs. Other studies reported higher use of gloves.[9,14,16,17] Availability of gloves in these centres may have contributed to the better use. Use of other PPEs like goggles, caps and boots was poor in both the primary and tertiary health facilities though worse in the primary health facilities. This may be expected as some of the interviewed HCWs in the primary health facilities said that they have never seen goggles in their health facility and boots are rarely available. A study conducted among primary and tertiary health facilities in Nigeria reported poor availability of infection control supplies in both primary and tertiary health facilities.[18] A similar study done in Southern Nigeria reported that only about 15% of public HCWs wear goggles always while about 45% always wear boots.[19] However, other studies from Nigeria and Uganda reported higher findings.[14,17] The poor use of PPEs in our study brings to fore the importance of creating more awareness to the HCWs on the importance of appropriate use of these PPEs and making them available for use.

Higher proportion of the HCWs in both the primary and tertiary health facilities dispose sharps in sharp disposable boxes. This high rate of good sharp disposal may be due to the fact that most of the sharp disposable boxes come with immunization drugs and hence are readily available. These health facilities are involved in routine immunization. Also placing these boxes close to sharp applicable areas have been shown to help in its proper use.[20] Other similar studies reported similar findings in Ethiopia and Nigeria.[9,16] However, the findings in this study was higher than the report of other studies in Nigeria and Turkey.[21-23]

A significantly higher proportion of the HCWs in the primary health facilities recap (91.7%) and bend needles (33.3%) after use when compared to the tertiary HCWs (recap needles =72%, bend needles =8%). Majority of the observed HCWs in the primary health facilities were CHEWs and nurses while those in the tertiary health facility included doctors and laboratory scientists. These group of HCWs are more educated and may know more about safe injection practices. Also, those in the tertiary health facility may have received more training in their facility. However, the level of needle recapping in both facilities is high considering the associated dangers of infection transmission. Similar studies in Nigeria and Turkey reported similar high rate of needle recapping.[22,23] Other studies however reported lower level of needle recapping.[9,16,20] This may be explained by the cadre of HCWs involved in such studies and their level of training.

Also, they were quantitative studies reported by the HCWs which most times differs from qualitative observations. A similar study in Nigeria that compared the findings of quantitative and qualitative studies on the HCWs practice of SP reported that there were differences in what was reported by the HCWs and what was observed in their actual practice.[14] Thus, practice studies done with direct observations like the present study may give a more realistic result.

Though lower proportion of the HCWs bend needles after use, this still shows poor knowledge and practice of injection safety which is a major component of SP. A study conducted in Ethiopia reported similar finding while a multi-centre study in Uganda reported a lower rate of 2.7%.[9,17] The difference in proportion may be explained by the level of training of the HCWs involved in the study (doctors, nurses and laboratory technicians). These cadres of HCWs are known to have better knowledge and practice of SP.[24,25] Years of work experience may also play a role as more years of work experience have been associated with more knowledge and better practice of SP.[26] A study conducted among nurses in a tertiary health facility to assess their knowledge and practice of SP before and after receiving an educational booklet showed that only 12.3% of the respondents disposed sharps appropriately before receiving the educational booklet but this changed after receiving the educational booklet as the practice increased to 87.7% giving a 75.4% difference.[27] Though, the practice after the educational booklet was not still very good but there was a significant difference between the pre and post educational booklet practice of sharp disposal. This shows that education can significantly improve the practice of SP among HCWs. Also, one of

the interviewed HCWs said that most of them do not know much about SP hence the poor practice.

The study was limited by the fact that the study sample was chosen by convenience as this may have introduced a selection bias to the study. However, this was reduced by making sure that every subgroup of the HCWs were selected. Further research can be done with more funds to involve more than one state to assess other factors which may affect standard precautions.

CONCLUSION

The knowledge of SP among the studied HCWs in both groups was good though their practice of same was poor. The poor practice was linked to poor provision of infection control materials. Infection control supplies should be made readily available for the HCWs at all times. There should be training and retraining of HCWs on the importance of SP in their day to day practice.

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