

Original Article

Knowledge and Practice of Standard Precautions for Infection Prevention and Control among Health Care Workers in Public Primary and Secondary Health Facilities in Edo State: A Reflection of the Neglect of First and Second Levels of Care in Infection Prevention in Nigeria

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ABSTRACT

Standard precautions (SP) refer to the minimum infection prevention practice applied whenever providing patient care, irrespective of the diagnosis. SP is applied to all patients all the time to prevent unprotected contact with body fluids so that bloodborne infections and the risks of infection transmission are unlikely. It involves various components that when consistently practised, prevents the spread of infection to health care workers, patients, and visitors. This study assessed the knowledge and practice of standard precaution among health care workers in public primary and secondary facilities in Edo State. A Cross-Sectional study design was used to study 217 HCWs in both public primary and secondary health facilities. Respondents were selected using the cluster sampling technique. The study was carried out between April and October 2019. Most of the HCWs (94.5%) were aware of SP with their source of awareness, mainly from their colleagues. Their knowledge of SP was generally poor. Only 23 (10.6%) of the respondents had good knowledge, others either had fair 153 (70.50%) or poor [41 (18.90%)] knowledge of SP with a statistically significant relationship between knowledge of SP and the HCWs level of completed education (p -value 0.019) as well as with the professional group they belong to (p -value 0.002). The practice of SP was generally abysmal, with only 3 (1%) having good practice. The knowledge and practice of standard precaution among health workers at both the primary and secondary levels of care in Edo State were abysmally poor. There is an urgent need to organise sustained infection prevention and control (IPC) training as well as implement strategies to improve IPC competence among the HCWs in the primary and secondary facilities in Edo State.

Keywords: Infection Prevention, Neglect, Practice, Primary, Health, Facilities, Standard, Precaution.

BACKGROUND

Standard precautions (SPs) are the basic infection prevention practices that apply to all patients all the

time regardless of the diagnosis of the patient, in any setting where health care is required.¹ These practices are designed to protect the healthcare workers (HCWs) and at the same time, prevent them from spreading the infection

to and among patients they care for. It is generally known that health care workers often come in contact with bloodborne pathogens and other microorganisms, and this exposure commonly occurs during major or minor surgical procedures, routine clinical and nursing services and disposal of sharps, as well as during lifesaving emergency procedures.²

Health care workers are at risk of various occupational hazards in the hospital, including exposure to bloodborne infections such as human immunodeficiency virus (HIV), hepatitis B and C (HBV and HCV) infection from sharps and contact with body fluid.^{2,3} The World Health Organization (WHO) in 2005 estimated that about 2.5% of HIV infections and 40% of HBV and HCV infections among healthcare workers worldwide were as a result of exposure, following a needlestick injury.^{3,4} Occupational exposure of health workers to bloodborne infections, mainly through needlestick and other sharp injuries, has become a significant concern in developing countries. In Africa, the incidence of sharps injuries among HCWs is estimated to be about 2.1% per year.^{3,4} Due to this concern, the Center for Disease Control (CDC) and Occupational Safety and Health Administration (OSHA) introduced "Universal Precautions" in 1985, to protect health care workers who come in contact with patients' blood and body fluids from infections. In 1996, this concept was further expanded and changed to the term Standard Precautions which is a set of measures formulated to prevent transmission of bloodborne diseases when providing health care regardless of the diagnosis or infectious status of the patient.^{2,5}

The components of standard precaution include hand hygiene, use of personal protective equipment (e.g. gloves, masks, goggles), respiratory hygiene/cough etiquette, sharps safety (engineering and work practice controls), safe injection practices (i.e., an aseptic technique for parenteral medications), sterile instruments and devices, clean and disinfected environmental surfaces, waste management, education and training.⁶

The knowledge and adherence with these set of practices by HCWs vary from region to region and by the level of health care services involved. It has been observed that

attention to capacity building of HCWs on SP is disproportionately skewed in favour of those practising at the tertiary facilities compared to those at the primary and secondary healthcare facilities. For instance, a cross-sectional survey conducted in 2012 to assess the knowledge, attitude and practice of standard precaution of infection control among healthcare workers in two tertiary hospitals in Nigeria, revealed a percentage median knowledge score of 90%, with 97% of the respondents knowing that standard precautions should be practised on all patients and laboratory specimen irrespective of diagnosis.⁵ Conversely, a study carried out among HCWs in Primary Health Care levels in Enugu, Southeast Nigeria revealed that there were serious knowledge deficits on the meaning, aim and components of SPs especially those related to hand hygiene, sharps disposal, and the management of sharps injuries.⁷ Similarly, in another study conducted at Mizan-Aman General Hospital, Southwest Ethiopia, the researchers concluded that the majority of health care workers' knowledge, attitude and practice toward standard precaution were not sufficient, favourable and safe enough to the expected standard.⁸

Generally, most of the studies on the practice of standard precaution are commonly conducted in tertiary health facilities in Nigeria and other developing countries without attempts to ascertain what the situation is at the primary and secondary levels of health care deliveries. Findings from one of these few studies in Nigeria carried out at the secondary level of healthcare by Johnson et al., in the South-south region of Nigeria revealed that there were poor practices among the HCWs in the area of needle recapping (54%) and faulty sharps disposal (13%).⁹ They concluded that there were several gaps in the practice of SP among health workers in the secondary level of health care deliveries and that regular training of these health workers was critical in optimising infection control and prevention in that level of healthcare delivery.⁹ To further worsen the matter of poor knowledge as revealed above, further study has shown that even in settings where the knowledge level was found to be high, the compliance level with standard precaution was poor. In a survey carried out among nurses working in Primary Health

Facilities in Saudi Arabia, an acceptable level of knowledge was seen. Still, they had poor compliance with standard precaution, especially in observation of compliance.¹⁰ The authors concluded that there were needs to commit more resources for education and monitoring of the implementation of standard precaution among nurses in primary care centres.¹⁰

Suffice to say that the forgoing has alluded that generally, the poor compliance to the standard precaution of infection control is not entirely due to inadequate knowledge of the subject SP alone but maybe as a result of insufficient resources for infection prevention and control or a complex mix of both and other factors.^{5,11} Implementing standard precaution in the lower levels of healthcare has been a significant challenge, especially in developing countries like Nigeria, where non-compliance with standard precautions is often understudied.¹² This situation has become worse at the primary and secondary levels of health care delivery due to lack of political will, human resources, materials, training, and motivation of the few health care workers who are engaged at that level of healthcare service delivery. This study was therefore carried out to ascertain the level of awareness, knowledge, and practice of standard precaution by healthcare workers in public primary and secondary health facilities in Edo State with a view of identifying the gaps and make appropriate recommendations for effective implementation of infection prevention and control policies actions.

MATERIALS AND METHODS

Study Area

This study was carried out in the primary and secondary health care facilities in Esan West Local Government Area (LGA) of Edo State, Nigeria. Esan West LGA, one of the 18 LGAs in Edo State, has its administrative headquarters in Ekpoma. It lies between latitudes 6° 43' and 6° 45' North of the Equator and longitudes 6° 6' and 6° 8' East of the Greenwich Meridian.¹³ It is bound on the North by Owan East and Etsako West LGA, on the West by Uhunwonde LGA, on the East by Esan central LGA and in

the South by Igueben LGA all in Edo State.¹⁴ There are 19 public Primary Healthcare Centres and two public Secondary Healthcare facilities with a population of 279 and 50 healthcare workers, respectively.

Study Design

This study is a descriptive cross-sectional study conducted between April and October 2019.

Study Population

The study was carried out among selected participants including doctors, nurses, CHEWs, nurse assistants and health attendants in Edo State, South-South, Nigeria.

Inclusion and Exclusion criteria

All Health care workers who willingly gave their consent and had at least six months working experience in the facilities were included in the study, while those who did not give their consent to participate in the survey were excluded.

Sample size determination

The Sample size was determined using Cochran's formula for cross-sectional surveys $N = (z^2pq)/E^2$ with the prevalence (P) of 0.915 being the probability of standard precaution practice among health care workers in a previous study.^{15,16} A minimum sample size of 132 participants was obtained with a non-response rate of 10%, thereby given rise to 147.

Sampling technique

The study was carried out using a cluster sampling technique to select HCWs. The state has 18 local government which was taken as clusters each. One local government (Esan West) was selected from the 18 LGAs of Edo State through simple balloting, and all consenting HCWs in the selected local government who met the selection criteria were recruited for the study.

Data Management

Data collection was done with the aid of a semi-structured interviewer-administered questionnaire designed by the

researchers. Information obtained includes sociodemographic characteristics of the respondents, level of awareness, knowledge, and practice of standard precautions as well as factors associated with knowledge of standard precautions.

Data collected was then analysed using IBM SPSS (version 21) and presented in tables and charts. Scoring for knowledge and practice was done by allocating two marks for each correct answer while each wrong answer score zero. Knowledge score had a maximum of 22 marks, and the areas covered included the definition, measures, advantages, and applications of SP. The maximum score of the practice of SP was 14 marks. These scores were converted to percentages and graded as poor, fair and good for less than 50%, 50-69%, and at least 70%, respectively.

RESULTS

The results are summarised below in tables and charts.

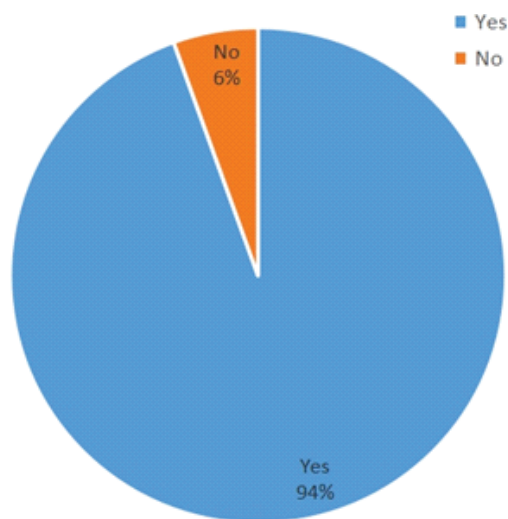


Figure 1: Respondents' awareness of standard precaution.

The majority 205(94%) of the respondents reported having heard of standard precaution.

Table 1

Health post-6(2.8%); Primary health clinic -32(14.7%); Primary health centre – 87(40.1%); and Comprehensive health centre – 37(17.1%).

The age of respondents ranged from 25 to 50 years, with most of the respondents (71.9%) belonging to the age group 31 to 39 years. There were more female respondents (53.0%). Most of the respondents worked in a PHC (40.1%) and General hospital (25.3%). The duration of work experience ranged between 2 to 12 years, with most of the respondents (52.5%) having 5 to 9 years' experience. Majority of these respondents (29.5%) were Nurses, 20.7% were health attendants, 16.1% were CHEWs, and 15.2% were nurse assistants.

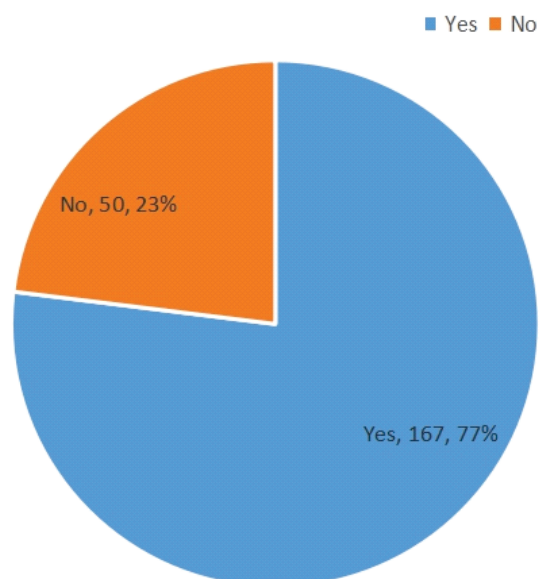


Figure 2: Respondents' knowledge of the meaning of SP.

A majority (77%) of the respondents knew what standard precaution was.

Table 1: Sociodemographic Characteristics of Respondents

Variable	Frequency (N=217)	Percent (%)
Age (years)		
20 – 29	52	23.96
30 – 39	156	71.89
40 – 49	8	3.69
50 – 59	1	0.46
Mean (\pm S.D.)	32.25 \pm 3.70	
Level of health care	162	74.65
The primary level of health care		
The secondary level of health care	55	25.35
Duration of work (years of experience)		
0-4	94	43.32
5-9	114	52.53
10-14	9	4.15
Health care profession		
CHEW	35	16.13
Doctor	5	2.30
Environmental health officer	6	2.77
Health attendant	45	20.74
Health educator	15	6.91
Laboratory scientist	10	4.61
Laboratory technician	1	0.46
Nurse assistant	33	15.21
Nurse/Midwife	64	29.49
Pharmacist	2	0.92
Pharmacist technician	1	0.46

Table 2: Sources of Information about Standard Precautions

Variable	Frequency(n=205)	Percent (%)
Formal training in school	23	11.22
Hospital Seminar	68	33.17
Colleague	89	43.41
Friend	15	7.32
Social Media	6	2.93
Internet	4	1.95

Of the 217 respondents, 205 (94.5%) have heard of standard precautions. The majority of respondents 89 (43.41%) reported that their sources of information were from their colleagues, and 68 (33.17%) said hospital seminars as their source of information.

Table 3: Respondents' knowledge of SP

Variable	Frequency(n=206)	Percent (%)
Knowledge of SP		
Good	23	10.6
Fair	153	70.5
Poor	41	18.9
Mean Knowledge (\pm S.D.)	12.81 \pm 2.73	

Of the total respondents 206, 23 (10.6%) had good knowledge, 153 (70.5%) had fair knowledge, and 41 (18.9%) had poor knowledge of SP in the study. The mean knowledge score was 12.81 \pm 2.73

Table 4: Association between some selected sociodemographic characteristics and respondents' knowledge of standard precaution

Variables	Knowledge of std. Precaution			χ^2	p-value
	Poor n=41 (%)	Fair 153 (%)	Good n=23		
Age (years)					
20 – 29	9(22.0)	39(25.5)	4(17.4)	4.998†	0.561†
30 – 39	32(78.0)	107(69.9)	17(73.9)		
40 – 49	0(0.0)	6(3.9)	2(8.7)		
50 – 59	0(0.0)	1(0.7)	0(0.0)		
Level of education					
No formal education	0(0.0)	3(2.0)	0(0.0)	18.796†	0.019*†
Primary	3(7.3)	1(0.7)	0(0.0)		
Junior Secondary	0(0.0)	5(3.3)	0(0.0)		
Senior Secondary	14(34.1)	41(26.8)	1(4.3)		
Post-Secondary	20(48.8)	85(55.6)	15(65.2)		
Post-graduate	4(9.8)	18(11.8)	7(30.4)		
Health facility type					
Primary healthcare	35(85.4)	114(74.5)	13(56.5)	6.484	0.039*
Secondary healthcare	6(14.6)	39(25.5)	10(43.5)		
Duration of work(years)					
0-4	22(53.7)	63(41.2)	9(39.1)	7.935	0.089
5-9	19(46.3)	84(54.9)	11(47.8)		
10-14	0(0.0)	6(3.9)	3(13.0)		
Health care profession					
CHEW	6(14.6)	27(17.6)	2(8.7)	43.607	0.002*
Doctor	1(2.4)	3(2.0)	1(4.3)		
Environmental health officer	2(4.9)	4(2.6)	0(0.0)		
Health attendant	10(24.4)	35(22.9)	0(0.0)		
Health educator	3(7.3)	12(7.8)	0(0.0)		
Laboratory scientist	0(0.0)	6(3.9)	4(17.4)		
Laboratory technician	0(0.0)	1(0.7)	0(0.0)		
Nurse assistant	11(26.8)	22(14.4)	0(0.0)		
Nurse/Midwife	8(19.5)	40(26.1)	16(69.6)		
Pharmacist	0(0.0)	2(1.3)	0(0.0)		
Pharmacist technician	0(0.0)	1(0.7)	0(0.0)		

Key: *Statistically significant, †Fisher's Exact Test applicable.

There was a significant statistical association between level of education and knowledge of standard precaution, ($p=0.019$), also observed was a significant statistical association between professional group and knowledge of standard precaution, ($p=0.002$).

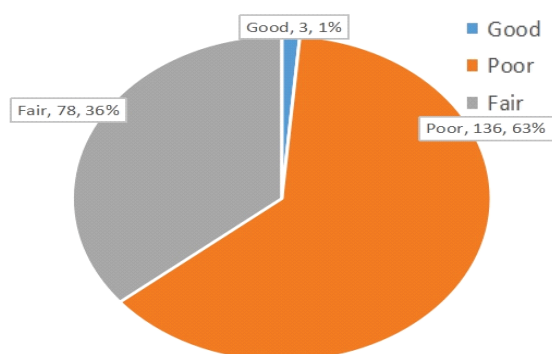


Figure 3: Pie chart of respondents' practice of Standard Precaution.

Only 1% of the respondents had a good practice; 63 % of the respondents had a poor practice of SP (Fig.3).

DISCUSSION

The majority 205 (94.47%) of respondents have heard of standard precautions, with over one third (43.41%) reporting that their sources of information were from colleagues and about one third 68 (33.17%) reporting hospital seminars as their source. This is similar to a

previous study conducted in Enugu² where 94.4% of respondents had heard about SP but higher when compared to the survey done at Asaba, Delta state¹⁷ whereby 82.0% of the respondents were reported to have heard about standard precautions. The low level of dissemination of information on SP to HCWs at the primary and secondary health care facilities through quality means like hospital seminars and training in schools could be a reflection of the neglect and lack of commitment to workforce development at the primary and secondary facilities with the resultant manifestations of inadequate knowledge of the critical subject matter demonstrated by the HCWs in these facilities.

In the assessment of the knowledge, more than two-thirds of the respondents had known what standard precaution was but with only 10.6% having a good knowledge of SP. This is similar to the study carried out among HCWs in primary health centres in Enugu whereby only 18% had good knowledge of Standard precaution;⁷ this points towards poor training of HCWs in these health facilities. There was a statistically significant association between respondents' knowledge and the health care professional group they belong to as it was noted that nurses (69.6%) had more knowledge of SP as compared to other health care workers in the study. This finding is similar to the survey carried out in Jamaica.¹⁸ However, a more substantial portion (90.0%) of the nurses in the Jamaican study had good knowledge in contrast with the finding in this study. The majority (70.5%) of the respondents had a fair knowledge of SPs in this study, and this may be due to the erratic and irregular activities and attention given to the implementation of standard precautions at the primary and secondary levels of care by the relevant stakeholders in the health care industry. Also, contributory to this is the lack of training or seminars for health care workers in these facilities to enhance the knowledge of standard precaution.

There was a statistically significant association between respondents' level of education and knowledge of standard precautions. This association may also be related to the professional group as already elucidated in this study. HCWs in some professional groups like medicine,

dentistry, nursing, and midwifery, pharmacy, and laboratory medicine are expected to have attained higher educational qualifications than their counterparts who are orderly, clerical, and security staff. This further underpins the fact that training and retraining of these HCWs at the primary and secondary facilities cannot be overemphasised. The training, especially in the form of hospital seminars and continuous professional education on topics like SP would afford all cadres of HCWs the opportunity to be equipped for better knowledge for safer health deliveries in the primary and secondary levels of care.

Regarding the practice of standard precaution, inadequate levels of practice were reported among two-third (63%) of respondents; these included the practice of handwashing, use of gloves during and after patients' point of care, and practice of needle recapping. There were reduced practices and the use of two-hand methods of recapping needles. This finding is similar to that conducted in Mizan-Amam, SouthWest Ethiopia⁸ but in contrast to the findings in Abuja, Nigeria,⁶ Hawassa City and Addis Ababa Ethiopia^{19,20} where more than half of the respondents had good standard precaution practice. The lack of practice of standard precaution was due to lack of knowledge of SP as a result of the neglect for training and retraining of these HCWs. This may have been worsened with a possible lack of provision of personal protective equipment in these facilities as a further reflection of the neglect these levels of care had suffered.

CONCLUSION

Based on the findings of this study, the knowledge and practice of standard precautions for infection prevention and control among HCWs in public primary and secondary health care facilities in Edo State were abysmally poor. These have serious implications for the implementation of good infections prevention and control. Most of the HCWs sourced their information on standard precautions from sources that were not standardised for quality and mode of delivery as a means of filling the vacuum created by the neglect in training.

Recommendation

Based on the findings of the present study, it is recommended that concerned stakeholders should put measures in place for more health facility seminars to train and retrain HCWs on the importance and practice of standard precaution. Also, the supervising arms of government should ensure that mechanisms for monitoring HCWs' compliance with standard precaution practices are put in place at the primary and secondary healthcare facilities in Edo State, Nigeria.

Limitation

This study was a cross-sectional study and thus may limit the generalisation of its findings.

Declarations**Ethical considerations**

Informed written consent was obtained from each study subject after a thorough explanation of the objectives and procedures of the study. The benefit of this study was explained to the study population that the concerned body could utilise the results in improving occupational health safety and service. Confidentiality was ensured by making the questionnaire anonymous and avoiding personal identification.

Availability of data and material

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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