



A study of the practice of universal precautions by primary health care workers in Sokoto state, Nigeria

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Abstract

Background: This study was to determine the universal precaution practicing profile of health care workers in Sokoto State primary health care facilities.

Methods: Using a structured and comprehensive questionnaire, information was obtained from 420 health care workers from the various cadres selected through a multistaged random sampling procedure from the 23 PHC facilities located in the 23 LG headquarters of the state.

Results: The Universal Precautions practicing profile of the participants was marginally appropriate ($61.0 \pm 19.6\%$) being above 50% taken as cut-off point, with inter-professional variations that were found statistically significant ($p < 0.05$). The JCHEWs and SCHEWs, the two cadres that form the bulk of community health care workers, collectively and individually had low mean practice scores ($61.3 \pm 18.0\%$ and $56.5 \pm 20.6\%$ respectively). Gaps and deficit were observed among the staff. The practice of not recapping, bending and breaking of needles and “hands free” handling of needles and sharps was low, being 33.3% and 32.4% respectively. The professional status of workers was found to influence appropriate practice, as cadre with higher professional qualification were found to generally have better practice profile. However, longer years of experience conferred no improved practice, and there was no significant difference in practice between the mainstream PHC workers (JCHEWs, SCHEWs and CHOs).

Conclusion: Interventions to improve practice among the PHC workers is essential for safety in health care delivery services against occupational hazards.

Key Words: PHC workers, universal precaution, practice

Introduction

The close interaction between the health workers and the patients, between equipments and the health care workers exposes the health care provider to various forms of hazard inherent within the health care environment notably blood borne infectious organisms thereby creating a growing concern for occupational safety within health facility settings.¹⁻⁵

Following the adoption of primary health care and the role of PHC facilities as major service delivery points, the safety of the PHC facility has become of significant public health importance. In the rural communities which account for majority of the nation's population, PHC facilities are the main health service delivery points.⁶

Primary health care services, provided mainly by community health trained personnel, are rendered often in a unique and unpredictable environment, and often in situations in which the health care provider is unable to comply with universal precaution guidelines thereby increasing the potential of disease transmission. The important roles being played by PHC facilities as sources of health care provision make their safety for both service providers and users an important health concern. It is thus important that the practice of universal precautions as prescribed by the World Health Organization by PHC workers be determined for informed decision on effective interventions that would make these facilities relevant in the overall goal of ensuring a healthy population.

It, therefore, becomes important to assess the status of practice of occupational safety by PHC workers who make direct contact with the numerous rural settlers, the main users of the services provided therein.

The World Health Organization estimated that, in the course of health services provision, about 3 million health care workers worldwide were known to have sustained one form of accidental occupational exposure to blood borne pathogens annually with more than 90% of these infections occurring in developing countries.⁷ Despite the paucity of data on

accidental exposure to potentially infectious blood and body fluids, available figures indicate that the risk of blood borne viral infections is significant.⁸⁻¹⁰ The rates of exposure have been found to range from 9.7% among scrub nurses to 90.3% among operating physicians.⁸ Infections attributable to exposure among the health care workers in the WHO African Region has been shown to be high when compared with other zones.⁹ The practice of concept of universal precaution in Nigeria has been unsatisfactory, translating into significantly high incidences of accidental exposure to blood and body fluids.^{8,11}

The mean annual incidences of percutaneous exposure were found higher in developing countries of Nigeria, Brazil and Egypt with their annual incidences of 2.10, 2.53 and 4.68 sharps injuries per year respectively compared to the 0.18, 0.64 and 0.74 of the United States, United Kingdom and Australia where the practice of universal precautions is common.⁹ The probabilities of injury and exposure as well as subsequent prevalence of, susceptibility to infection and potential for percutaneous transmission are similarly comparatively higher within these developing countries. Ernest, in Ilorin,¹¹ had shown a low level of practice of injection safety among health workers. A similar trend was observed in a Nepalese study¹⁴ where the use of preventive measures was suboptimal with an accompanying needle stick rate of 74% among the study group, a situation considered quite high. Kermode and colleagues¹⁵ found suboptimal compliance among rural Indian health care workers, as only 32% wore eye protection even when indicated and 40% recapped needles at least sometimes as against the always as prescribed by Universal Precautions.

This study was to assess the practice of universal precautions among primary health care workers in PHC facilities in Sokoto State, and the likely factors that inform this practising profile.

Materials and Methods

This was a cross-sectional descriptive study, carried out among the primary health care centre in each of the Sokoto State's 23 local government headquarters.

The list of all PHC workers consisting of medical officers (MO), community health officers (CHO), nursing and midwifery staff (NMW), senior community health extension workers (SCHEW), junior community health extension workers (JCHEW) and laboratory technicians (LT) was obtained from the Ministry of Local Government & Community Development, the supervisory ministry in Sokoto State, to ascertain the number of potential participants from each of the facilities.

An estimated sample size of 420 was determined and this was selected through a multistage sampling procedure. Based on the staff strength of each PHC centres, proportionate allocation was employed to determine the number that would be selected from each of the facilities.

The the number of participants from each cadre in each facility was arrived at through proportionate allocation based on the size of each facility's workforce. A simple random method using balloting system was applied to the list of each cadre at each facility to select the number of study participants. The sum of selected participants from each cadre within facility gave the required number of participants from each facility for the study, and with those of other facilities gave the total of 420, the estimated sample size.

Relevant information on respondents' universal practicing profile which included respondents' years in service as PHC providers, current points of service delivery, their practice of and forms of practised universal precautions was collected through an interviewer-administered questionnaire. These were manually cross-checked to ascertain their accuracy and completeness and this was analysed using Epi Info Version 3.3.2 through which the relevant frequency distributions, cross-tabulation to examine relationship between variables and descriptive statistics

were determined. GraphPad InStat, a statistical package was used for X^2 -test as well as tests of means (ANOVA and Student t-test) and decision was taken at $p \leq 0.05$.

A system for scoring respondents' responses and determining their practice profile was designed and implemented. Forty (40) correct responses on practice of safety in health care setting were expected, each attracting 1 mark. The total correct responses expressed as a percentage of the overall expected correct answers gave the practice score and the profile of an individual respondent. This was used to determine the score and profile of each cadre as well as that of the entire study group, and the grading of the respondents. Grading of individual and group practice profiles was stratified as appropriate ($>50\%$) and inappropriate ($<50\%$), and these provided the means for comparison.

Approval from the Ethical Committee of Usmanu Danfodiyo University Teaching Hospital, Sokoto was obtained. Permission to allow the conduct of the study was obtained from the Sokoto State Government, and a letter of introduction obtained which was presented at each facility to allow for administration of the data collection tool. Informed consent from the study subjects was sought after the objectives of the study have been explained to them. Confidentiality was assured and anonymity ensured as names were not required from the subjects. The presence of any member of management of each facility was courteously discouraged to allow for unhindered responses by participants during the survey. Participants were informed of the safety of the study to their health and job, and that the study was intended to help establish their safety at their workplaces, and that all information collected therein would be strictly confidential. Participants who objected to involvement were politely excused.

Results

Profile of Participants

Of the 420 participants, 29.5%, 48.3% and 8.6% were JCHEW, SCHEW and CHO respectively, and these cadres collectively

constituted 86.4% of the workforce of these PHC facilities. Medical officers, nurses and midwives and laboratory technicians constituted the remaining 13.6%. Over 50% of participants were less than 10 years in service as primary health care providers. Among the 48.6% who have put ten years and above in service, 12.4% have being in the service for twenty years and above. The outpatient department had the greatest number of staff (40.24%) followed by treatment section (20.5%). Maternity unit with 19.3% has the third largest number of health care workers in the state's PHC. The ward or observation room, immunization and laboratory have smaller number of staff with 7.6%, 7.4% and 5.0% respectively.

Scope of Universal Precaution Practice

The commonest form of universal precaution practice among participants was reporting of accidental exposure (78.8%) followed by post exposure retroviral screening and use of glove (73.1%), and hand washing (70.7%) (Table 1). However, the practice of bending, breaking and recapping used needles, risk for accidental exposure, was very common (66.7%), while "hands free" handling of needles and sharps, which protects against similar exposure, was low (32.4%). There was varying adherence to the various forms of Universal Precautions among the respective cadres. Generally, the medical officers had better adherence to the various measures as shown by all of them practicing these measures with the exception of hand washing where adherence rate was 42.9%. The other cadres revealed lower adherence profile, with profound variations. The differences in proportions of each cadre who adhere to the respective universal precaution measures were statistically significant. Within each cadre, the different measures found varying degrees of application, and these were statistically significant except among the doctors where all the measures, with the exception of handling of used needles, found equal application with no significant difference ($p = 0.1069$, Fisher's Exact Test). The differences in practice profile as illustrated by the different score between the cadres shows

that professional status of the respondents had an influence on their practice of universal precaution and this was found to be significant ($p < 0.05$).

Profile of Participants' Practice

The profile of the participants' universal precautions practicing is illustrated by their performance scores (Table 2). This was $61.0 \pm 19.6\%$ (95% CI = 58.5 63.5) for the whole group. However, the medical officers had the best practice profile ($82.0 \pm 2.7\%$; 95% CI = 79.5 84.5), followed by the CHO ($71.6 \pm 11.7\%$; 95% CI = 67.6 75.5) and by laboratory technicians ($69.6 \pm 9.7\%$; 95% CI = 65.1 73.9). The SCHEW and JCHEW had lower profile ($56.5 \pm 20.6\%$; 95% CI = 53.7 59.3 and $61.3 \pm 18.0\%$; 95% CI = 58.1 64.5 respectively). The differences in the practice profile as illustrated by their respective group mean performance scores was found to be statistically significant ($F = 8.528$; $p < 0.05$, ANOVA). The proportion of the respondents who had practice score above 50% was 62.7%. All the doctors (100%), 94.4% of the CHO and 90.5% of the laboratory personnel had practice scores above 50%. The Senior Community Health Extension Workers, had the lowest proportion of their members adhering to appropriate safety practice was found with the SCHEW (73.4%). Stratified along cadre line, the doctors followed by the CHO and the laboratory technicians had greater proportions of their members with practice score above 50% and the nurses/midwives had 86.2%. Comparatively, the differences in proportions of the respective cadres with performance score higher than 50% were statistically significant ($p < 0.05$). The community health workers (consisting of JCHEW, SCHEW and CHO) had 48.3% adhering to appropriate safety practice. But within this composite group, a higher proportion of the SCHEW (26.6%) were found not adhering to appropriate practice compared to the 16.1% and 5.6% of the CHEW and CHO respectively.

The respondents' years in service and by implication, years of experience in health service delivery did not influence their safety practice profile, as there was no significant

Table 1: Forms of safety practices by respondents

No. of Respondents	JCHEW 124 (29.5)	SCHEW 203 (48.3)	CHO 36 (8.6)	NMW 29 (6.9)	MO 7 (1.7)	LT 21 (5.0)	x ² p	Prevalence (%) among cadres
Hand washing	73.4	64.5	91.7	62.1	42.9	100.0	24.2 <0.05	70.7
Gloving	80.7	70.0	86.1	86.2	100.0	19.1	44.5 <0.05	73.1
“Hands free” handling of needles and sharps	16.1	38.9	41.7	44.8	100.0	9.5	42.0 <0.05	32.4
Reporting accidental exposure	78.2	76.4	66.7	82.8	100.0	100.0	15.0 <0.05	78.8
Post exposure retroviral screening	76.6	68.0	66.7	82.8	100.0	90.5	11.4 <0.05	73.1
Needle recapping, bending & breaking	76.6	62.1	58.3	55.2	100.0	71.4	14.0 <0.05	66.7
x ²	175.1	72.9	27.9	26.2	-	76.9		
p	< 0.05	< 0.05	< 0.05	< 0.05	0.107 ⁺	< 0.05		

⁺ Fisher's Exact Test (Not Statistically Significant)

JCHEW: Junior Community Health Extension Workers; SCHEW: Senior Community Health Extension Workers; CHO: Community Health Officers; NMW: Nursing Midwifery; MO: Medical Officers; LT: Laboratory Technicians

Table 2: Respondents' practice performance

No. of Respondents	JCHEW 124	SCHEW 203	CHO 36	NMW 29	MO 7	LT 21	Total 420
	Practice Performance						
Mean±SD	61.3±18.0	56.5±20.6	71.6±11.7	68.8±7.3	82.0±2.7	69.6±9.7	F=8.528+
95%CI	58.1-64.5	53.7-59.3	67.6-75.3	62.2-75.3	79.5-84.5	65.1-73.9	p<0.05
	Score Grades						
<50%	16.1	26.6	5.6	13.8	0	9.5	x ² =15.492
≥50%	83.9	73.4	94.4	86.2	100.0	90.2	p<0.05
	Practice Score (%) with years in service						
1 – 10	61.2±18.9 (111)	55.1±21.1 (115)	-	67.5±19.8 (12)	-	66.4±10.9 (13)	
11 - 20	61.1±6.5 (13)	57.6±19.1 (59)	73.8±11.3 (23)	72.3±18.6 (17)	-	75.0±4.1 (8)	
21 - 30	-	65.3±20.6 (29)	66.8±11.9 (13)	-	-	-	
	t = 0.18 p = 0.86	F = 2.89+ p = 0.06	t = 1.75 p = 0.09	t = 0.67 p = 0.51	-	t = 2.12 p < 0.05	

⁺ ANOVA

association with years in service. Only with the laboratory technicians was there found a significant association in practice with years in service ($p < 0.05$).

Discussion

Adherence to Universal Precautions was found to vary amongst the participants. The different forms of Universal Precautions measures similarly found varying applications. The medical officers demonstrated a comparatively higher practice profile with the exception of hand washing practice. The high patient load often characteristic of settings where doctors are known to be available by care users may account for their inability to effectively practice and sustain this form of Universal Precautions. Notification of accidental exposure was found to be a common practice among the participants, probably in fear of been infected by blood borne infective agents post-exposure.

Despite the adoption of various forms of measures to stem the occurrence of accidental exposure by the participants in the course of their service delivery, only the medical officers had comparatively consistently better and practicing profile. Among the others, there were profound variations both in their proportions adhering to safety measures and in methods adopted. A similarly low profile from similar rural health setting had been demonstrated.¹⁵ Gurubacharya and colleagues¹⁴ found only 23% were in the habit of using gloves in venepuncture, while Sado and colleagues¹⁶ found that a high percentage (94.6%) observed to practice hand washing compared to the 70.7% in this study.

Though the practice of safety measures was better in this study than was found from previous studies, this was not in every form of universal precautions. The practice of recapping, bending and breaking needles was high (66.7%) and “hands free” low (32.4%). Sado and colleagues¹⁶ and Gurubacharya *et al*¹⁴ recorded similar but high prevalence of 63.8% and 79% of needle recap among their study subjects respectively.

Primary preventive measures, most important in infection prevention, in the forms of hand washing, gloving and “hands free” handling of sharps were not widespread practices among these PHC staff, thereby exposing them to potentially infective body fluids which necessitated the high reporting rates of accidental exposure and subsequent post-exposure screening encountered here. What is yet to be determined are the potential infection rates accruing from such exposures to determine their impact.

The profile of universal precaution practice among the participants illustrated by their mean practice scores was found to be marginally appropriate but low. Kermode and colleagues found similar suboptimal compliance to Universal Precautions in their study among rural health care providers.¹⁵ The physicians' better profile may not be unconnected with their institutional training which, based on their more elaborate training curriculum, was of superior quality than the other cadres. Though exhibiting better practicing profile, the medical officers were few in number and not widely spread across the PHC facilities, thus may not significantly impact on the overall universal precaution practice of the entire workforce.

Among the other professional groups, profiles were low: comparatively lower mean scores and proportions adhering to measures of safety, and wider internal variations in appropriate practice. This was significantly prominent within the JCHEW, SCHEW and CHO groups, the main bulk of the PHC personnel.

A number of factors may account for the seeming gaps. The PHC facilities are often bereft of necessary resources and infrastructures that guarantee safety practice due to paucity of funding.¹⁷ This may account for inability to adopt the most protective primary preventive measures as illustrated by findings from this study. The JCHEW and SCHEW, with a larger proportions and spread, had low profile and this may not be unconnected with their not-so-extensive institutional training in addition to the deficient infrastructure of the

facilities for universal precaution practice. The impact of training on practice of universal precautions has been identified previously and is similarly shown in this study.¹²

In addition, the years or duration in PHC practice did not influence the participants' practice of universal practice. In this study, only the laboratory personnel demonstrated that increasing years in service did have positive influence, and this may have been due to their more consciousness of the need to be cautionary in their practice of collecting and handling specimens. The poor spread of medical doctors across the facilities is unlikely to allow any mentoring of these other cadres that would positively impact on their practicing profile and thereby raise their compliance.

Conclusion

On the whole, respondents' practice was marginally appropriate but with profound variations within and between the cadres. The best profile was demonstrated among the doctors and the community health extension workers; the bulk of the PHC facilities' had the least satisfactory practice performance. Gaps and deficits in the practice of Universal Precautions were observed to be prevalent among the respondents and mostly among the lower cadre PHC workers, indicative of inherent potential for poor control of infection transmission and compliance with the practice of Universal Precautions within the state's PHC facilities.

Addressing the gaps and deficits would entail the conduct of a comprehensive educational/training programme on Universal Precautions for PHC workers in Sokoto State coupled with provision of necessary resources and ensuring application of proper safety measures and procedures at workplace by workers. In addition, there is the need for the establishment, at respective PHC facilities, of safety training and monitoring schedules to ensure periodic updating and appraisal of staff and facility's safety profiles. The periodic review of facilities' safety profile will ensure the sustenance of standard or quality of safety

practice and measures in the respective PHC facilities. Personnel should be encouraged to adhere to safety measures and practices especially in the use of personal protective facilities and procedures and motivational measures for compliance put in place.

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