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PROFILE OF INSTITUTIONAL INFRASTRUCTURE FOR IMPLEMENTING UNIVERSAL PRECAUTIONS IN PRIMARY HEALTH CARE FACILITIES IN SOKOTO STATE, NIGERIA: IMPLICATION FOR OCCUPATIONAL SAFETY

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Abstract

Background: The adoption of primary health care in Nigeria has led to the expansion of health care delivery frontiers especially at the rural level. At this level is the most critical health services delivery point, with an attendant increase in contact between primary health care providers and patients. There is however also a simultaneous increased exposure to occupational and related health risks and hazards.

Methods: The objectives of this study were to assess the universal precaution profile of primary health care facilities and determine those factors that inform their prevailing safety status. Using a structured checklist, 23 representative primary health care facilities from the 23 local government areas in Sokoto State were randomly selected for the study, one from each of the local government areas.

Results:

The facilities were found to have poor universal precaution profile that could guarantee effective control of infection transmission and safety of their personnel. The facilities' mean score on measures and frameworks for ensuring the implementation of Universal Precautions was $53.12\% \pm 21.68\%$ with only 56.52% scoring above 50%.

Conclusion: Safety protocol and facilities for ensuring safe environment were inadequate and poorly developed. None of the facilities had full complement of facilities or resources for ensuring safety of working environment and for personnel's implementation of Universal Precautions. Policy for safety practice was poor, and post exposure intervention programmes for staff in event of accidental exposure grossly underdeveloped.

Interventions to improve safety environment and creation of safe climate are essential to protect primary health care workers against occupational hazards.

Key Words: Primary Health Care Centre, universal precautions, occupational safety

Introduction

Infections within the health care facilities are important in terms of the safety and wellbeing of patients and health care workers, and due to the enormous resources expended on avoidable infections. Their control thus remains a high priority globally. In the United Kingdom, they constitute a significant drain in terms of human and financial resources (1-3).

Interaction between patients and health care workers, therapeutic procedures, behaviour of

health care providers, state of a health facility environment, organizational profiles and estates and facilities have fostered the ease with which infections are transmitted within health care settings(1,4-6).

The characteristic organizational structure and functions of the health facility, which promote intimate interaction between the sick and health care workers, are capable of promoting the

transmission of infectious agents from sources to the susceptible within the health care environment. In the absence of, and unless proper precautions are taken, health care facilities can become sources of infection transmission.

Primary health care facilities in Nigeria are often faced with poor funding, inadequate facilities and poor environmental factors such as absent regular running water for safety practices. Services are often rendered in unpredictable environment, and in such situations the health care provider is unable to comply with universal precautions thereby increasing the potential of disease transmission. Inadequate infection control facilities and materials due to limited supplies and equipment are often characteristic of health care facilities in developing countries. These encourage infection transmission and militate against their effective control. Safety materials such as gloves, gowns and masks are often in short supply, and with these is the general scarcity of disinfectants and hand washing facilities (7, 8).

In developing countries, Nigeria inclusive, primary health care facilities constitute major sites for health service delivery to the vast majority of the population. This is due to the adoption of primary health care as the mainstay of health care delivery in Nigeria with a resultant expansion of health care delivery frontiers and interface of patient-health care worker interaction.

Primary health care services such as immunization, maternal and child health, family

planning, general medical and emergency, laboratory, school health, housekeeping, community-based, waste and instrument management are associated with infection transmission requiring adequate provision of enabling environment for effective control of infectious agents capable of been transmitted through them. In addressing the problem of infection transmission and its control within health care settings, WHO/CDC developed precautionary guidelines collectively known as Universal Precautions for implementation within health care settings (9 - 11). Its implementation was meant to reduce accidental exposure to blood and body fluids and the attendant infection that could result thereof. Working characteristics, organizational climate and administrative support are factors that have bearing in the profile of Universal Precautions in health facilities.

A growing body of research links working conditions such as working characteristics with safety for both patients and workers in health care settings. The provision of disposal facilities in the wards of a tertiary care centre in Vellore, India in 1998, saw to the reduction of percutaneous injury from 124 episodes in 1998 to 32 in 1999 (12). Vaughan *et al* showed that availability of infection control personnel and facilities were positive predictors for occupational safety (13). In a related study by Clarke, nurses working in hospitals with better practice environment were one-third less likely to be injured (14). Using data from 39 ICUs in 23 hospitals across the United States to examine the

impact of hospital structural characteristics and working conditions on occupational safety, the intensive care units with more positive organizational climates were found to have lower rates of occupational injuries and blood and body fluid exposures (15).

Thus organizational climate and administrative support are capable of influencing health care workers' likelihood of occupational injuries.

Where these are lacking, higher rates of occupational exposure have been observed. Aisen and Shobowale(16) showed that paucity of materials were responsible for 60% of health care workers' exposure to blood and body fluids. Atulomah and Oladepo(17) showed positive correlation between lack of institutional frameworks for safety measures and preponderance of related exposure to inherent risks in health facility environment. Clarke and colleagues buttressed this when, based on their study, they concluded that health care workers from poor organizational climates were generally twice as likely as those on better-organized units to report risk factors, needle stick injuries(18).

In countries of the developed world with strong administrative support and where government has made it compulsory that Universal Precautions be adhered to by both employers and employees, there is significantly high compliance and reduction in accidental exposures to hazards in health care settings, unlike what obtains in developing countries where Universal Precautions concept is not enforced or in existence. Thus administrative

responsibility is an important factor. The United States, United Kingdom, Canada, Hong Kong, Japan all have policies derived from the WHO/CDC Recommendations on Universal Precautions and to which strict adherence is a norm, requirement and practice (19-23).

Nigeria has its own national policy (23) which advocates for a nationwide adoption of Universal Precautions as developed by CDC. It outlines the minimum for the practice of universal precautions for the prevention of exposure to potentially infectious materials.

The policy has also established the Minimum Standard of Universal Safety Precautions to be observed by health workers in line with CDC Universal Precautions as well as guidelines for the implementation of post exposure management in event of accidental exposure to potential sources of infection with special reference to HIV.

In all, the policy is in line with international approach to prevention of blood borne pathogens especially blood borne viruses in event of accidental exposure in health care settings.

Developing world, characterised by lack or absence of these infrastructures, would parade higher rates of occupational exposure. This study was carried out to assess the status of safety measures in PHC facilities as well as their institutional framework for ensuring it and determine those factors that inform such prevailing profiles.

Methods

One primary health care centre was randomly selected from the PHC facilities in each of the 23 local government areas of Sokoto State. The study was conducted among these selected primary health care facilities using a set of checklist structured to ascertain the adequacy and appropriateness of measures and institutional framework for ensuring safe working condition and environment in each of the facilities.

Determination of appropriateness and adequacy of facility's measures and institutional framework for ensuring safe working environment was made through a scoring system. Assessment was done against eight (8) main items necessary for safety in health care setting. These consist of availability of universal precaution training and monitoring schedule; teaching, supporting and monitoring of appropriate hand washing; alternative arrangement in absence of water; teaching, supporting and monitoring of appropriate use of barriers; system for disposing equipment; appropriate system for processing instruments; waste disposal and housekeeping system. These were further broken down into 26 indicators for appropriate measurement.

For the purpose of determining the safety profile of these facilities, a scoring system based on the 26 indicators was designed. The percentage (%) scores on Checklist Assessment of Safe Working Characteristics of the Health Facilities is determined by the proportion of facility's total positive response to the total positive responses acceptable which is 26 overall. The result was

then used to grade the facility's profile with respect to its appropriateness and adequacy of its safety measures. A total score above 50%, indicating above average was accepted as satisfactory, while 50% and below was considered unsatisfactory.

Ethical approval was sought and obtained from the Ethical Committee of Usmanu Danfodiyo University Teaching Hospital, Sokoto, and permission obtained from the Sokoto State Government through the State Ministry of Local Government and Community Development. At the facility level, co-operation of the facilities' management team was obtained by explaining the purpose of the study.

Results

Teaching and supporting appropriate hand washing was the commonest safety measure in place, this being implemented in 65.23% of the primary health care facilities (Table 1). This is closely followed by the provision of alternative arrangement in absence of water and teaching, supporting and monitoring of appropriate use of barriers in 56.52% of the facilities. Among 47.83% of the facilities, there was appropriate waste disposal system, and established system for disposing used equipment and housekeeping in 39.13% that ensure safety for workers and the environment. Appropriate instrument processing system existed in 30.43% while safety training and monitoring schedule was available in only 8.70% of the primary health care centers. None of the facilities had the eight measures for safety completely available within it.

Resources for safety practice were similarly limited (Table 2). Equipment for processing instruments, as well as personnel for waste disposal was available in 82.61% of the primary health care centers surveyed. In 69.57% of these primary health care facilities, containers for sharps were available, while there was appropriate supply of disposable gloves as well as such gloves being readily available in treatment and laboratory areas as well as running water in 65.22% of the facilities.

Supply of disinfectants was appropriate in 56.52% and materials for cleaning and housekeeping adequate in 43.48% of the facilities. Functioning sink was found in treatment rooms of 34.78% and only 8.70% of the health centres had utility gloves for their cleaners for housekeeping. Water supply was from various sources among the facilities. As shown in Table 3, 47.83% of the health centres had both bore hole and well as sources of water, while 21.74% had either borehole or public water supply as source of water. Only 8.70%

was well as only source of water.

The commonest disinfectant in use among the facilities in the care of their instruments was Chloroxylenol 4.8% (52.86%). Methylated spirit was found as the main disinfectant in 46.43% of the facilities, while 25.24% of these centres used Chlorhexidine gluconate 1.5% and 14.29% commonly employed chlorine solution (bleaching solution).

Sources of gloves for patients' use were the health centre (43.48%) and patent medicine stores (56.52%). In both instances, the patients had to pay for them. All the facilities used boiling and disinfection in processing their instruments. Five (21.74%) of the centres however had functioning autoclaving machines for instrument care. None of the centres had any appropriate policy on post exposure management for staff in event of exposure to potential sources of infection. In all, the mean score of the facilities in ensuring safe environment was 53.21% (Table 4). Only 56.52% of the health centres had score above 50%.

TABLE 1: FACILITIES AND SAFETY MEASURES

Safety Measures	Proportion of PHC Centres (%)
Availability of safety training and monitoring schedule	2 (8.70)
Teaching and supporting appropriate hand washing	15 (65.23)
Alternative arrangement in absence of water	13 (56.52)
Teaching, supporting and monitoring of appropriate use of barriers	13 (56.52)
System for disposing equipment	9 (39.13)
Appropriate system for processing instrument	7 (30.43)
Waste disposal	11 (47.83)
Housekeeping	9 (39.13)

TABLE 2: RESOURCES FOR SAFETY IN THE FACILITIES

Resources	PHC Facilities
Running water	15 (65.22)
Functioning sink in treatment room	8 (34.78)
Appropriate supply of gloves	15 (65.22)
Ready availability of gloves in treatment and laboratory areas	15 (65.22)
Availability of gloves for cleaners	2 (8.70)
Supply of disinfectants appropriate	13 (56.52)
Containers for sharps available for use	16 (69.57)
Equipment for steaming, boiling or chemical sterilization available	19 (82.61)
Personnel for waste disposal available	19 (82.61)
Cleaning supplies adequate	10 (43.48)

TABLE 3: SANITATION FACILITIES

Description	% of Facilities
Sources of water in the PHCs	5 (21.74)
Tap water	5 (21.74)
Bore hole	11 (47.83)
Bore hole + Well	2 (8.70)
Well alone	
*Commonly Used Disinfectants/Antiseptics	
Bleaching solution (Chlorine solution)	14.29
Chloroxymenol 4.8%	52.86
Hydrogen peroxide	17.62
Saponated cresol	8.33
Chlorhexidine gluconate 1.5%	25.24
Methylated Sprit	46.43
Others (Eusol etc)	11.90
Sources of Disposable Gloves for Patient Care	
Health Centre	43.48
Patent Medicine Store	56.52
*Instrument Processing	
Boiling and Disinfection	100
Autoclaving	21.74
Post Exposure Management Policy	0.00

* Multiple responses allowed

TABLE 4: GRADING OF PHC FACILITIES' MEASURES AND INSTITUTIONAL FRAMEWORKS FOR SAFE ENVIRONMENT

Score (%)	No. of PHC Centres
0 - 50	10 (43.48)
> 50	13 (56.52)
<i>Overall Mean Score ± SD = 53.21 ± 21.68%;</i>	
<i>95% CI = 34.43 - 66.98%</i>	

Discussion

The study showed that the facilities vary in the availability of measures and resources for implementing Universal Precautions concepts and guidelines that ensures safety of health care setting. This variation was found to be profound as indicated by the wide standard deviation and 95% confidence interval.

The mean score of 53.21% was marginally above average and can be considered not entirely satisfactory to guarantee a safe environment for health care workers in the rendering of their services. If considered as a system, the primary health care cannot be said to satisfactorily safe for primary health care workers in Sokoto State. Many of the measures and resources for implementing and practicing Universal Precautions were grossly lacking across the facilities. None of the facilities had entire measures and resources in place for Universal Precautions implementation. Only a few measures (teaching and supporting appropriate hand washing, alternative arrangement in absence of water, and teaching, supporting and

monitoring of appropriate use of barriers) and resources (equipment for instrument decontamination, waste disposal personnel, sharps containers, availability of gloves in treatment and laboratory, appropriate supply of gloves and running water) were available in more than 50% of the facilities.

Essential measures that improve knowledge and information dissemination and ensure safety of equipments in patient care were lacking in about 70% of the centres. With the absence of appropriate waste disposal system and poor housekeeping, health care workers as well as clients in quite a number of the primary health care centres are at risk of exposure to pathogenic micro-organisms. The lack of housekeeping personnel, inadequate cleaning materials and lack of functioning sinks in treatment rooms further reduce the capability of sustaining a safe working environment for staff or achieve an effective infection control.

The availability of water from diverse sources in all the facilities did not translate into availability of actual running water and functioning sinks in all the facilities. This may have affected the status of handwashing practice, a basic and cost effective safety procedure and other measures that requires the use of water. The alternative arrangement whereby water use is through scoops underlines the effect of non-functioning sinks. There were other gaps between resources available and their actual deployment in ensuring safety.

Various types of disinfectants were found to be in use in study setting. Chloroxylenol 4.8%, Methylated spirit and Chlorhexidine gluconate 1.5% are the commonly used antiseptics as against the more effective antiviral chlorine product (bleaching solution). Their use would likely create a false sense of protection especially among those who employ them in the care of accidental injured or exposed sites.

These have seeming implications for safe working environment in the primary health care centres. Such state as found from this study indicates low safety profiles of the centres, and which is unlikely to militate against infection control in the facility environment. The problem of conducive and enabling environment in the health institutions as observed in this study constitutes determining factors of ensuring the practice of the universal precaution concept. Lack of constant running water, shortage of personal protective equipment, paucity of institutional policy and frameworks would lead to poor compliance with Universal Precautions

by the various types of health care workers who make contact with patients with resultant increase in exposure of health care providers to infective agents.

Where these are thus lacking, higher rates of occupational exposure are resultant outcomes. This was the conclusion from the work of Aisen and Shobowale where paucity of materials was responsible for 60% of health care workers' exposure to blood and body fluids (16). In the study by Atulomah and Oladepo there was a positive correlation between lack of institutional frameworks for safety measures and preponderance of related exposure to inherent risks in health facility environment (17). Further credence to this was made through Clarke and colleagues in their study from which they showed that health care workers from poor organizational climates were generally twice as likely as those on better-organized units to report risk factors, needle stick injuries (18).

Where such measures and resources are available, accidental exposures are minimal. Availability of disposal facilities led to the reduction of percutaneous injury from 124 episodes in 1998 to 32 in 1999 in Vellore tertiary care centre in India, while infection control personnel were available as shown from the work of Vaughn and colleagues, occupational safety was enhanced (12,13).

The poor adherence to universal precautions among the respondents in the study by Aisien and Shobowale (16) was attributed not just to lack of knowledge (48%), but paucity of materials (60%) among the workers.

Administrative responsibility is an important factor in the overall process towards ensuring safe health facility environment as organizational support and administrative support are positive predictors of occupational safety in health care settings. Clarke demonstrated in health care settings with better practice environment, incidence of injuries would be less(14). Similarly, more positive organizational climate as shown from the data in 39 intensive care units in 23 hospitals across the United States was associated with lower rates of occupational injuries and blood and body fluid exposures (15).

None of the centres has any policy on post exposure management for staff in event of exposure to potential sources of infection. Policy guidelines and resources (human, material and monetary) are essential ingredients for an effective infection control within the health care facility and where absent or not implemented, workers are unlikely to know what to do or even comply. Such situations are common places in developing countries.

Developing world often characterised by lack or absence of these infrastructures would parade higher rates of occupational exposure.

Recommendations

Each primary health care centre should be encouraged to establish their respective safety training and monitoring schedules under the oversight of an organizational structure (a committee of some sort) within the facility for periodic updating and appraisal of staff and facility's safety profiles. Such a monitoring

system should strive to ensure the availability of necessary tools and supplies for safety practice, encourage and support behaviour change amongst the personnel.

Periodic review of primary health care centres' safety profile by the central supervisory body, the Ministry of Local Government and Community Development through its Directorate of Local Government Matters in collaboration with the State Ministry of Health through its Inspectorate Division in charge of ensuring standard or quality of health care delivery in all health institutions in the state. This is essential for the sustenance of safety practice and measures in the respective primary health care centers.

Policy on post exposure management for staff in event of exposure to potential sources of infection should be developed by the central supervisory organ for implementation at primary health care level.

References

1. National Audit Office (NAO). *The management and control of hospital acquired infection in Acute NHS Trusts in England*. London: The Stationery Office, 2000.
2. Plowman R, Graves N, Griffin M et al. *The rate and cost of hospital acquired infections occurring in patients admitted to selected specialties of a district general hospital in England and the national burden imposed*. J Hosp Infect 2001; 47: 198 – 209.

3. National Health Service (NHS). Quality Improvement Scotland. *Health Care associated Infection, Infection Control in NHSScotland. National Progress Report*. Edinburgh: NS Quality Improvement Scotland, 2004
4. Department of Health. *Winning ways: working together to reduce health care associated infections in England*. London: Department of Health, 2003
5. Department of Health. *MRSA surveillance system: results*. London: Department of Health, 2005.
6. National Audit Office. *Improving patient care by reducing the risk of hospital acquired infection: a progress report*. London: The Stationery Office, 2004
7. Adegboye AA. *Traditional medical practices likely to spread bloodborne pathogens in Nigeria*. In: Abstracts of 8th Conference on Traditional Medical Practice, Newfoundland, Canada, August 1994
8. Adegboye AA, Moss GB, Soyinka F and Kreiss JK. *The epidemiology of needlestick and sharps instrument accidents in a Nigerian hospital*. *Infect Control and Epidemiology* 1994; 15: 27 – 31.
9. Chin J. *Public health surveillance of AIDS and HIV infections*. *Bulletin of the World Health Organization*. 1990; 68: 529 – 536.
10. Epidemiological Division, Disease Control and International Health Department, Federal Ministry of Health, Lagos, Nigeria. *Focus on AIDS*. *Nigeria Bulletin of Epidemiology*. 1992; 2: 2 – 20
11. Garner JS. *Guidelines for isolation precautions in hospitals*. The Hospital Infection Control Practice Advisory Committee. *Infection Control Hosp Epidemiol* 1996; 17: 53 – 80.
12. *Education and needlestick in India*. <http://www.jr2.ox.ac.uk/bandolier/index.html> (accessed 30/07/2006).
13. Vaughn TE, McCoy KD, Beekmann SE, Woolson RE, Torner JC, Doebbeling BN. *Factors promoting consistent adherence to safety needle precautions among hospital workers*. *Infect Control Hosp Epidemiol*. 2004 Jul; 25 (7): 548 – 55
14. Clarke SP. *Hospital work environment, nurse characteristics, and sharps injuries*. *Am J Infect Control*. 2007 Jun; 35 (5): 302 – 9.
15. Stone PW and Gershon RR. *Nurse work environments and occupational safety in intensive care units*. *Policy Polit Nurs Pract*. 2006 Nov; 7 (4): 240 – 7.
16. Aisen AO and Shobowale MO. *Health care workers' knowledge on HIV and AIDS: universal precautions and attitude towards PLWHA in Benin City, Nigeria*. *Niger J Clin Pract*. 2005 Dec; 8 (2): 74 – 82.

17. Atulomah NO and Oladepo O. *Knowledge, perception and practice with regards to occupational risks of HIV/AIDS among nursing and midwifery students in Ibadan, Nigeria*. Afr J Med Sci. 2002 Sep; 31 (3): 223 – 7.
18. Clarke SP, Sloane DM and Aiken LH. *Effects of hospital staffing and organizational climate on needlestick injuries to nurses*. Am J Public Health. 2002 Jul; 92 (7): 1115 – 9
19. UK Health Departments. *Guidance for clinical health care workers: protection against infection with blood borne viruses*. Recommendations of the Expert Advisory Group on AIDS and the Advisory Group on Hepatitis, 2005. <http://www.open.gov.uk/doh/chcguid1.htm> (accessed 25/02/2006)
20. CDC. *Universal precautions for prevention of transmission of HIV and other bloodborne infections*. Morbidity and Mortality Weekly Report, 1987, 36 (Suppl. No. 2S).
21. NIOSH. *Preventing needlestick injuries in health care settings*. Washington, DC, US Department of Health and Human Services, National Institute for Occupational Safety and Health (Publication No. 2000-108). (<http://www.cdc.gov/niosh/2000-108.html>, accessed 30th July 2006).
22. Health Canada. *Preventing the transmission of bloodborne pathogens in health care and public service settings*. Canada Communicable Disease Report, 23S3 (http://www.hcsc.gc.ca/hpb/lcdc/publicat/ccdr/97vol23/bbp_supp/index.html#intro, accessed 30th July, 2006).
23. Scientific Committee on AIDS (SCA) and Scientific Working Group on Viral Hepatitis Prevention (SWGHP). *Recommendations on the management and postexposure prophylaxis of needlestick injury or mucosal contact to HBV, HCV and HIV*. March 2003.aca@dh.gov.hk.
24. FMOH. *Post exposure prophylaxis and universal safety precaution*. Guidelines for the Use of Antiretroviral (ARV) Drugs in Nigeria. Federal Ministry of Health, Abuja, Nigeria, 2005: 49 – 52.

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