

Accidents, injuries and the use of personal protective equipment, among hospital cleaners in a tertiary hospital in south west Nigeria

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Abstract

Objectives: Hospital cleaners are exposed to various accidents and injuries. They are often neglected and their health and safety are generally overlooked. This study aimed to show the relationship between occurrence of work place hazards and the use of Personal Protective Equipment (PPE) among cleaners in a tertiary hospital.

Methods: A cross-sectional study of 249 out of 300 hospital cleaners at the Federal Medical Centre Owo, was conducted. Interviewer administered questionnaire containing socio-demographic characteristics, time respondents used at work, use and awareness of each personal protective equipment was used. Data was analyzed using SPSS version 21. Descriptive statistics were done. Chi square-test was used to compare the use of PPE and occurrence of accidents or injury. Level of statistical significance was <5%.

Results: The mean age of the respondents was 34 ± 7.2 years, 7.6% were males, 75.1% were married while 142(57%) had completed secondary level of education. In the month preceding the study, 10% of the respondents had an accident at the workplace while 4% had injury, 60% had burns/scald injury while 72% had falls. In all, 6(54.5%) who used overall regularly had accidents/injury compared to 13(7.3%) of those who did not make use of it, $p < 0.001$.

Conclusion: This study adds to the body of existing knowledge that PPE cannot eliminate but reduce the occurrence of injury, if correctly and consistently used. Training on work place health and safety, correct and consistent use of PPE is required.

Key words: Hospital cleaners, personal protective equipment, accidents, injuries, workplace.

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Les accidents, les blessures et l'utilisation d'équipements de protection personnelle, parmi nettoyage des hôpitaux dans un hôpital de soins tertiaires dans le sud ouest du Nigeria

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Résumé

Objectifs: nettoyage des hôpitaux sont exposés à divers accidents et les blessures. Ils sont souvent négligés et leur santé et leur sécurité sont généralement négligés. Cette étude visait à montrer la relation entre l'apparition des risques professionnels et l'utilisation d'équipements de protection individuelle (EPI) chez les nettoyeurs dans un hôpital de soins tertiaires.

Méthodes: Une étude transversale de 249 sur 300 nettoyage des hôpitaux au Centre médical fédéral Owo, a été menée. Interviewer questionnaire administré contenant les caractéristiques sociodémographiques, les répondants de temps utilisées au travail, l'utilisation et la sensibilisation de chaque équipement de protection individuelle a été utilisé. Les données ont été analysées en utilisant SPSS version 21. Les statistiques descriptives ont été effectuées. Chi carré-test a été utilisé pour comparer l'utilisation des EPI et l'apparition des accidents ou des blessures. Niveau de statistique significative était <5%.

Résultats: L'âge moyen des répondants est de $34 \pm 7,2$ ans. 7,6% étaient des hommes, 75,1% ont été mariés pendant 142 (57%) avaient terminé niveau d'enseignement secondaire. Dans le mois précédant l'étude, 10% des répondants ont eu un accident au travail, tandis que 4% ont eu des blessures, 60% avaient des brûlures / blessures par échaudage, tandis que 72% avaient des chutes. En tout, 6 (54,5%) qui ont utilisé l'ensemble avaient régulièrement des accidents / blessures comparativement à 13 (7,3%) de ceux qui ne font pas usage de celui-ci, $p < 0,001$.

Conclusion: Cette étude ajoute à l'ensemble des connaissances existantes que les EPI ne peut éliminer, mais de réduire la survenue de blessures, si elle est utilisée correctement et systématiquement. Formation sur le lieu de travail santé et la sécurité, de rectification et utilisation cohérente des EPI est nécessaire.

Mots clés: Nettoyage des hôpitaux, de l'équipement de protection individuelle, accidents, les blessures, le lieu de travail.

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INTRODUCTION

The work of cleaners in a hospital could be physically demanding. Most of them had little or no formal education relevant to their job. However, their low level of education, and their approach to observing standard precautions including the use of Personal Protective Equipment (PPE) and health and safety education are usually poor and crude, thus being at a disadvantage concerning exposure to accidents and injuries (1-4). Accident in form of any discrete occurrence in the course of work, leading to physical or mental harm, or any unforeseen adverse event causing harm, injury, disease, or death is prone to occur in the work place (5, 6). Work related injury is that which occur when the person is at a place for the purpose of working (7).

Globally, exposure to blood and body fluids is a common problem among health care workers, including hospital cleaners and this phenomenon often results in increased risk of transmission of blood borne viral infections (8). Recent research in Australian hospitals found that, while registered nurses (RNs) caused 26% of all injury incidents, cleaners caused 9%. However, rates of injury for cleaners were higher than those for nurses and twice the average for all occupations (2). Cleaners were found to be at risk of all injury categories when compared with other health care workers in general (8). A cross-sectional study of sharp injuries among hospital support personnel including cleaners demonstrated that cleaners sustained the majority (66%) of injuries and that inappropriate disposal was associated with 55% of all injuries. Other studies have shown that female cleaners are more at risk of injuries, although workers who have up to ten years of work experience have significant low risk for all injuries (1, 2). Common pattern of work related injuries sustained by hospital cleaners include injuries from sharps, contamination of skin and mucus membrane with blood and body fluids, cuts, puncture, bruise, burns, dermal and respiratory injury from chemical agents, slips, falls and musculoskeletal disorders (1, 2, 9-11). Some of these hazards can be significantly reduced by use of PPE as well as observing standard precautions when handling blood products, excreta and secretions. This has

shown to provide a high level of protection to patients, health care workers and visitors (5, 8).

Generally, PPE protects the user against health or safety risk at work and it reduces the risk of accidents and injuries as well as spread of nosocomial infections as shown in studies done (12-14). Examples of PPE include gloves, gowns or aprons, masks and respirators, goggles, face shields and boots and these have specific functions (15). However, the negative effects of PPE usage includes physical and mental stress, musculoskeletal problems, skin problems, psychosomatic disorders, heat stress, impaired vision, mobility and communication discomforts (16).

Selection of PPE for use is based on the type of anticipated exposure, the durability and appropriateness of the PPE for the task (17). Determinants of PPE use includes: safe design and construction, maintained in clean and reliable fashion, fit and comfortable to wear, workers training by employer, research limitations of the equipment, lack of knowledge, experience, competence, facility design, administrative control, forgetfulness and behavioural attitude (17-19). Hospital cleaners often lack basic preventive measures including education and training for health and safety. A baseline is needed in order to institute a suitable intervention among them. This study intends to determine the prevalence of occurrence of accident and injury, PPE usage, and identify the relationship between occurrence of work place hazards and the use of PPE among cleaners in a tertiary hospital in Nigeria.

METHODS

This was a cross sectional survey conducted at the Federal Medical Centre, Owo. Owo is an ancient city located in Owo Local Government Area of Ondo state in south western Nigeria with an estimated population of 400,000 people. Agriculture (including fishing) constitutes the main occupation of the people. The main tribe in Owo are the Yorubas. Other tribes living in Owo are Igbos and Ebiras. It is located at the intersection of roads from Akure, Kabba and Benin City.

Federal Medical Centre (FMC), Owo is a

250 bed hospital with staff strength of about 1,200 out of which doctors and nurses constitute about 500. It is the only tertiary hospital in Ondo State which provides primary, secondary and tertiary level of care. It also serves as the referral centre for the people in the catchment areas (entire Ondo state and neighbouring Osun, Ekiti, Edo, and Kogi states). The hospital offers services essentially in all clinical specialties, Laboratory, Radiologic, Social/welfare and Community Health as found in most teaching hospitals in Nigeria. It also offers residency training programmes in Family Medicine, Surgery, Medicine, Obstetrics and Gynaecology as well as Paediatrics.

The cleaners in the hospital do a physically demanding job. Most of them had little or no formal education relevant to their job. Their approach to observing standard precautions including the use of personal protective equipment (PPE) and health and safety education have not been documented. They are disadvantaged concerning exposure to accidents and injuries. These include injury from sharps, contamination of skin and mucus membrane with blood and body fluids, cuts, puncture, bruise, burns, slips and falls.

A cross-sectional study involving consenting cleaners working in the Federal Medical Centre, Owo was done. All the cleaning staff (about 300) were invited to participate in the study. However, 249 staff were available at the time of data collection.

Data was collected using self-administered questionnaire. Questions were asked on work place accident and work related injury. The questionnaire contain socio-demographic characteristics, time respondents used at work, and awareness of each personal protective equipment and use. Data was analyzed using SPSS version 21.0. Descriptive statistics were presented using frequency tables, pie and bar charts; age was summarized as mean and standard deviation. Chi square-test was used to compare the use of Personal Protecting Equipment (PPE) and occurrence of accidents or injury. Level of statistical significance was < 5%.

Ethical consideration: Approval for the study

was obtained from the Federal Medical Centre, Owo Health Research Ethics Committee. Informed consent was obtained from the respondents after being made to understand that participation is voluntary and there is no consequence whatsoever for non-participation or withdrawal at any stage of the study.

RESULTS

Table 1 shows the socio-demographic characteristics of respondents. The mean age was 34 ± 7.2 years. Only 19(7.6%) were male, more than three out of four of the respondents were married while above half of the respondents 142 (57%) had completed secondary education. Ondo state origin were 208(83.5%) of the respondents. Other socio-demographic characteristics are as shown in table 1.

The periodic prevalence of accident at the workplace in the last one month prior to data collection was 25(10%) while the proportion that had injury at work in the last one month before data collection was 10(4%). Ingestion of chemicals occurred in 5(20%), electric shock in 6(31.6%), fire occurred in 6(31.6%), trauma from falling object in 7(28%), trauma from moving object in 7(28%) needle prick in 9(36%) and falls in 18(72%).

Table 2 shows the total time spent at work, time spent standing and sitting. A total of 156(62.7%) of respondents, spent less than 8hours at work, about 112(45%) spent 5 hours standing and 63(25.3%) spent 5hours sitting.

Table 3 shows the awareness and regular use of personal protective equipment. A total of 221(88.8%) respondents were aware of the use of face mask to prevent injury out of which only 82(37.1%) made use of it regularly. Also, safety goggles awareness was reported by 172 (69.1%) but only 12(7.0%) made regular use of it. Concerning the use of gloves, 233(93.6%) were aware but 183(78.5%) made regular use of it. The awareness and the regular use of other personal protective equipment are as shown in table 3.

Table 4 shows the use of PPE and occurrence of accidents or injury. Among the respondents who used safety goggle 5(41.7%) had accident/injury compared to 14(8.8%) who

did not use it, $p=0.002$. A statistically significant proportion of cleaners 6(54.5%) who used overall regularly had accidents/injury compared to 13(7.3%) who did not make use of it regularly, $P<0.001$. Among the respondents who made regular use of safety boots 6(35.3%) had accidents/ injury, compared with 12(7.0%) who did no use it, $P< 0.001$. Considering the respondents who made regular use of face shield 5(55.6%) of them had accident/injury compared with 12(7.5%) of those that did not make use of it. $P<0.001$

DISCUSSION

This descriptive study was designed to examine work place accidents and injuries in relation to use of PPE among cleaners in a tertiary health facility in South West Nigeria. Health workers are constantly exposed to work place injury and accidents and these accidents are hazards, which may be physical, biological, chemical, mechanical or psychosocial in nature. Studies done worldwide have shown that the correct and consistent use of PPE reduces the risk of accidents, not only among hospital cleaners, but also among other healthcare professionals (2, 8).

The mean age of the respondents was 34 ± 7.2 years and females constituted the majority of them, which is similar to studies done in Finland and Spain (1). More than half of respondents are literate, having completed secondary level of education and this serves as an advantage when training on health and safety is conducted. A high literacy level will enhance learning and use of PPE which will culminate in reducing work related injuries and accidents. Considering accidents and injuries at work within a period of one month, where 10% of respondents had accidents and 4% sustained injury, this suggest that accidents and injuries occur in everyday life, whether or not PPE are used.

Burns/scald was the most prominent injury sustained, followed by cuts and lacerations. Burns /scald resulted from harsh chemicals, friction, steam or hot water, while carrying out routine cleaning. Cuts/lacerations were reported among 50% of respondents with injury while falls and needle stick injury were

reported as commonly occurring accidents. These falls could be attributed to wet and damp floor, inappropriate foot wear, improper cleaning, nature of floor and poor vision. Prevalence of needle stick injury in health care settings have been documented widely (14, 20, 21). It had been estimated that 3 million percutaneous exposures occur yearly among 35 million health care workers globally, with 90% occurring in resource constraint countries like Nigeria, Tanzania and South Africa (22).

Most respondents that were aware of the existence of PPE did not utilize it except for the use of hand gloves. The reasons for relatively low regular use of PPE could be due to ignorance, lack of knowledge on proper use, lack of proper education and training on health and safety at work, level of perception of risk of injury and availability of PPE (16). Less accidents occurred among those who used PPE regularly than those cleaners who did not. However, it was not all PPE use that reduced occurrence of accident statistically. A study showed that despite the use of gloves by obstetric surgeon, 11% of glove perforation still occurred (23). In contrast, a Bureau of Labor Statistics, survey of workers who suffered eye injury in United States of America, revealed that nearly three out of five were not wearing eye protection at the time of the accident. Improper use and removal of PPE can have adverse health effects to health care workers as seen during 2003 SARS outbreak in Canada (16).

A statistically significant proportion of respondents who used safety goggle had accident/injury compared to those who did not use it. Among the respondents who used apron regularly, a quarter had accident/ injury compared to three quarter of those who did not use it regularly. Regular use of overall did not protect against the occurrence of injury. Though studies have shown that gloves reduced the incidence of blood and body fluids contamination of hands, it cannot prevent penetrating injuries caused by needles or other sharp instruments (24, 25). However, a study showed that double gloving has been found to be more protective against needle stick injury (26). Strategies such as double gloving is a practice which protects

healthcare workers from patients' blood and body fluids this is evident in a study where in 82% of cases, the outer glove is perforated, the inner glove has been found to protect the users from contamination (27, 28).

This significant finding is in support of other literatures and studies done worldwide which have shown that PPE only create filters and barriers between the user and the hazard. PPE does not protect the worker against sharps injuries, since most PPE are easily perpetrated by sharp objects such as scalpel and needles (15). PPE reduces manual dexterity if the size and fit are inadequate (27, 29). This study adds to the body of existing knowledge that PPE is the last and least effective line of defence used against the transmission of blood borne pathogens and that a hazard cannot be eliminated by PPE but the risk of injury can be reduced, if correctly and consistently used (15, 30).

CONCLUSION

Falls and needle stick injury predominate among the hospital cleaners studied. Efforts should be made to reduce occurrence of falls among these cleaners at environmental, housekeeping and managerial levels. Since literacy level of respondents is above average, continuous training on work place health and safety, correct and consistent use of PPE as well as importance of universal precaution will prevent work place accidents and injuries among these cleaners. Other researcher can direct their efforts towards having a walk through survey during which the worker can be examined while working.

Conflict of interest: The authors declare no conflict of interest.

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Table 1: Socio-demographic characteristics of Hospital cleaners in a tertiary health facility in south west Nigeria

Socio-demographic Characteristics	Frequency	%
Age groups		
20-29	52	20.9
30-39	136	54.6
40	61	24.5
Sex		
Male	19	7.6
Female	230	92.4
Marital status		
Single	42	16.9
Married	187	75.1
Others*	20	8.0
Highest level of education		
Primary Education	55	22.1
Junior Secondary	29	11.6
Senior Secondary	142	57.0
Tertiary	23	9.2
Religion		
Islam	29	11.6
Christianity	220	88.4
State of origin		
Ondo	208	83.5
Others	41	16.5
Tribe		
Yoruba	223	89.6
Others	26	10.4

*Others were widowed and divorced

Table 2: Time Hospital cleaners in a tertiary health facility in south west Nigeria spent at work.

Time	Number of respondents	Percentage (%)
Total time spent at work		
<8hrs	156	62.7
8hrs	93	37.3
Time spent standing		
<5hrs	137	55
5hrs	112	45
Time spent sitting		
<5hrs	186	74.8
5hrs	63	25.3

Table 3: Awareness and regular use of personal protective equipment among hospital cleaning staff in a tertiary health facility in south west Nigeria

Personal Protective Equipment(PPE)	Awareness n (%)	Regular use among those who were aware n (%)
Face mask		
Yes	221(88.8)	82(37.1)
No	28 (11.2)	139(62.9)
Safety goggles		
Yes	172(69.1)	12(7.0)
No	77 (30.90)	160(93.0)
Apron		
Yes	194(77.9)	4(2.1)
No	55(22.1)	190(97.9)
Overall		
Yes	190(76.3)	11(5.8)
No	59(23.7)	179(94.2)
Gloves		
Yes	233(93.6)	183(78.5)
No	16(6.4)	50(21.5)
Safety boot		
Yes	189(75.9)	17(9.0)
No	60(24.1)	172(91.0)
Face shield		
Yes	169(67.9)	9(5.3)
No	80(32.1)	160(94.7)

Table 4: The use of Personal Protective Equipment (PPE) and Occurrence of Accidents or Injury among cleaning staff in a tertiary health facility in south west Nigeria

Regular use of PPE	Occurrence of accidents/Injury		Chi-square	p-value
	Yes	No		
Face mask				
Yes	10(12.2)	72(87.8)	0.240	0.624
No	14(10.1)	125(89.4)		
Safety goggle				
Yes	5(41.7)	7(58.3)	9.187	0.002
No	14(8.8)	146(91.3)		
Apron				
Yes	1(25.0)	3(75.0)	0.034	0.301
No	18(9.5)	172(90.5)		
Gloves				
Yes	17(9.3)	166(90.7)	0.943	0.331
No	7(14.0)	43(86)		
Safety boots				
Yes	6(35.3)	11(64.7)	14.397	<0.001
No	12(7.0)	160(93.0)		
Face Shield				
Yes	5(55.6)	4(54.4)	16.762	<0.001
No	12(7.5)	148(92.5)		
Overall				
Yes	6(54.5)	5(45.5)	25.757	<0.001
No	13(7.3)	166(92.7)		