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The Efficacy of a Waste Management Educational Interventional Program among Cleaners at a Sudanese Pediatric Teaching Hospital

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ABSTRACT

Background: Hospitals are complicated entities that encompass numerous individuals from many cultures, regardless of age, gender, ethnicity, or belief (patients and caregivers). Health care personnel, patients, clients, and others who encounter infectious and hazardous waste, including garbage collectors, rag pickers, cleaners, and the environment, can all experience substantial health implications. In waste management, the amount of information and awareness of health staff is fundamental. The focus of the current study is to find how an intervention program regarding health care waste management impacts the knowledge and practice of cleaners at Mohamed Al-Amin Hamid Pediatric Hospital.

Methods: The study was a hospital-based interventional trial that involved 52 cleaners at Mohamed Al-Amin Hamid Pediatric Hospital. Information was acquired from participants using a standardized questionnaire. A tailored educational program pertaining to efficient medical waste handling was implemented for the cleaners in the group based on needs assessment. After a one-month evaluation, the approach was carried out using the same questionnaire to estimate the impact of the program on cleaners, and the information was then loaded into a statistical package for social sciences (SPSS Statistics 23, IBM®).

Results: The mean point of the entire knowledge and practice issues in the questionnaire was used to compute the knowledge and practice score. The overall scores for knowledge and practice were 21 and 15, respectively. In the pre-test before the interventional educational program, knowledge and practice were reported at (10.4, and 7.1) or (49 %, and 47%), respectively, and in the post-test after the interventional educational program, knowledge and practice were reported at (19, and 14.2) or (90%, and 94%), respectively. The findings indicate that the interventional program significantly increased cleaner knowledge and practice levels by 41% and 47%, respectively, with a p-value of 0.001.

Conclusion: The educational program was efficient, according to the study, and had an influence on cleaners' knowledge and practices, which improved by 41% and 47%, respectively.

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Abbreviations

BMW: Biomedical West

UNDP: United Nations Development Program

HCW: Healthcare Worker

BBPs: Blood Borne Pathogens

PPE: Personal Protective Equipment

SARS: Severe Acute Respiratory Syndrome

NSI: Needle Stick Injury

Introduction

A hospital is a complicated organization that involves a large number of individuals from many cultures, regardless of age, gender, ethnicity, or faith. All of them generate garbage, which is rising in quantity and variety as scientific understanding develops. Patients and personnel handling this waste are putting their health and the environment in jeopardy [1]. Medical waste is specified as any waste generated by health care institutions such as public hospitals, health centers, and clinics that has the ambition to disperse infections [2,3]. Dissatisfying biomaterials Waste management is documented in **18%** to **64%** of health-care facilities worldwide; determinants include a lack of awareness, limited finances, and substandard disposal procedures [4]. Healthcare workers, staff and patients, visitors, and those who deal with infectious and hazardous waste, particularly waste purchasers, garbage collectors, cleaners, and the surroundings, are always at hazard [5]. This can potentially be a source of a variety of infectious ailments [6]. Medical waste management is a novel concern that is accentuated by inadequate training, awareness, and budgetary incentives to facilitate innovative solutions. The management and disposal of this garbage is crucial considering it can have a significant impact on human and environmental health [7]. The generation, storing, management, transport, and disposing of medical waste, which comprises contagious and toxic elements, has prompted public concern. Diverse removal and management solutions to lessen the negative impact of biomedical waste have been invented recently [8]. In waste management, the value of the understanding and attention of health personnel is essential [9]. In **2018**, Ahmed Ali Hassan conducted a cross-sectional research on healthcare waste management in Sudan, stating that inadequacies in waste management in hospitals are primarily due to a limitation of financial means, a dearth of attention and education, and procedural constraints. Uncompelling bio-medical waste management is found in **18** to **64** percent of health care facilities worldwide; predictors include a lack of knowledge, insufficient funds, and ineffective disposal systems [4]. The current trend of deploying disposable items, along with the intensification of health institutions, has resulted in an unparalleled load of health-care-related trash, making unfettered biomedical waste management a substantial hazard to public health and safety [10].

A serious issue is the paucity of meaningful statistics and assessments on medical waste. Notwithstanding the fact that certain statistics set the overall tonnage of medical waste in the Arab world at upwards of **135** thousand tons. Authorities representing **16** Arab countries emphasized avoiding abandoning the establishment of acceptable cemeteries in Arab countries for the management of residential and medical garbage. Sudan is one of the developing countries struggling with the issue of medical waste and how to manage with it. Specifically in the Greater Khartoum Area, where there are numerous hospitals. According to a survey conducted by the state ministry of health in 2004, the entire volume of medical waste is approximately **15** tons daily. According to the report, AIDS, hepatitis B, and TB are the most significant infections induced by a scarcity of precise management for the disposal of waste.

Potentially risky and medicinal wastes have not been adequately tackled in Sudanese health institutions. Blood-borne viruses such as HIV and hepatitis might be spread via contaminated needles and syringes. Medical waste and household garbage are

currently processed and disposed of simultaneously in Sudan. One of the primary contributors to the paucity of practical and acceptable action is a dearth of studies and references highlighting the significant aspects influencing adversely on medical waste management. The study is warranted in order to determine and optimize the management approach as well as promote public awareness about the health concerns pertaining to medical waste management. The project intends to determine the impact of a healthcare waste management intervention program for cleaners at Mohamed Al-Amin Hamid Pediatric Hospital on their knowledge and practice levels. Because of the possible threats to human health and the environment, waste management is regarded as a crucial issue.

Materials and Methods

An interventional hospital-based study was implemented at Mohamed Al-Amin Hamid Pediatric Hospital in Omdurman, Sudan. According to the following formula, a total of 75 participants were included in this study: $n = N/1 + (N)(e)^2$, N = total population of cleaners (**75**) in Mohamed Al-Amin Hamid Pediatric Hospital, E = error estimation (0.05 in this case), $n = 52$. Respondents were recruited employing a basic random classification approach. Information was ascertained using a verification list and a self-administered questionnaire, which included a set of questions concerning socio-demographic characteristics, inquiries regarding knowledge, and questions on personnel practices. A professionally created teaching session concerning efficient medical waste management was used for all cleaners in the sample. Researchers assessed the intervention after one week by completing the same questionnaire to determine the program's impact on cleaners.

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Ethical Consideration: The study was authorized by the University of Medical Sciences and Technology's (UMST) and Mohamed Al-Amin Hamid Pediatric Hospital's ethics committees. The study's focus was described to each participant, and all individuals submitted their informed permission. The study information and statistics were strictly exploited for research objectives. The privacy issues were considered on purpose.

Results

A total of 52 cleaners were included in this study to determine the assessment impact of educational program on waste management among cleaners in Mohamed Al-Amin Hamid Pediatric Hospital, socio-demographic data and questions related to knowledge and practice were collected via questionnaire (pre) and after one month from educational program (post). The respondents in the study varied in age from twenty to more than fifty years old, with the age cluster of forty to fifty comprising approximately half of the volunteers. Males comprised more than 90% of the study subjects, and nearly 80% of the participants labored on a daily basis, varying from eight to twelve hours. When retrieving medical waste, approximately one-third of the study electorate, or 32%, reported being confronted with sharp needles, while more than a quarter of the study sample reported being challenged with sharp objects other than needles table 1. The difference in knowledge and practice between the study sample before and after the implementation of the research educational program was statistically significant, indicating the program's high productivity in enhancing the classification of cleaners' efficiency table 2. In contrast to the study, gender has statistical significance in practice, not knowledge. This is an inconsistency since the percentage of females is about 95%. In considerations of knowledge, on the one hand, and practice, on the other, the level of education within the study population had no statistically significant influence, which is a dilemma table 3.

Table 1: Study participants general characteristics and risk factors

Variables	Character	Frequency n=52	Percent
Age/years	20 - 30	4	7
	31 - 40	8	16
	41 - 50	23	44
	51 and more	17	33
Gender	Male	3	5
	Female	49	95
Educational level	Primary	15	29
	Preparatory	35	68
	Secondary	2	3
Duty/hours	8 - 12	40	76
	More than 12	12	24
Needle sharp injury	Yes	32	61.5
	No	20	38.5
Other sharp injury	Yes	14	26.8
	No	38	73.2

Table 2: Mean of Knowledge and practice scores of study participants

Variables	Mean (Pre)	Percent %	Mean (Post)	Percent	P-value
Knowledge	10.4	49	19.0	90	<0.0001
Practice	7.1	47	14.2	94	<0.0001

Table 3: Mean different between pre-test and post- test of knowledge and practice concerning educational level and gender of study participants

SVariables	Parameters	Characters	Percent	P-value
Knowledge	Educational level	Primary	25.3	0.702
		Preparatory	27.6	
		Secondary	25	
Practice		Primary	15	0.901
		Preparatory	14.8	
		Secondary	17.3	
Knowledge	Gender	Male	22.1	0.401
		Female	25.5	
Practice		Male	8.1	0.040
		Female	13.4	

Discussion

The study, which comprised 52 cleaners, aimed to interpret the impact of an instructional program on trash management among cleaners at the Mohamed Al-Amin Hamid Pediatric Hospital. The majority of participants were female (95% and 5%, respectively), 68% had a preparatory degree, 29% had a primary and 3% had a secondary degree, the majority of duty hours were 8 – 12 hours with 76%, and the majority of participants had previously been injected with needles with 3%.

The mean total of the knowledge and practice scores in the questionnaire was 21 and 15. Consequently, for this study, it was (10.4, and 7.1) or (49% and 47%), respectively, in the pre-test prior to the interventional educational program, as well as (19 and 14.2) or (90% and 94%), respectively, in the post-test after the interventional educational program.

The research revealed that the interventional program accelerated cleaners' knowledge and practice scores by 41% and 47%, correspondingly, with a p-value of 0.001. These conclusions are accepted with in Tehran, who stated a meaningful distinction between pre-test and post-test knowledge and practices scores on waste management with a p-value of 0.00, and also with in Egypt to clarify the potency of education. In this report, the proportions of improvement in knowledge and practice of survey respondents were evaluated by comparing them with their gender and educational levels, and it was found that there were no substantial variations in knowledge and practice with educational levels, denoting that our educational program strengthens scores at any educational level [11, 12]. While we compared gender, we highlighted that female practices improved considerably once contrasted to male practices with p. value = (0.04). This suggests that the educational program has a significant impact on female practice abilities, this seems to be significant, considering females made up only 5% of the study's participants. To demonstrate the strength of the correlation, studies with an estimated number of women must be initiated.

Conclusion

The research concluded that the educational program was efficient in enhancing cleaners' knowledge and practices; the levels of knowledge and practice intensified by 41% and 47%, respectively, which contextualizes impactful interventions to diminish viral hepatitis inconsistencies in such groups.

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Conflicts of interest

The authors certify that they have no irreconcilable obligations. There was no financing or support offered for the study's execution.

Authors Contribution

The authors have contributed equally to the study design and manuscript write-up. All authors read and approved the final version of the manuscript.

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