The Role of Health Education in Promotion of Health Care Waste Management in Khartoum North Teaching Hospital

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Abstract

The study was conducted as a quasi-experimental design in Khartoum North teaching hospital to assess the role of health education in the promotion of health care waste management. A sample size of (103) targeted workers (cleaners) were used in the investigation. Data collected was analyzed using the T-test and chi-square test by computer using SPSS. The results revealed remarkable improvement in the knowledge of the respondents, as regards the hazards of the health care waste (53%-100%) before the intervention, after the intervention, it increased to 100% showing highly significant change. The opinion of the respondents to use the protective clothes ranging from (45% - 100%) before the intervention, rose after the intervention to (70.5% – 100%) showing significant change. The practice of workers about touching contaminated cotton and linen with patient body fluids was 16.7% before the intervention, after the intervention only 7.4% touch the waste showing significant change.

Keywords— *Health Education, Health Care Waste Management, Health workers, Health Promotion.*

Introduction

Health care waste includes all the waste generated by health care facilities, research facilities and laboratories. It includes the waste originating from minor or scattered sources such as that produced in the course of health care under taken in the home (dialysis, insulin injection etc.) [(1)]**.** Hazardous health care waste is classified to: Sharps, non-sharps blood, body parts, chemicals, pharmaceuticals, medicals, devices and radioactive materials [(2)]. WHO stated that, between 75% to 90% of health care waste produced by health-care providers is non-risk or "general" health- care waste, it is comparable for domestic wastes. The remaining 10-25% of health care waste is regarded as hazardous, may be infectious, toxic, or radioactive [(3)]. Health care waste is a reservoir of potential harmful major organisms which can infect hospital patients, visitors, health-care workers and the general public particularly the rage pickers [(4)].

Integrated waste management systems for health care waste are not introduced in most developing countries resulting in mixing of hazardous and nonhazardous waste [(1)], Poor management of health care waste causes serious diseases in health care personnel, waste workers, patients and the general public. The main sources of illness from infectious waste is probably due to needle stick injuries, which can cause hepatitis B and C and an estimated 250000cases of HIV. There are, however numerous other diseases that could be transmitted by contact with infectious health care waste [(5)]. WHO stated that the main reasons for failure of waste management are absence of effective waste management, lack of awareness about the health hazards, insufficient financial and human resources, poor control of waste disposal, and many countries do not have appropriate regulation or do

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not enforce them [4]. These are to some extent the same reasons for the failure of health care waste management in Sudan which it is still treated as municipal waste concerning collection, storage, transportation, treatment and disposal [6].

In many health facilities the health care waste is handled in the same manner as domestic refuse and collected in black bags and this is unsafe and mishandling, collection, storage movement transportation and disposal practices e.g. the waste collected in open container and full until the waste scattered in the ground. Central Storage areas in many health care facilities may provide breeding sites for vectors for many diseases and provision of the food for cats [7]. Comprehensive risk assessment of all activities involved in health care waste management carried out aiming to promote health care waste management, will allow the identification of necessary protection measures, these measures should be designed to prevent exposure within safe limit. Once the assessment is completed health staff should receive suitable training and increasing the awareness is indispensable in this program which could be achieved via information dissemination thus health promotion expected to play leading role in the protection of health staff.

The preset study aimed that to raise the awareness of workers to words health care waste management and potential risks associated with health care waste. To assess the knowledge, attitude and practice of workers about health care waste management. To encourage the usage of protective measures to protect the workers from the hazards of health care waste.

Materials and Methods

Study Area: Khartoum North Teaching hospital was founded 1965 in area of 65000 (Km) ^{2}, and consists of 15 department.

Study design: Quos experimental [interventional. hospital based study

Study population; Cleaners (325) in Khartoum North Teaching Hospital

Sample size: The sample size was determined from Khartoum north teaching hospital cleaners by the formula: N= z2 p qd2 x2/ d2 Sample size = (103 worker)

Sample selection: The individual of the study population in the hospital were selected using the systematic random sample from the total.

Phases of the stud:

Phase One: (Data collection)

Preliminary survey was conducted in order to assess the knowledge, attitude and practice of the cleaners using these methods.

Questionnaire: The questionnaire contains the following variables wastes segregation, packaging, safe handling, storage, color coding and collection of the medical waste. A questionnaire was prepared to assess the knowledge, attitudes and practice of the cleaners towards the health care waste. needle stick –injury, hepatitis infection, immunization, protective cloth, regular examination and the knowledge of the hazards of health care waste.

Interviews: Hospital managers interviewed for their responsibilities toward hospital safety and what is their policy program, planning to improve the hospital hygiene and the workers their training, protective measures, laws, regulations and rules governing the staff.

Reports: Reports are collected on information of health care waste management program in the hospital about reported cases of infectious diseases, regular medical examination, immunization and needle stick injury among the workers.

Observation: personal observation focused on health care waste management and the workers practice before and after the intervention.

Phase two: (intervention)

Training courses: Training courses was held for workers, two days the training courses included:

Lecture 1- Health care waste management. Lecture 2 –Health care waste hazards.

Lecture 3 –Health protection and healthy practice for workers

Audiovisual aids: Audiovisual aids e.g. Video tape and posters used during lectures of training courses

and workshop for workers to reinforcing the lectures and papers, video tap+ was used on from World Health Organization from Al Basher hospital in Jordan.

Phase three: (Evaluation)

Evaluate knowledge, attitude and practice of the health workers through questionnaire and observation, to compare between pre and post questionnaire to assess effect of health education.

Revising records of intervention phases to evaluate health education activities.

Data Analysis

The study used frequency distribution, percentages, figures and tables, chi square test and T test to assess the effective of the intervention phase and comparison between pre and posttest and tested statistically to show the significant change, to test the correlation between two samples. The data was analyzed by computer using SPSS.

Results

One-day workshop which was held in the Khartoum North Teaching hospital came out with recommendations. these recommendations have to be implemented in the hospital. The first step is to designate a responsible person (public health inspector) and committee. The committee first focused on the safe practices and procedures for health care waste segregation, segregation of health care waste into three categories general waste in the black pages and hazardous waste in the yellow labeled pages and sharps in the safety boxes. Second step internal collection and storage, the committee provided a small car for collection and transportation of the health care waste from the wards to the storage area, new storage area was built.

Interviews

Hospital managers interviewed before the intervention, in the hospital there is no system of the health care waste management, the staff were not trained and did not use the protective cloth and no laws about medical waste management. After the intervention there were clear system of management. The law of Sudan 2009 was provided

- Reports

Before the intervention there were no careful records of information of health care waste management concerning, cases of infections, medical examination, immunization and needle stick injury among the workers after the intervention all of them were fully implemented due to the impact of health education**.**

- Observations

Before the intervention no segregation. After the intervention the waste were segregated into three categories general waste in black pages, hazardous waste in red pages and sharps in the safety boxes which were collected from the wards with small car to the storage area. Storage area before the intervention an open area there were uncapping syringes scat red, after the intervention the storage area was constructed away from food storage, preparation of the food, it was easy to clean with smooth finishing, good light and ventilation.

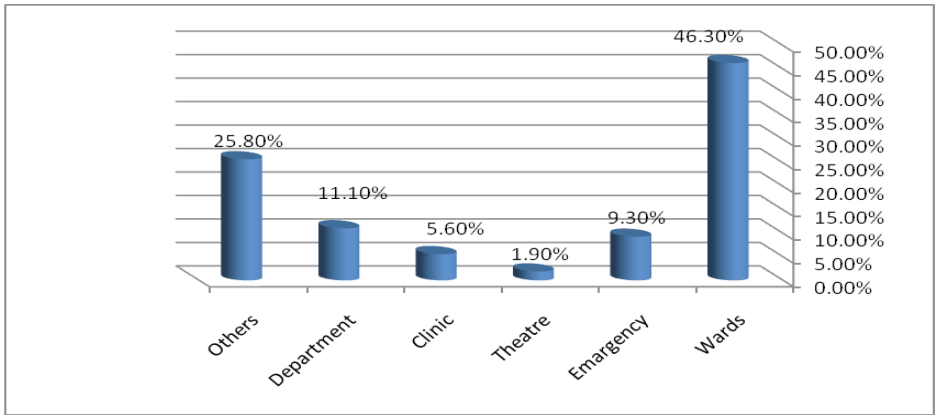

Figure 1 Distribution of workers in the units of the hospital (N = 103).

Figure 1 shows the distribution of workers in the units of the hospital More than third of workers are illiterates (38.9%) and more than half of them are have primary education (57.4%). More than half of the workers are in the wards (55.6%). More than one third (35.2%) of the were provided with special bags before intervention. After intervention all sites (96.3% were provided with special bags. T test =7.968, p-value =0.00 showing highly significant change. Before the intervention (16.7%) of the worker used to touch the contaminated cotton and linen, soiled by the patient's fluids. After the intervention workers minimized the touching of body fluids of the patient. T test =2.837 p. value =0.006 showing highly significant change.

Less than half (48.1%) of the workers were exposed to needle stick injury before the intervention and after the intervention there is no new cases of Injury. About (13%) of the workers were examined before intervention. After the intervention about the half (48.1%) of the worker were examined due to the impact health education test= 2.214 p value =0.031 showing significant change. Only (11.1%) of the workers were immunized before the intervention.

Table (1) Shows the co-relation factor between education level and the knowledge of the workers about hazard of health care wastes. (N= 103), X^2 = 26.491, p- value = 0.000

Level education	Knowledge					
	Yes		No		Total	
	No	%	No	%	No	%
Illiterate	20	37.0	1	1.9	21	38.9
Primary	31	57.4	0	0	31	57.4
Secondary	2	3.77	0	0	2	3.7
Total	53	98.1	1	1.9	54	100

After the intervention, the half (48.1%) of workers were immunized due to the impact of health education. T test=4.595 p. value =0.000 showing highly significant change. Less than half (46.3%) of the workers used protective clothing. After intervention more than three quarters used protective clothing. T test=2.440 p. value =0.018 significant change. One fifth (22.2%) of the workers were trained before the intervention, After the intervention all the workers showed a positive respect and were involved in the training program. T test =2.982 p. value =0.004 showing highly significant change. More than half (53.7%) of the workers know the hazards. After intervention all (98.1%) of the workers have gained increased knowledge about hazards of health care wastes. T test =6.512 p. value =0.000 showing highly significant change.

Table (2) Shows the co-relation factor between education level and the practice of the workers in the means of the collection and transportation of health care waste. (N = 103), X^2= 27.462 p- value = 0.000

Level education	Practice					
	Wheeled trolleys		Plastic		Wheeled trolleys and plastic	
	No	%	No	%	No	%
Illiterate	3	5.6	18	33.3	0	0
Primary	2	3.7	29	53.7	0	0
Secondary	0	0	1	1.9	1	1.9
Total	5	9.3	48	88.9	1	1.9

This means there is co-relation between the level of education of the workers and the knowledge of the workers about hazards showing highly significant test. This means there is co-relation between the level of education of the workers and the practice of the workers in the way of the collection and transportation of health care waste showing significant test.

Table (3) shows the co-relation factor between education level of the workers and the utilization of protective clothing. (N = 103), $X^2 = 1.793$, p- value = 0.408

Level education	Utilization					
	Yes		No		Total	
	No	%	No	%	No	%
illiterate	10	18.5	11	20.4	21	38.9
Primary	15	27.8	16	29.6	31	57.4
Secondary	0	0	2	3.7	2	3.7
Total	25	46.3	29	53.7	54	100

This means there is co-relation between the level of education of the workers and the utilization of protective clothing showing in significant test. Because there are other factors e.g. enabling factor, availability and uncomfortable to wear in a hot climate

Discussion

Educational attainment of the workers, more than third of workers are illiterate 39.9% and more than half 52.4% of them are primary education which increased the difficulties of the training and explaining of the softly practices proper handling and use of protective cloth. Nazir Mirza 1996 stated that the health workers in Nerobi were over worked, poorly educated and lacking in supervision [8]. and also, Shereen Eassa 2007 mention that in Zagazig Egypt the highest risk was observed among unskilled workers back [9]. Mona Gamal Eldin (2000) in Egypt illustrated that the level of awareness among hospital workers especially those involved in waste handling is poor. Due to the high illiteracy rate of hospital workers handling waste and lack of supervision, changing their attitudes requires intensive planning and reorganization [8,10]. Distribution of the workers in the wards, about three quarters 74.1% were employed in the hospital wards. The type of the work of the workers all of them collect waste in the bags Mamdouh H. M. Abdon (2007) mentioned that in Jeddah (Saudi Arabia) Majority of the workers are poor ignorant and work in any job regardless the hazards that may result from such work [11].

About the third 35.2% of the sites are provided with specialized bags before the intervention. After the intervention all of the sites are provided with specialized bags, showing significant change. Nasir Mirza 1996 in Narobi illustrated that disposal of the waste in an expensive exercise. The plastic bag required are costly and sometimes, simply unavailable [8]. Also, Gihan et al. in 2005 in Alexandria stated that segregation in limited amounts of colored bags the remaining are mixed with domestic waste poor segregation due to lack of staff awareness [12]. Also, Isam and Rana. Elkhatib (2006) in Palestinian illustrated that management practices were in adequate, there was in sufficient separation between hazardous and nonhazardous wastes [13].

Practice of touching contaminated cotton and linen with blood and other liquid of the patient and the placenta showing highly significant change which agree with, Khalid Yousif and Yousif Alameen (2018) in Sudan mention that the study population handle health care waste both in Khartoum and Bahri hospital 96%use gloves [14]. Also, Ahmed and Shuwaiter (1995) in United Arab Emirates stated that biomedical waste in the hospital are primarily segregated from nonhazardous waste they are collected either in yellow bags or syringes boxes [15].

The most common form of occupational exposure experienced by health care staff and waste handlers is by pathogens in blood such as hepatitis B and C .and HIV through a needle stick injury. In Khartoum North teaching hospital, about half of workers had been picked with needle injury (48%) and there were some cases of hepatitis (13%)were reported Musa (2014) in the Sudan stated that (58.3) of the study population have been exposed to the needle stick injury during the work in Omdurman hospital [16]. Sadoh et al. mention that sharps injuries have become one of the most important occupational injuries and routes of contagion among health care workers [17]. Also, Henry and Campbell (1995) mention that over 40% of the workers had been picked with needle while handling health care waste [18]. Also, Laymer U.B (1997) in Sweden stated that needle stick injuries constitute the leading cause of job-related injuries in hospitals [19]. Abd El-Salam (2010) mention that health care workers collectors in Cairo university hospitals it was found that HBV and HCV infected about 55% at the end of the monitoring period almost a year, also it was found that the prevalence of infection was directly related to the efficacy of the preventive measures specially vaccination and post exposure prophylaxis [20].

Regular medical examination for the workers before or during employment only 13%of the workers were examined before the intervention. After the intervention the half of the workers were examined due to impact of health education. Henry and Campbell (1995) mention that no medical examination for workers before or during employment [18]. Medical surveillance should be implemented for at risk hospital staff, particularly hospital waste collectors, special attention to be paid for hepatitis B, C viral infections. Only about 11% of the workers immunized before the intervention ,after the intervention the half (48%) of the workers were immunized due to the impact of health education Ezzadin A.A .Frank (2006) in Libya stated that more than three forth (79%) of health care waste workers are not immunized against hepatitis B [21]. Hassan et al. (2018) mention that majority (91.6%) of study population do not receive any vaccination services against hepatitis B [14].

Less than half 46.3% of the workers used protective clothing before the intervention, after the intervention more than three quarters used protective clothing. N Motamed and others (2006) in (Iran) mention that occupational safety and health regulations require both employers and employees to reduce or eliminate occupational risks protective barrier use is a major element of universal precautions. To encourage their use protective barriers must be readily available, easy to use, effective and comfortable [22,23].

After the intervention all the workers were involved in the training program. Musa (2014) mention that 71.7%of the study population do not received any training about health care waste in Omdurman teaching hospital [16]. Hassan et al. (2018) stated that more than half (61.7) of study population do not received any training in handling infectious wastes [14]. And also, mention that only 20% of the study population were trained in Khartoum teaching hospital (6,16) [14].

More than half (53.7) of the workers know the hazards before the intervention, after the intervention all 98% of the workers have gained increased knowledge about hazards of health care wastes showing highly significant change. Graham Ngumi (2006) mention that population of Nairobi Kenya have failed to establish proper facilities for waste disposal and are often unaware of the danger of exposing the community at large to bio hazardous waste [24]. Also, Ezzadin A.A. Franka (2006) in Libya stated that 98.7% of the worker having information about AIDS and viral hepatitis, as health risks of the health care waste [21]. Ali and others recommended that mass awareness campaign needs to be planned designed and implemented to make the people aware of the consequences of infectious waste handling, storage and disposal. Appropriate communication modes need to be used for this awareness campaign [25].

Conclusion

The intervention under taken achieved remarkable improvement in the knowledge, attitude and practice of the health staff as regards of health care waste management. The Study has suggested that the hazards of health care wastes which have greatly negative impact on occupational and public health. Could be reduced by improved management of hazardous health care waste, safety measures immunization, wearing protective cloth, periodic examination, hand hygiene and awareness raising through training of the health staff and health education for patient, co patient, visitors and

general public. And lastly coordination between medical departments and those involved in the management of health care waste and infection control, all of those are essential component in sustaining the operation of health care waste management system.

Recommendations

1) To establish clear applicable policy in hospitals to supervise the health care waste management.

2) Ensuring early and proper segregation and identification of hazardous waste through proper color coding and labeling.

3) Establishment a comprehensive occupational health (safety measures, Medical surveillance, Training policy, and safety practice).

Declaration of Competing Interest

The authors declare that they have no conflicts of interest to disclose. And there is no financial support.

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