



Assessment of Medical Waste Disposal Program in Governmental Hospitals in Khartoum locality , Khartoum State, Sudan- (2020)

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Abstract

Medical waste management is great importance due to its infectious and hazardous nature that can cause undesirable effects on humans and the environment health. The objective of this study aimed to assess of medical waste(MW) disposal program in Governmental Hospitals at Khartoum locality - Khartoum State Sudan- (2020)

A cross-sectional descriptive study was conducted in 19 governmental hospitals. Data were collected using a standardized checklist, interviews with facility managers, and direct observation. Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 22.0. Both descriptive and inferential statistics were applied. The chi-square test was used to assess associations between variables, and a p-value of <0.05 was considered statistically significant.

In regards to the current practices, results revealed that, hospitals have a specific program for collection and transportation (MW) to store room in and the bags and packages filled up to two thirds of the size in (13)hospitals (68.4%) respectively . The segregation of medical wastes according to color coded system is not conducted according to (WHO) standards, waste not remained in its generated site more than one day only in (6) hospitals recorded (31.6%) , bags and packages are labeled in a number at (10) hospitals with percentage (52.6%), replace of new bag or packages instead of transported ones immediately in a number of (14) hospitals (73.7%), the place of store (MW) is separated from the hospital departments and places of storing domestic waste (DW) is found in (12) hospitals revealed (63.2%), the way of storing is adequate only in (2) hospitals , there are weighing device and recording for



generated amount and the general cleanness for the store room was good was (10.5%) in a row . There are no specified panel truck for transportation of (MW) and have a temporary licensing from environmental health department. (100%) of hospitals sends the (MW) to the recommended final dump , liquids waste drained directly to sewer net and the liquid waste drained to sewer net not after disinfection also respectively.

The overall amount of (MW) that sends in each time in the studied hospitals was found to be (215.2 ± 18.7 kg) with frequency of sending (MW) per week (2.7 ± 0.3 times). The most shortcomings and weakness points of medical waste in hospitals were mixing between (DW) and (MW) was (52.6%), no labeling on (MW) bags is (15.8%), the store room not according to specifications was (10.5%) and (MW) workers not using personal protective equipment (PPE) in regularly. Finally These findings indicate significant correlation gaps in compliance with WHO guidelines for medical waste disposal and treatment (P-value = 0.03).

1.Introduction

Despite variations in medical waste management (MWM) practices among hospital , the major problem areas remain similar across healthcare facilities and throughout all stages of waste management the problematic areas are similar for all healthcare units and all stages of management (**Tamplin *et al.*, 2005**). In the process of healthcare it was included many type of wastes (sharps, human tissues or body parts and other infectious materials) (**Awodele *et al.*, 2016**). Interestingly, there are reasonable ranges of technologies available for the treatment of healthcare wastes that may be appropriate for use in the third world countries. The World Health Organization (WHO) estimates that each year there are about 8 to 16 million new cases of Hepatitis B virus (HBV), 2.3–4.7 million cases of Hepatitis C virus (HCV) and 80,000–160,000 cases of Human Immunodeficiency Virus (HIV) due to unsafe injections disposal and mostly due to very poor waste management systems (**WHO, 1999**). Contaminated injection equipment may be scavenged from waste areas and dump site either to be reused or sold to be used again. The negative health and environmental impacts of MW includes transmission of diseases by virus and

microorganism, defacing the aesthetics' of the environment, as well as contamination of underground water tables by untreated MW in landfills (**Chua et al., 2012**). Good medical waste management in hospital depends on a dedicated waste management team, good administration, careful planning, sound organization, underpinning legislation, adequate financing and full participation by trained staff (**WHO, 2005**). However, it is pertinent that before any of these options is adopted, hospitals and medical facilities will need to assess the problems and put forward a management strategy that is suitable to their economic circumstances and also sustainable for use, based on local technology (**Manyele and Tanzania, 2004, Abah and Ohimain, 2016**). Paradoxically, health-care activities which are meant to protect health, cure patients and save lives have been known to also generate waste. About 20 % of these wastes pose high risk, either of infection and chemical or radiation exposure (**IRC, 2011**). Health-care activities generate significant amounts of hazardous waste such as mercury and expired pharmaceuticals, as well as large amounts of general waste. As a matter of fact, the management of health-care waste is an integral part of a national health-care system. A comprehensive approach to health-care waste management should include a clear delineation of responsibilities, occupational health and safety programs, waste minimization and segregation, development, adoption of safe and environmentally sound technologies, and capacity building. Recognizing the urgency of this problem, a growing number of countries have taken initial steps to respond to this need. These include the establishment of regulatory frameworks, development of national plans and the demonstration of innovative approaches. However, funding of health-care waste management remains very inadequate (**WHO, 2007**).

2. Methods

2.1 Study design:

This was cross- sectional study hospitals-based.

2.2 Study area:

Khartoum is the capital city of Sudan locality Khartoum from importance localities in Khartoum state that refer to geographical location and , located at the confluence of the White Nile in the Blue Nile (Al- Muqran), forming the

Nile River together . A governance center in Sudan , Khartoum has a population of (927311).

2.3. Sample :

The sample was a total coverage sampling (19 hospitals Total Coverage) .

2.4Data collection:

The tools were used for collected of data were; chick list, Interview and observation in 2020 .

2.5. Data analysis:

The data was analyzed using SPSS version (22.0.) Descriptive and inferential statistics were used Chi-square test was used to find an association between variable, p-value considered significant at less than (0.05) levels.

3.Results and Dissection

Table (1) shows that the special committee concerning medical waste and held periodic meetings in (14) hospitals of Khartoum Locality was (73.7%). The majority (94.7%) of hospitals has plan or informative guide for workers. All the hospitals (100%) have informative panels hung in a prominent place within the departments. Waste bag holders have a snug lid that opens with feet and matches the color of the bag in (11) hospitals recorded (57.9%). The capacity of the bags is proportional to the amount of (MW) generated in (16) hospitals out of(19) was (84.2%). The (MW) segregated according to color-coded in all departments in (15) was hospitals (78.9%).

Table(1). Medical waste administration and segregation system

Statement	Yes		No	
	No.	%	No.	%
There is a special committee concerning medical waste and held periodic meetings	14	73.7	5	26.3
There is a plan or informative guide for workers	18	94.7	1	5.3
There is Information panels hung in a prominent place within the departments	19	100	0	0.0
Waste bag holders have a snug lid that opens with feet and matches the color of the bag	11	57.9	8	42.1
The capacity of the bags is proportional to the amount of waste generated	16	84.2	3	15.8
The waste segregated according to color-coded in all departments	15	78.9	4	21.1

Bags and plastic packages:

The thickness of the bags is not appropriate in (15) hospitals out of (19) was (78.9%). However, Bags and plastic packages manufactured from non-halogenated plastic only in (8) hospitals was (42.1%). The capacity of the bags is proportional to the amount of waste generated in (16) hospitals was (84.2%). The plastic bags specified for sharp waste (SW) are appropriate and not open able in a number of (11) hospitals is (57.9%). While the bags and packages filled only up to two thirds of the size in (13) hospitals was (68.4%).

The amount of bags and packages are provided by adequate numbers only in (10) hospitals was (52.6%). Only the chemical waste (CHW) are segregated and collected in adequate packages not subjected to interact with it in (7) hospitals was (36.8%). There is primary treatment for high contagious wastes at the site of its generation were done only in (8) hospitals was (42.1%).

The studied hospitals (19) showed lack of Autoclave device is exist, cooling (Temperature not more than -20 C), disinfection by formalin (Concentration not exceed 10% for 24 hours), and recapping of needles as shown in table (2).

Table (2). Bags and plastic bags packages (n=19)

Statement	Yes		No	
	No.	%	No.	%
The thickness of the bags is appropriate	4	21.1	15	78.9
Bags and plastic packages manufactured from non-halogenated plastic	8	42.1	11	57.9
The capacity of the bags is proportional to the amount of waste generated	16	84.2	3	15.8
The plastic bags specified for sharp waste are appropriate and not openable	11	57.9	8	42.1
The bags and packages filled only up to two thirds of the size	13	68.4	6	31.6
The amount of bags and packages are provided by adequate numbers	10	52.6	9	47.4

The chemical waste are segregated and collected in adequate packages not subjected to interact with it	7	36.8	12	63.2
There are primary treatment for high contagious waste at the site of its generation	8	42.1	11	57.9
Autoclave device is exist	0	0.0	19	100.0
Cooling (Temperature not more than -20 C)	0	0.0	19	100.0
Disinfection by formalin (Concentration not exceed 10% for 24 hours)	0	0.0	19	100.0

Collection and transportation of medical waste inside hospital:

Table (3): indicates that there is a specific programme for collection and transportation of waste to store room in (13) hospitals was recorded (68.4%), However, medical waste not remained in its generated site more than one day only in(6) hospitals was (31.6%). Bags and packages are labeled in a number of (10) hospitals was (52.6%). There are replace of new bag or packages instead of transported ones immediately in a number of (14) hospitals was (73.7%).

Table (3): Collection and transportation of medical waste inside hospital (n=19)

Statement	Yes		No	
	No.	%	No.	%
There is a specific programme for collection and transportation of waste to store room	13	68.4	6	31.6
Waste not remained in site more than one day	6	31.6	13	68.4
Bags and packages are labeled	10	52.6	9	47.4
There are replace of new bag or packages instead of transported ones immediately	14	73.7	5	26.3

Table (4) :Trucks and vehicles transportation:

In terms of trucks and vehicles transportation, table (4) showed that, trucks are easy to load and unload in (12) hospitals was (63.2%). The trucks have flattened surfaces in (11) hospitals was (57.9%) and trucks are washed and disinfected daily in only (7) hospitals was (36.8%). There were specific workers for transportation of medical waste in (9) hospitals was (47.4%). (63.2%) of hospitals their roads for store room not pass with food preparation room (63.2%).

Table (4) :Trucks and vehicles transportation (n=19)

Statement	Yes		No	
	No.	%	No.	%
Easy to load and un load	12	63.2	7	36.8
Have flatten surfaces	11	57.9	8	42.1
Washed and disinfected daily	7	36.8	12	63.2
There were specific workers for transportation of medical waste	9	47.4	10	52.6
The road for store room not pass with food preparation room	12	63.2	7	36.8

Table (5) : Store/place of storing medical waste inside hospital:

Table illustrates that the place of store is separated from the hospital departments and places of storing domestic waste is found in (12) hospitals was (63.2%). There are enough cleaning tools and water source and drainage in only (7) hospitals was (36.8%).

Animals and birds are cannot enter the site in a number of (13) hospitals was (86.4%) and the store room fitted with door always closed only in (6) hospitals was (31.6%). Ventilation and lightening are enough and adequate only in (2) hospitals (10.5%) and the storing period not exceed (24 h) in summer and (48 h) in winter are available only in(4) hospitals (21.1%). However, the way of storing is adequate, in addition the bags and medical waste package placed in the ground or inside containers and the store room cleaned and disinfected according to daily programs , when appropriate , weighing device and recording

for generated amount , general cleanness for the store room was good but (8) of hospitals has accepted general only in (2) hospitals was (10.5%) respectively . Most of hospitals their way for store room is easy and secured was (73.7%). The road for store room not passes with food preparation room in (12) hospitals was (63.2%).Cleanness was (42.8%) and in (8) hospitals was not accepted while in (1) hospital it was very bad.

Table (5): Store/place of storing medical waste inside hospital (n=19)

Statement	Yes		No	
	No.	%	No.	%
Place of store is separated from the hospital departments and places of storing domestic waste	12	63.2	7	36.8
There are enough cleaning tools and water source and drainage	7	36.8	12	63.2
Animals and birds cannot enter the site	13	68.4	6	31.6
The store room fitted with door always closed	6	31.6	13	68.4
Ventilation and lightening are enough and adequate	2	10.5	17	89.5
Storing period not exceed 24 hours in summer and 48 hours in winter	4	21.1	15	78.9
The way of storing is adequate	2	10.5	17	89.5
The bags and medical waste package placed in the ground or inside containers	4	21.1	15	78.9
the store room cleaned and disinfected according to daily programme and when appropriate	2	10.5	17	89.5
The way for store room is easy and secured	14	73.7	5	26.3
The road for store room not pass with food preparation room	12	63.2	7	36.8
there are weighing device and recording for generated amount	2	10.5	17	89.5
	Good	Accepted	Not accepted	Very bad
The general cleanness for the store room (By using check List)	2 (10.5%)	8 (42.1%)	8 (42.1%)	1 (5.3%)

Table (6): Transportation out of hospital:

There are no specified panel truck only for transportation of medical waste and have a temporary licensing from environmental health department as shown in table (6).

Table (6): Transportation out of hospital (n=19)

Statement	Yes		No	
	No.	%	No.	%
There are specified panel truck only for transportation of medical waste and have a temporary licensing from environmental health department	0	0.0	19	0.0

Management and final disposal:

Table (7): showed that there was no incineration in the studied hospitals.

Disposal out of hospital:

All hospitals sends the medical waste sanded to the recommended final dump (100%), the liquid waste drained directly to sewer net in all hospitals, and the liquid waste drained to sewer net not after disinfection.

The overall amount of medical waste that sends in each time in the studied hospitals was found to be (215.2 ± 18.7 kg) with frequency of sending medical waste per week (2.7 ± 0.3 times).

Table (7): Disposal out of hospital (n=19)

Statement	Yes		No	
	No.	%	No.	%
The medical waste sanded to the recommended final dump	19	0.0	0	0.0
The liquid waste drained directly to sewer net	19	0.0	0	0.0
The liquid waste drained to sewer net after disinfection	0	0.0	19	0.0
Mean± SE				
The amount of medical waste that send in each time	215.2 ± 18.7			
Frequency of sending medical waste per week	2.7 ± 0.3			

Records:

In table (8) there are specific records for vaccination of health cadres and workers in (12) hospitals was (63.2%), there are specific records for accidents related medical waste only in (8) hospitals was (42.1%) and there are records for medical waste committee meetings was (42.1%).

Table (8) : Records (n=19)

Statement	Yes		No	
	No.	%	No.	%
There are specific records for vaccination of health cadres and workers	12	63.2	7	36.8
There are specific records for accidents related medical waste	8	42.1	11	57.9
There are records for medical waste committee meetings	8	42.1	11	57.9

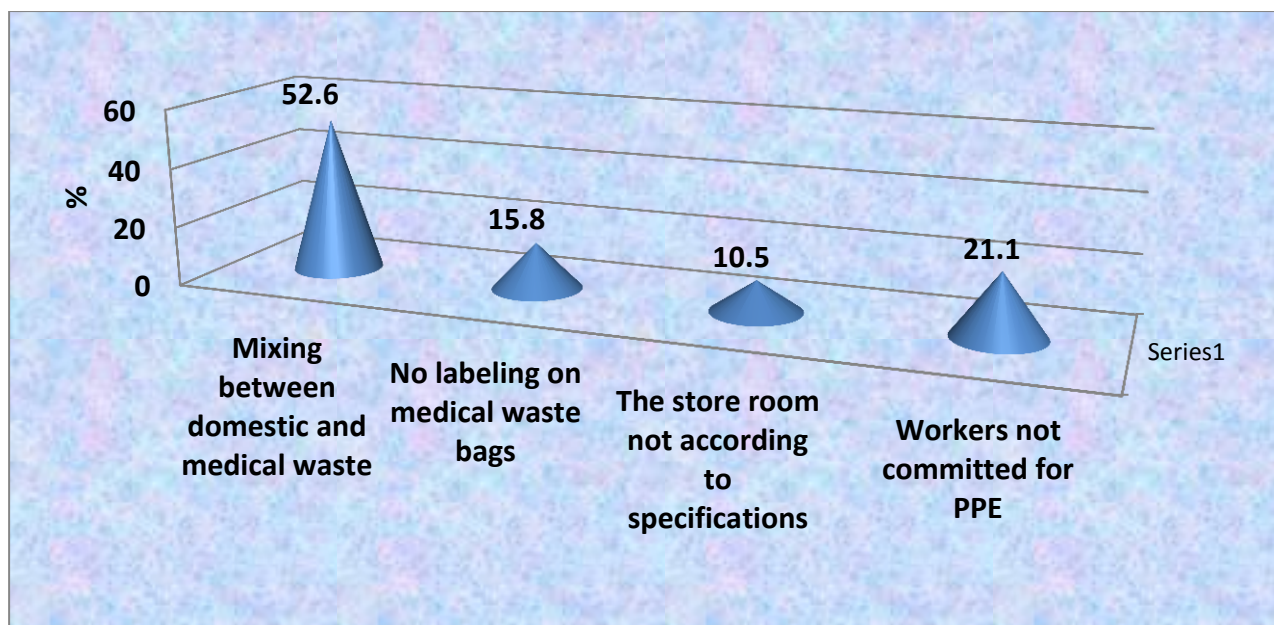


Fig. (1) : Shortcomings and weakness points in medical waste (n=19)

Fig. (1) shows that the most shortcomings and weakness points of medical waste in hospitals were mixing between domestic and medical waste showed (52.6%), no labeling on medical waste bags was (15.8%) and the store room not



according to specifications was (10.5%) and workers not committed for (PPE) was (21.1%).

4. Discussion

According to the evaluation checklist of medical waste in studied hospitals, special committee concerning medical waste and held periodic meetings in (14) hospitals was (73.7%). The finding indicated still there is a gap in a number of (5) hospitals which indicated not proper disposal of (MW). However, the ideal way to make sure health care waste (HCW) is properly managed on the long term, it is important to supervision a regular basis practices of the staff. This should be performed by the health care waste management (HCWM) officer and/or members of (HCWM) committee within each (HC) Facilities (depending on the size of the facility). Typically members of such a committee are usually the same as those in charge of nosocomial infections. Appropriate on-going training and awareness sessions should be organized accordingly to keep practices at the best standards possible (**WHO, 2005**). Encouragingly, the study confirmed that the majority of hospital. The study explained that the majority (94.7%) had had an operational plan or informative guide for workers.

Also the study indicated that (MW) bag holders have a snug lid that opens with feet and matches the color of the bag in (11) hospitals (57.9%). While the capacity of the bags is proportional to the amount of waste generated in (16) hospitals out of (19) was (84.2%). In addition the (MW) segregated according to color-coded in all departments in (15) hospitals was (78.9%). This indicated also still there is a gap in segregation system in 4 hospitals. The finding is not away from the statements that despite the necessity of segregation in Health Care Waste Management (HCWM), some countries either lack proper rules and regulations on HCW segregation or do not impose them; hence the Health Care Waste Management Systems (HCWMS) are insufficient (**Nwachukwu et al., 2013**). An assessment carried out in 22 developing countries in 2002 showed that 18% to 64% of the Health Care Facilities (HCF) did not employ appropriate waste disposal methods (**WHO, 2014**).



Furthermore, the study showed that the thickness of the bags is not appropriate in (15) hospitals out of (19) was (78.9%) for medical waste. However, Bags and plastic packages manufactured from non-halogenated plastic only in (8) hospitals was (42.1%). However, the capacity of the bags is proportional to the amount of waste generated in (16) hospitals was (84.2%). The plastic bags specified for sharp waste are appropriate and not openable in a number of 11 hospitals (57.9%). While the bags and packages filled only up to two thirds of the size in (13) hospitals was (68.4%).Also the amount of bags and packages are provided by adequate numbers only in (10) hospitals was (52.6%). Only the chemical waste are segregated and collected in adequate packages not subjected to interact with it in (7) hospitals was (36.8%). In addition there is primary treatment for high contagious wastes at the site of its generation were done only in (8) hospitals was (42.1%). These findings indicate significant correlation gaps in compliance with WHO guidelines for medical waste disposal and treatment (P- value = 0.03). WHO guidelines emphasize that appropriate containers should be available at all waste generation points, instructions for waste segregation should be clearly displayed, and waste bags should be sealed when three-quarters full using appropriate closure methods rather than staples. Sharps containers should be sealed and placed in labeled yellow infectious waste bags before removal (WHO, 1999).

Moreover, the studied hospitals (19) showed lack of Autoclave device is exist, cooling (Temperature not more than (-20 C), disinfection by formalin (Concentration not exceed (10%) for (24h), while no hospital recapping of needles which considered good practice of medical waste. But lack of autoclave in hospitals may make microorganism still survive in waste and it may disseminated in the environment posing risks. Autoclave with steam, moisture, heat and pressure is used in order to inactivate the micro-organisms, and to sterilize the medical devices and for medical wastes treatment (**Forbes *et al.*, 2007**).The BMW (Management and Handling of Wastes) Rules (2000) recommend autoclaving for disposables, microbiological waste and sharps. Typical operating conditions for an autoclave are a temperature of at least (121°C) at a pressure of (105 K Pa) for a period of at least (60 min). The



second option for the temperature, etc., is that BMW can be sterilized at (132°C) for (30-60 min) (**WHO, 1999**). Anatomical and pathological wastes, low-level radioactive waste, organic solvents, laboratory chemicals, and chemotherapy waste should not be treated in an autoclave (**Al Khatib et al., 2009**). In a recent study also, it has been suggested that alternatives for waste treatment rather than incineration such as a locally made autoclave integrated with a shredder should be evaluated and implemented (**Gautam et al., 2010**). The study showed that indicated that there is a specific programme for collection and transportation of waste to store room in (13) hospitals was (68.4%). However, waste not remained in its generated site more than one day only in 6 hospitals (31.6%). Bags and packages are labeled in a number of (10) hospitals was (52.6%). Also the study showed that there are replace of new bags or packages instead of transported ones immediately in a number of (14) hospitals was (73.7%). Still there were hospitals not have regular program for medical waste collection and transportation, wastes remained more than one day in many hospitals, no replacing of new bags or packages by the old ones and bags and packages are not labeled in a number of (9) hospitals. This considered improper disposal and treatment of medical waste that may pose risks inside hospitals for environment and for workers This may be due to lack of awareness about the health hazards related to health-care waste, inadequate training in proper waste management, absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the topic are the most common problems connected with health-care waste as indicated by the World Health Organization (**WHO, 2018**). Still there were problems in trucks and waste vehicles in many hospitals such as difficulty in loading and unloading, a part of the trucks have no flatten surfaces, washed of trucks, no specific workers for transportation of medical waste in hospitals and hospitals roads for store room pass with food preparation room. This is not according to WHO (**1999**) specification for medical waste vehicles which supposed to fulfill the following criteria; the body of the vehicle should be of a suitable size commensurate with the design of the vehicle, with an internal body height of (2.2 meters.), there should be a bulkhead between the driver's cabin and the vehicle body, which is designed to retain the load if the vehicle is involved in a



collision., there should be a suitable system for securing the load during transport., empty plastic bags, suitable protective clothing, cleaning equipment, tools, and disinfectant, together with special kits for dealing with liquid spills, should be carried in a separate compartment in the vehicle., the internal finish of the vehicle should allow it to be steam-cleaned, and the internal angles should be rounded and the vehicle should be marked with the name and address of the waste carrier., the international hazard sign should be displayed on the vehicle or container, as well as an emergency telephone number.

Also the study illustrated that still there were gaps in many hospitals in terms of the place of store is not separated from the hospital departments and places of storing domestic waste. In addition there are no enough cleaning tools and water source and drainage. Also this is not matched the WHO Guidelines (WHO, 1999) that stated the storage area should have an impermeable, hard-standing floor with good drainage; it should be easy to clean and disinfect and there should be a water supply for cleaning purposes. The other gaps in many of the studied hospitals were animals and birds can enter the site and the store room not fitted with door always closed. Ventilation and lightening are not enough and adequate and the storing period exceed (24h) in summer and (48 h) in winter. However, the way of storing is not adequate. In addition the bags and medical waste package not placed in the ground or inside containers. The store room not cleaned and disinfected according to daily programmes and when appropriate. Hospitals way for store room is not easy and secured. The road for store room passes with food preparation room. There are no weighing device and recording for generated amount. This not according to WHO (1999) which indicated that the storage area should afford easy access for staff in charge of handling the waste., It should be possible to lock the store to prevent access by unauthorized persons., easy access for waste-collection vehicles is essential., there should be protection from the sun., the storage area should be inaccessible for animals, insects, and birds., there should be good lighting and at least passive ventilation., the storage area should not be situated in the proximity of fresh food stores or food preparation areas., a supply of cleaning equipment, protective clothing, and waste bags or containers should be located conveniently close to the storage area. In addition the study showed that the general cleanness



for the store room was not good in 9 hospitals out of 19. This is not acceptable because keeping hospitals clean is a crucial patient safety issue. The importance of the hospital environment in patient care has only recently been recognized widely in infection prevention and control (IPC). Although the available literature is limited, there is now enough evidence to demonstrate that maintaining the hygiene of the hospital environment helps prevent infections. Still, good interventional studies are rare, the quality of products and methods available is heterogeneous, and environmental hygiene personnel is often relatively untrained, unmotivated, under-paid, and under-appreciated by other actors in the hospital. Coupled with understaffed environmental hygiene service departments, this creates lasting issues in regards to patient and healthcare worker safety (**Peters *et al.*, 2018**).

The current study showed that there are no specified truck only for transportation of medical waste and have a temporary licensing from environmental health department. This condition not conformance to Standards of the Medical Waste Practice (**İlce *et al.*, 2009**). In addition the study showed that there was no incineration in the studied hospitals, but the transported medical waste was transported to one incineration in one complex namely Alsaudi hospital. Also the interviewer stated that the management of medical waste was not appropriate where the final dumping is not completely that make easy for pickers. Also no specialized incinerations but there will be one specialized incineration for medical waste it may be received in the coming days.

This supported by the interview of locality manager who stated that all the medical wastes transported to the Saudi Complex where the waste exposed to high heat and then transported to the final disposal for dumping in specific location specified for medical waste dumping. Also all hospitals sending the medical waste to the recommended final dump, the liquid waste drained directly to sewer net in all hospitals, and the liquid waste drained to sewer net not after disinfection. The results indicated gap in drainage of liquid waste directly and not conformance with WHO Guidelines (**1999**). In terms of incineration the justification may be returned to the high cost of initiation of incineration. The situation is not differ from the previous studies that described the HCW



management system in hospitals in various countries (**Gai and Kuroiwa, 2009; Mbongwe *et al.*, 2008; Sawalem *et al.*, 2009; Stankovic *et al.*, 2008; Taghipour and Mosaferi, 2009**).

The present study showed that the overall amount of medical waste that sends in each time in the studied hospitals was found to be (215.2 ± 18.7 kg) with frequency of sending medical waste per week (2.7 ± 0.3 times). This is in corresponded with WHO guidelines (the world Health Organization estimated the total medical waste per person per year is anywhere to be from (0.50 to 3.00 kg/bed/day) in developing and less developed countries the average rate of medical waste in hospital is (0.6 kg/bed/day) (**WHO, 2018**). This study revealed that there are deficiency in of health cadres and workers in approximately one third of the studied hospitals in addition to deficiency in more than half of the hospitals related to records of accidents related medical waste and also similar deficiency in committee meetings. This is not conformity with WHO (**1999**) Guidelines for safe disposal and treatment of medical waste. Finally, where records do exist, the information is generally not present in a publicly accessible form. Paper-based records will be the norm outside of the high income countries and the resources or drive to collate them is simply not present. This is true even in countries with comparatively well-structured systems (**Jordaan, 2015**).

The most shortcomings and weakness points of (MW) in hospitals were mixing between (D) and (M) waste was (52.6%), no labeling on medical waste bags (15.8%), the store room not according to specifications (10.5%) and workers not committed for (PPE). This may be returned to the limited level of education of the majority of medical waste workers. These results are inconsistent with the findings of another study that was done in two hospitals in south west Nigeria . The main weak point appeared in hospitals (A) and (B) was the absence of permanent committee. In addition, there was lack of waste minimization concept in the evaluated hospitals knowing that hospital (E) was planning to use electronic health records in future instead of papers. But the study results were similar to the study done in Nepal (**Sapkota *et al.*, 2014**). The weakness points emerged in the study supported by the interviewer future plans for medical waste which includes; provision of modern incinerators for medical



waste; increased number of closed and cooled trucks; holding of workshops training in medical waste field; conduct of periodic medical check-up for medical waste workers and provision of PPE and commitment of workers to use. in addition to initiation of occupation health administration in administrative Units.

5.Conclusion

Additional focus is needed to enhance the entire process of waste management and thus to avoid the health and environmental hazards associated with these hazardous wastes. In summary the main problems confronting the hospitals with respect to the management of medical waste include, mixing of hazardous wastes with domestic waste of the hospital , poor knowledge of workers to use of colored bags coded and the absence of a committee responsible for monitoring medical waste management practices in many hospitals, and the lack of education and training on medical waste management, availability of (PPE) and used , medical check-up for workers and vaccination against (HBV).

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