

ASSESSMENT OF MEDICAL WASTE DISPOSAL METHODS IN HARGEISA PUBLIC HOSPITAL – SOMALILAND

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Abstract: Medical waste is all waste materials generated at health care facilities, such as hospitals, clinics, physician's offices, dental practices, blood banks, and veterinary hospitals/clinics, as well as medical research facilities and laboratories. Medical waste can be identified by one of four different categories: general, infectious, hazardous and radioactive. This study assessed medical waste disposal methods in Hargeisa public hospital – Somaliland. A cross sectional descriptive study design was conducted to assess of medical waste disposal methods in Hargeisa public hospital – Somaliland. 144 participants were engaged the study. In-depth interview, participant observation and questionnaire were the tools used for data collection. The study findings revealed that workers who deal with the medical wastes are able to identify the nature of medical waste and new medical waste reasons behind sorting medical wastes. The discovery was that the segregation and handling of medical waste are neither active nor effective. An active department responsible for waste available within hospital management could be prioritized to minimize or prevent the threat of preventable physical harm.

Keywords: Medical Waste, Segregation, Disposal.

I. INTRODUCTION

Medical waste refers to all waste materials generated at health care facilities, such as hospitals, clinics, physician's offices, dental practices, blood banks, and veterinary hospitals/clinics, as well as medical research facilities and laboratories (GRP, 2012). In some International reports, Medical waste is a by-product of health-care that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices and radioactive materials (WHO, 2015). Medical waste can be identified by one of four different categories: general, infectious, hazardous and radioactive (Malsparo, 2015). Such wastes could undermine the health living standards of people living or operating in waste dumping places.

Evidence states that about “16,000 million injections are administered worldwide, but not all of the needles and syringes are properly disposed of afterwards ...and about 80% of waste generated by health-care activities, is comparable to domestic waste while 20% is considered hazardous material that may be infectious, toxic or radioactive” (Adumanya et al., , 2013). The risk of medical waste in other parts of the world may be comparable to the African state of medical waste.

For example, Africa is estimated to have “67,740 health facilities and produce approximately 282,447 tons of medical waste every year” whereby hazardous substances “requiring special treatment may be higher than the expected 10 to 25% because of poor waste handling practices” cited in various studies (Gulis., 2015). Not having waste disposal areas could multiply the danger of specific wastes against health lives. In fact both health workers in the host health centers as well as their clients may be at risk of waste infections.

When you walk around Somaliland cities and suburbs, you are welcomed by waste. It appears that littering is part of the culture, as if people have a duty to throw garbage anywhere. Such an environment tells the world that its hospital waste management may be a dream unmet.

A National Health Policy of Somaliland plays an essential role in defining a country's vision, policy directions and strategies for ensuring the health of its population. It responds to the growing calls for strengthening of health systems and the renewal of Primary Health Care: universal coverage, people-centered care, emphasis on public health and health in all policies; it also serves to guide and steer the entire, pluralist health sector rather than being command-and-control plans for the public sector; it also go beyond the boundaries of health systems, addressing the social determinants of health and the interaction between the health sector and other sectors in society.

In the other hand a national health policy is a key in the management of every hospital work. All activities carried out by medical personnel could be achieved with policy directions.

Somaliland has a national health policy in place. It focuses on “increased utilization of quality health services especially by people in the underserved area, by improved access to quality and responsive health services, strengthened governance and management in health sector, improved institutional mechanisms for community participation and systems for accountability; and strengthened financial management systems” (MoH, 2011).

With the worrying state of health in Somaliland, It should be guaranteed that medical substances are handled with seriousness to avoid any possible harm. This policy addresses all of key health issues such as occupational Health including chemical management and control on indicated in section 2.2.6.9 of this policy. It also addresses of disease control measures but ignores the most pressing subject of medical waste management that is dangerously harmful not only to the environment but the general human health in case of any contact. This is gap that my dissertation is trying to address. This thesis calls upon the Ministry of Health to rethink the policy to incorporate a section on medical waste management and control. This could minimize several health risks a head.

In some previous research, it was suggested that “planning and implementation of waste management can reduce and environmental risks” (Msuya and Nyaruhucha, 2000 cited in Kuchibanda and Mbayo, 2015). This is however not the case in Hargeisa Group Government Hospital of Somaliland. Due to absence of policy regulating medical waste, medical workers and cleaners throw some of the wastes around the hospital premises while most of them are transported to the Municipal council garbage/waste dumping areas in Hargeisa city without any segregation at all. Such health care wastes have been potentially harmful to medical workers, cleaners themselves and the general public. So many children have been infected with micro-organisms exposed through used and sharp equipment exposed in the municipal waste dumping areas. There are currently no waste management and disposal systems put in place yet, by the hospital management or government of Somaliland. The health threats are so high that there is urgent need for mitigating infections and diseases resulting from such medical waste substances. The purpose of this study was to assess medical waste disposal methods in Hargeisa public hospital. Its specific objectives included; analyzing the knowledge and practices of waste workers in Hargeisa Public hospital; ascertaining waste segregation, collection, storage, and handling in Hargeisa Public hospital and determining the best practices for waste disposal management in public hospital of Hargeisa.

2. METHODS AND TECHNIQUES

2.1 Research Area:

The study was carried out in Hargeisa Public Hospital which is located in Hargeisa city of Somaliland. This city total population of 1,200,000, across 5 districts, with an average household of 4.5 members (WPR, 2018). Hargeisa borders Berbera in the East, Gabiley in the West, Hawd in the South and Djibouti in the North. The weather of Hargeisa is normally 25°C to 30°C. The city is home to Hargeisa International Airport, with flights to Addis Ababa, Djibouti, Dubai and many other cities across Africa and Somalia. Numbers of health facilities in Hargeisa are 3 governmental hospitals, 10 private hospitals, 13 health centers, and one mental hospital. For the interest of this study, the assessment was based on just one government Hospital.

2.2 Research Design:

A cross sectional descriptive study design was conducted to assess of medical waste disposal methods in Hargeisa public hospital – Somaliland. The data from the single case study that has a bigger government hand could represent all other health centers. Absence of regulation on medical waste together with a culture of littering anywhere, could also mean that waste disposal pauses existential threat to many people’s health even in private health centers.

2.3 Target Population:

The target population of the study was hospital managements, hospital workers such as nurses, pharmacists, lab technicians and waste workers. Inclusion criteria were all waste workers and other workers available during data collection period and can give consent and. The exclusion criteria were workers whether they are waste handlers or not who were not attending at the shift and those who were not gave consent.

2.4 Sample Size:

The sample of this study was consisted of 169 participants of Hargeisa Public Hospital, decided according to (Krejcie and Morgan, 1970). These authors recommends a sample of 169 for a population of 300 at 95% level of confidence and 5% margin of error. The table was used because it is commonly used to determine sample size for finite populations. In this study, 169 was the matching figure (sample size) for the 300 target population of Hargeisa Public Hospital. However during data collection at Hargeisa Public Hospital, only 144 participants were accessible due to the busiest schedules of health workers there.

2.5 In-depth Interview:

In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation (Boyce, 2016). Pharmacists and nurses were interviewed with a view to obtaining an estimation of the number of sharp/needle items used every day. Interviews were explained to the participant on the purpose of the interview to study participants within the broader context of the research study. The mode of interaction with the study participants was face-to-face and involve one interviewer and one participant at a time.

Before engaging any participant in a conversation, I obtained informed consent from the respondent in accordance with procedures specified for the study. For this study in-depth interview, informed consent was oral in which each interview took a period of an hour. I was able to get detailed information about a person's thoughts regarding handling of segregated waste and explore new issues in depth. The participants were hospital staff members including waste workers to find out their perspective on medical waste disposal methods.

2.6 Participant Observation:

Marshall and Rossman (1989) define observation as "the systematic description of events, behaviors, and artifacts in the social setting chosen for study." During the interviews some of which were arranged in the hospital compound, I saw a lot of syringes thrown in verandas and under trees. Some respondent told me, "you have to be careful, there is a lot of sharp substances in this place." At that point I connected the absence of policy regulations in the hospital management of medical wastes.

2.7 Questionnaire:

According to Saul McLeod, a "questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondent" (2018). Questionnaire was administered to the hospital administrators, nurses, doctors and sanitation staff/cleaners to capture their independent views on medical waste disposal. Information regarding quantities and waste types generated and profile of waste handlers as well as how medical wastes are disposed was shared.

2.8 Focus Group Discussions:

The knowledge and practice of waste handlers was also assessed through and group discussion that was convenience select for this purpose. Additional information from some respondents and heads of units and wards. I continually learned that group members expressed dissatisfaction over health threats surrounding the mixture of medical wastes in and outside the hospital.

2.9 Data Analysis:

Quantitative data was entered in SPSS (IBM v20); cleaned by running frequencies of all the variables to check for incorrectly coded data. Incorrectly coded data was double checked with the raw data in the questionnaire and corrected. Statistical methods were used to analyses the data collected such as descriptive statistics, for example numerical summations, graphs and tables. The analysis software performed using the data are Statistical Package for Social Sciences (SPSS) and Microsoft Excel (v2013) statistical software packages. Then, qualitative stories and observations were used to make sense of the statistical data.

3. PRESENTATION OF RESULTS

3.1 Demographic Information:

Table 1: Background information of the waste workers

VARIABLE	FREQUENCY	PERCENTAGE (%)
GENDER		
Male	17	24.3
Female	53	75.7
AGE		
15 – 24 yrs.	9	12.9
25 – 34 years.	25	35.7
35 – 45 years	32	45.7
Above 50 years.	3	4.3
MARITAL STATUS		
Single	27	38.6
Married	41	58.6
Divorced	1	1.4
Widowed	1	1.4
LEVEL OF EDUCATION		
Non Educated	34	48.6
Can read and write	2	2.9
Primary Level	21	30.0
Secondary level	6	8.6
Post-secondary level	7	10.0
WORKING PERIOD AT HOSPITAL (years)		
Less than 1 year	4	5.7
2 – 3 Years	36	51.4
4 Years	24	34.3
Above 5 Years	6	8.6

Source: Primary

According to above table 70 waste workers were full responded the questionnaires and have the following background information.

Socio demographic information of the waste workers were varied, of their sex 75 % (N=53) were females and 24.3% (N=17) were males. In their marital status 58.6 (N=41) were married and 38.6% (N=27) were single while the others were divorced and widowed each of them were 1%. Their age 45.7% (N=32) were between 35 up to 45 years while 35.7% (N=25) were between 25 up to 35 years and 12.9% (N=9) were between the age of 15 – 24 years, there is some ages that were above 50 years which was 4.3% (N=3).

Participants have also different education backgrounds which have direct influence on how they are dealing with the medical waste. Of their education level 48.6% (N=34) were non educated workers. This will lead at risk on segregation or identifying the nature of medical waste. 30% (N=21) of them were primary level and 8.6 (N=6) were secondary level while 2.9% (2) can read and write. The level of education of the waste workers is very important and helping them to identify the nature of the waste, it also helps them to read the signs and hazard terms on different sections at the hospital.

Working period and the experience of the waste worker is also another vital issue. Participants have variety of working period; here is the number of years on each category. Most of workers (51.4%) (N=36) have been working the hospital 2 – 3 years. There are some workers who have been working the hospital 4 years 34.3% (N=24) and 8.6% (N=6) of them have been working more than five years while 5.7% (N=4) have been working less than a year.



Figure 1: Gender of waste worker

The above figure states that 75 % (N=53) were females and 24.3% (N=17) were males.

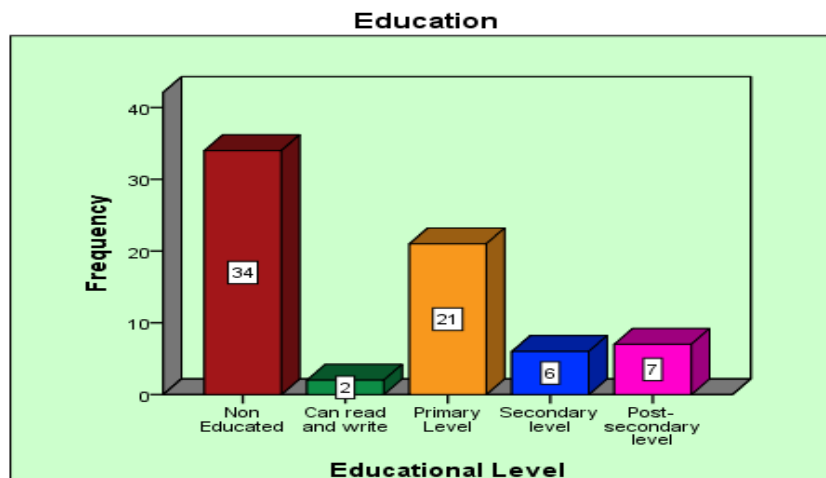


Figure 2: Educational Level of Hospital Waste Workers

This figure describes the education level of hospital waste workers that 48.6% (N=34) were non educated workers. This will lead at risk on segregation or identifying the nature of medical waste. 30% (N=21) of them were primary level and 8.6 (N=6) were secondary level while 2.9% (2) can read and write.

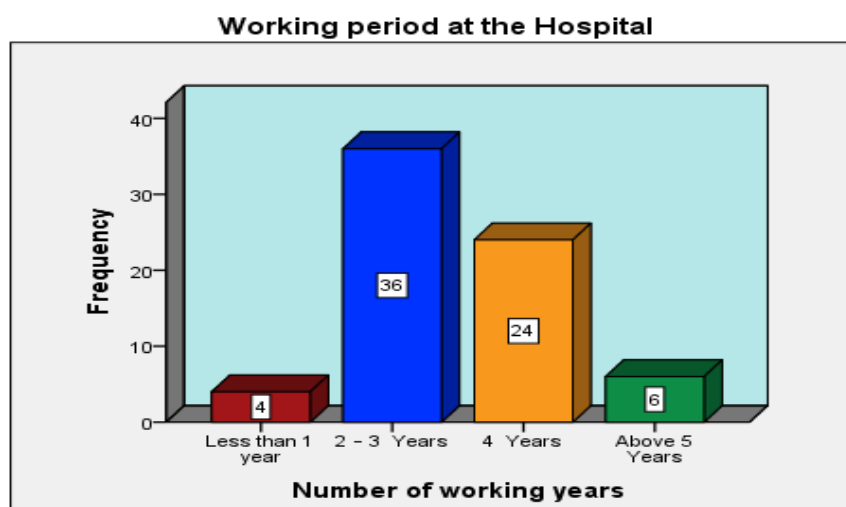


Figure 3: Working period of waste workers at the hospital

This figure describes the period of waste workers working at the hospital and (51.4%) (N=36) have been working the hospital 2 – 3 years. There are some workers who have been working the hospital 4 years 34.3% (N=24) and 8.6% (N=6) of them have been working more than five years while 5.7% (N=4) have been working less than a year.

Table 2: Waste-workers' knowledge about dealing with medical waste

VARIABLE	FREQUENCY	PERCENTAGE (%)
Able to identify nature of medical waste		
Yes	70	100
No	0	0
Identifies need to sort medical waste during collection		
Yes	56	80.0
No	14	20.0
Knows reasons behind sorting medical wastes		
Yes	57	81.4
No	13	18.6
Knows adequate quantities for packing medical waste		
Yes	34	48.6
No	36	51.4
Aware of risks in dealing with medical wastes		
Yes	34	48.6
No	36	51.4
Knows adequate disposal procedures of liquid waste		
Yes	35	50.0
No	35	50.0
Knows adequate disposal procedures of expired blood units and by-products waste		
Yes	36	51.4
No	34	48.6
Knows adequate disposal procedures of human tissue remains		
Yes	44	62.9
No	26	37.1
Knows adequate disposal procedures of expired medicines		
Yes	49	70.0
No	21	30.0
Believes throwing blood waste in domestic waste is an adequate disposal procedure		
Yes	31	44.3
No	39	55.7
Believes throwing of human tissue remains in domestic waste is an adequate disposal procedure		
Yes	1	1.4
No	69	98.6
Believes throwing expired medicines		
Yes	49	70.0
No	21	30.0

Source: Primary

The above table presents categories of waste-workers' knowledge and there is a variation on their knowledge about dealing with medical waste and their views were considered important for this study. Seventy participants were fully responded the questionnaire and obtained as follows.

All participants are able to identify the nature of medical waste 100% (N=70) and 80% (N=56) of waste workers have good knowledge on identification need to sort medical waste during collection while 20% (N=14) are have not able to identify need to sort medical waste during collection.

Most of the workers (81.4%) N=57) dealing with the medical waste knows reasons behind sorting medical wastes while 18.6% (N=13) didn't know well on the reasons behind sorting medical wastes. This is really nice attitude knowing the reason behind sorting medical waste. It helps and facilitates to prevent any risk that result from not sorting of the medical wastes.

On the other most of workers (51.4%) (N=36) didn't know exactly the adequate quantities for packing medical waste. This may cause to pack the medical waste extra and may result it risks that may affect patients, those who visit the patients and other workers.

The most important issue is whether the workers are aware of risks in dealing with medical wastes but this study indicated that the majority workers who deal with the medical wastes are not aware of risks in dealing with medical wastes (51.4%) (N=36) while another majority of them are aware of risks in dealing with medical wastes (48.6%) (N=34). It is also very critical issue and important whether the waste worker knows disposal procedures of liquid waste for preventing any possible risk and to protect them. This study obtained that half of the workers knows disposal procedures of liquid waste and another half of the workers didn't know disposal procedures of liquid waste (50%) (N=35) and (50%) (N=35) respectively.

In waste workers knowledge of adequate disposal procedures of expired blood units and by-products waste obtained that the 51.4% (N=36) knows the disposal procedures of expired blood units and by-products and 48.6% (N=34) didn't know the disposal procedures of expired blood units and by-products. Human tissue remains is one of the medical waste generated by the hospitals and knowing how to deal with this is very important to keep safe on both the environment and people. In this 62.9% (N=44) of workers know how to dispose of these human tissue remains while 37.1% (N=26) didn't know how to dispose of these human tissue remains. The knowledge gap in medical waste management is a disaster in itself.

The waste workers were also dealt with the expired medicines and 70% (N=49) knows disposal procedures of expired medicines while 30% (N=21) didn't know disposal procedures of expired medicines. This is related to attitude and practice of the worker on how to deal with these wastes so believing throwing expired medicines is considered important factor in this study. In this 70% (N=49) believes throwing expired medicines and 30% (N=21) didn't believe throwing expired medicines which means expired medicine should have their disposal procedure.

Throwing blood waste in domestic waste and human tissue remains in domestic waste is also important factor in this study. In this 55.7% (N=39) did not believe throwing blood waste in domestic waste is an adequate disposal procedure and 44.3% (N=31) believes throwing blood waste in domestic waste is an adequate disposal procedure on the other hand 98.6% (N=69) didn't believe throwing of human tissue remains in domestic waste is an adequate disposal procedure and only 1.4% (N=1) believes throwing of human tissue remains in domestic waste is an adequate disposal procedure.

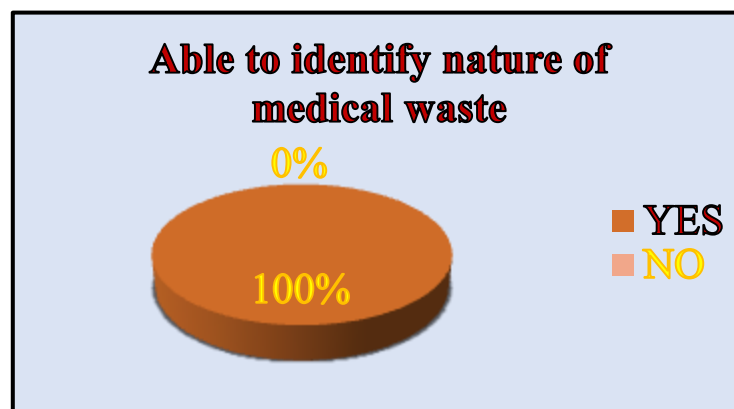


Figure 4: Presentation of waste worker's ability to identify the nature of medical waste

As above chart indicated all participants are able to identify the nature of medical waste 100% (N=70)

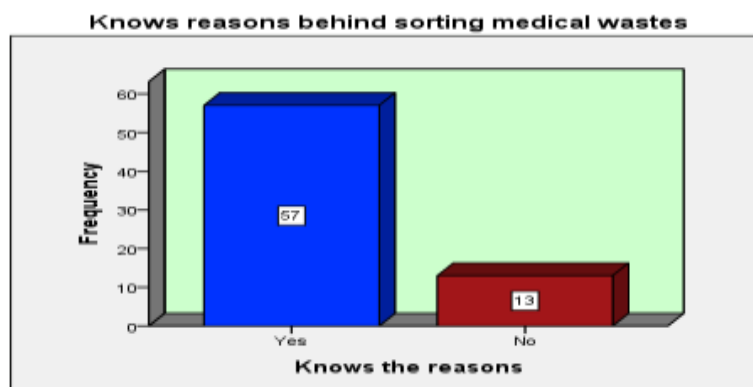


Figure 5: Presentation of Waste Worker's knowledge on reason behind sorting medical wastes

According to the above chart most of the workers (81.4%) N=57) dealing with the medical waste knows reasons behind sorting medical wastes while 18.6% (N=13) didn't know well on the reasons behind sorting medical wastes.

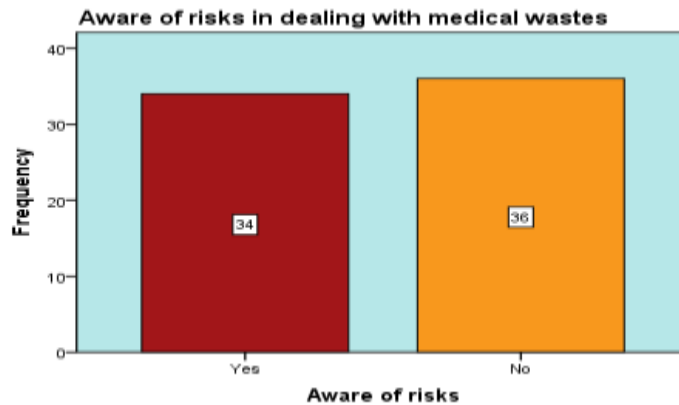


Figure 6: Waste Workers aware the risks in dealing with medical wastes

As above chart indicates that the majority workers who deal with the medical wastes are not aware of risks in dealing with medical wastes (51.4%) (N=36) while another majority of them are aware of risks in dealing with medical wastes (48.6%) (N=34).

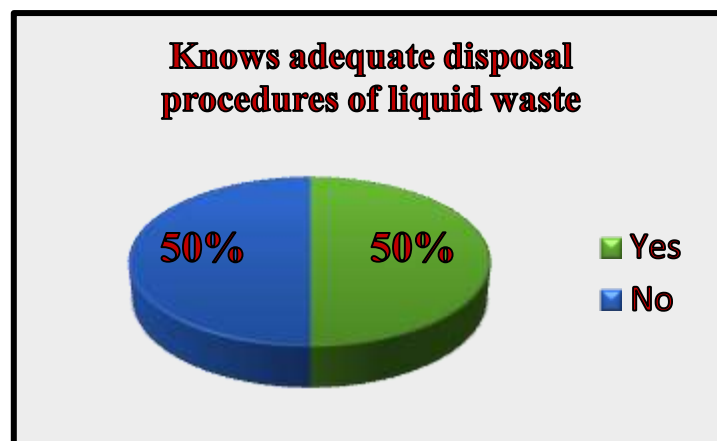


Figure 7: Waste worker's knowledge on disposal of liquid wastes

The above chart indicates that half of the workers know disposal procedures of liquid waste and another half of the workers didn't know disposal procedures of liquid waste (50%) (N=35) and (50%) (N=35) respectively.

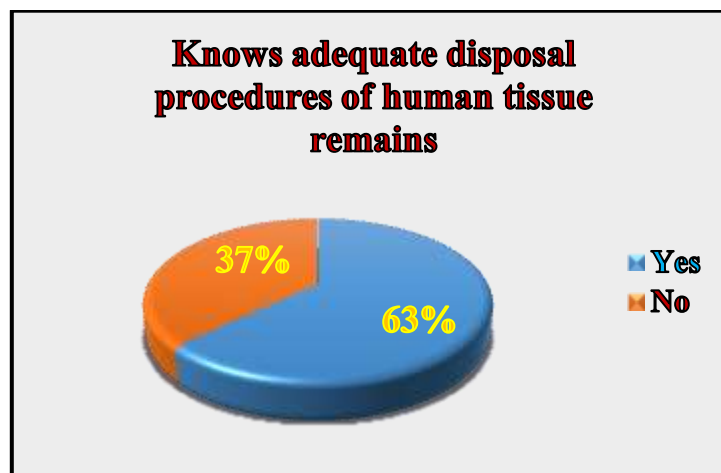


Figure 8: Presentation of waste workers knowledge of disposal procedures of human tissue remains.

The above chart presents 62.9% (N=44) of workers knows how to dispose of these human tissue remains while 37.1% (N=26) didn't know how to dispose of these human tissue remains.

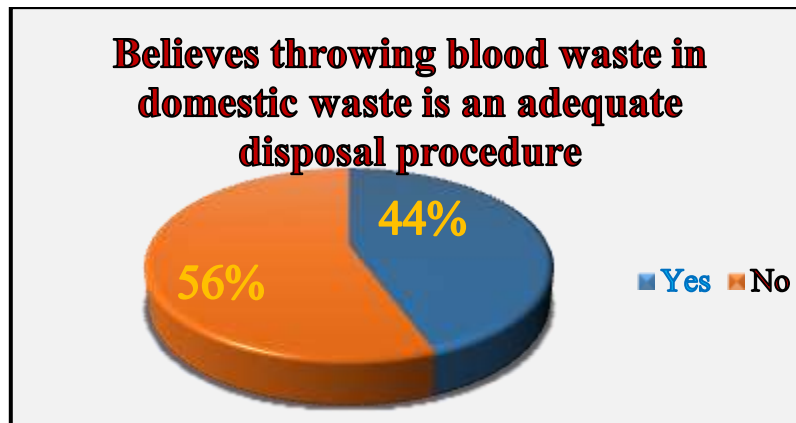


Figure 9: Waste worker's believes on throwing blood waste in domestic waste is an adequate disposal procedure

As above chart presents 55.7% (N=39) did not believe throwing blood waste in domestic waste is an adequate disposal procedure and 44.3% (N=31) believes throwing blood waste in domestic waste is an adequate disposal procedure.

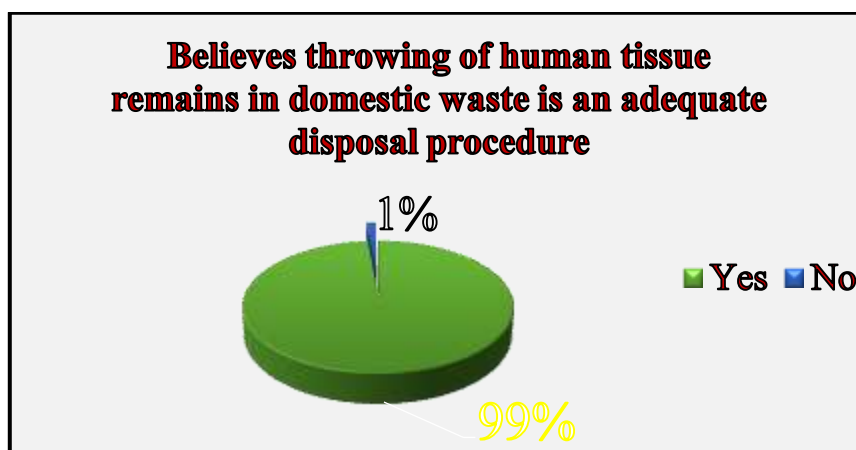


Figure 10: Waste Worker's believes on throwing human tissue remains in domestic waste

As above chart presents 98.6% (N=69) didn't believe throwing of human tissue remains in domestic waste is an adequate disposal procedure and only 1.4% (N=1) believes throwing of human tissue remains in domestic waste is an adequate disposal procedure.

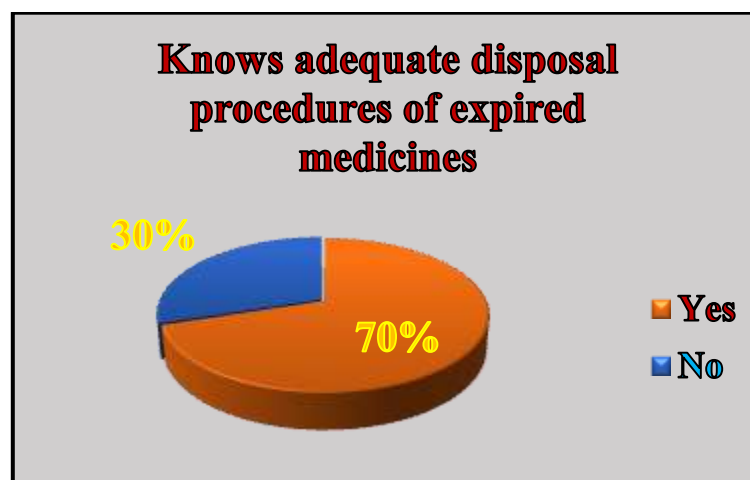


Figure 11: waste worker's knows on adequate disposal procedure of expired medicines

This figure presents that the 70% (N=49) of workers knows disposal procedures of expired medicines while 30% (N=21) didn't know disposal procedures of expired medicines.

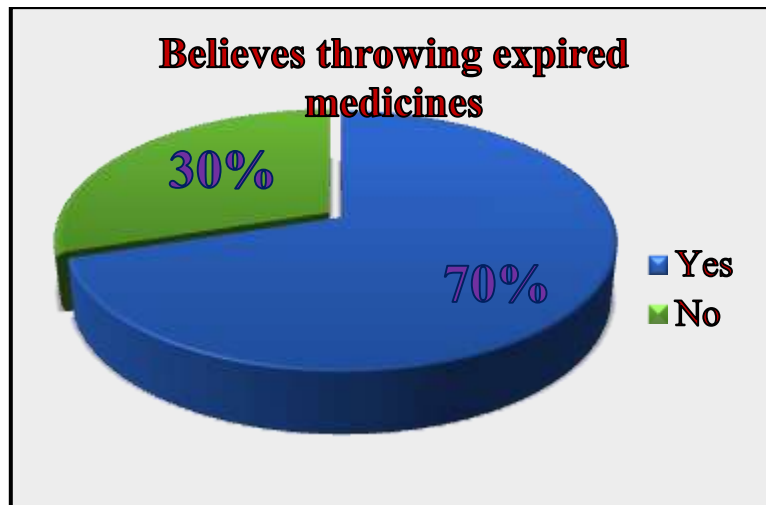


Figure 12: Waste worker's believes on throwing expired medicines

In the above chart 70% (N=49) believes throwing expired medicines and 30% (N=21) didn't believe throwing expired medicines which means expired medicine should have their disposal procedure.

TABLE 3: Background information of the hospital staffs

VARIABLE	FREQUENCY	PERCENTAGE (%)
GENDER		
Male	34	45.9
Female	40	54.1
AGE		
15 – 24 yrs.	32	43.2
25 – 34 yrs.	27	36.5
35 – 45 yrs.	15	20.3
MARITAL STATUS		
Single	41	55.4
Married	24	32.4
Divorced	8	10.8
Widowed	1	1.4
LEVEL OF EDUCATION		
Certificate	5	6.8
Diploma	48	64.9
Degree	13	17.6
Post-graduate	8	10.8
WORKING PERIOD AT HOSPITAL (years)		
Less than 1 year	16	21.6
2 – 3 Years	50	67.6
4 Years	8	10.8

Source: Primary

Hospital staff have different background information and considered as important in this study. Hospital staff's working period and experiences that he/she has along with their qualification and educational level or background is one of the most important things as health care professional.

In educational level of hospital staffs; 64% (N=48) of participants were diploma holder and 17.6% (N=13) were bachelor holder and 10.8% (N=8) were post-graduate level while 6.8% (N=5) were certificate.

In working period at the hospital most of staff (67.6) (N=50) have been working in the hospital 2 up to three years and 21.6% (N=16) have been working less than a year while 10.8% (N=8) have been working for 4 years.

Both educational level and working period at the hospital are related on how deal medical waste like collection, handling, segregation and disposal. When the staffs have enough experience and knowledge they deal with a good manner.

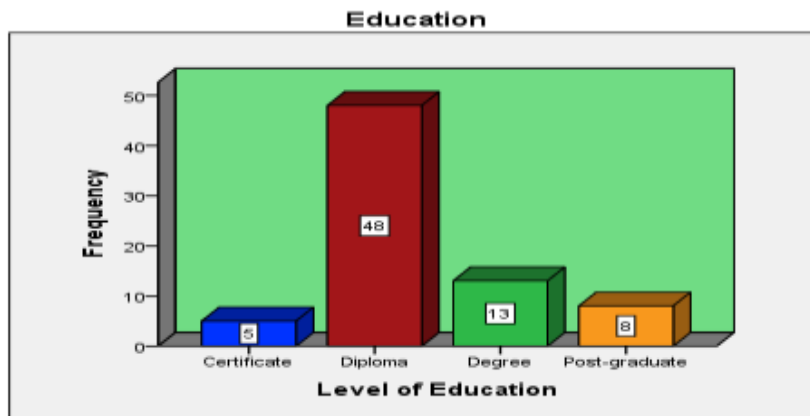


Figure 13: Level of education of participants of Hospital Staff

This chart presents the educational level of hospital staffs; 64% (N=48) of participants were diploma holder and 17.6% (N=13) were bachelor holder and 10.8% (N=8) were post-graduate level while 6.8% (N=5) were certificate.

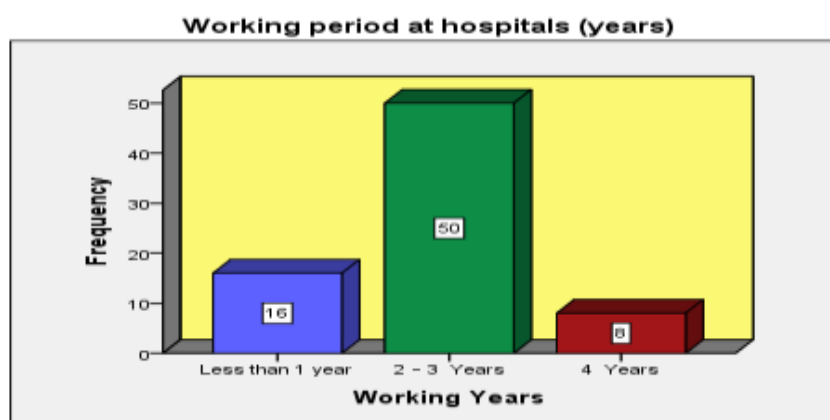


Figure 14: Participants of Hospital staff working period at the hospital

Participants (67.6) (N=50) have been working in the hospital 2 up to three years and 21.6% (N=16) have been working less than a year while 10.8% (N=8) have been working for 4 years.

Table 4: Knowledge and Practices of Hospital Staffs

VARIABLE	FREQUENCY	PERCENTAGE (%)
Knows importance of availability of specialized waste-workers		
Yes	74	100
No	0	0
Provide personal protection tools for workers		
Yes	68	91.9
No	6	8.1
Monitor usage of personal protection tools		
Yes	8	10.8

No	66	89.2
Train workers in dealing with medical waste		
Yes	23	31.1
No	51	68.9
Medical waste user manual available		
Yes	27	36.5
No	47	63.5
Raise workers awareness about knowing and dealing with medical waste		
Yes	21	28.4
No	53	71.6
Workers supervised during waste collection		
Yes	23	31.1
No	51	68.9
Medical waste budget available		
Yes	49	66.2
No	25	33.8
Adequate waste allocation within hospital cleaning budget		
Yes	17	23.0
No	57	77.0
Department responsible for waste available within hospital management		
Yes	5	6.8
No	69	93.2
Adequate number of workers collecting waste		
Yes	74	100.0
No	0	0
Collect waste 3 or more times per day		
Yes	12	16.2
No	62	83.8

Source: Primary

Knowledge and practices of hospital staffs is another important in this study. How hospital staff deal with medical waste and how frequency they practice as well as their knowledge will make alert on all hospital personals. These categories have different views on medical waste as staff.

The above table shows whether staff knows the importance of availability of specialized waste-workers. All hospital staffs know and agreed that it is important is available of specialized waste-workers (100%) (N=74).

Personal protection tools and monitoring their usage are considered important in this study especially when handling wastes. In this case 91.9% (68) provided personal protection tools for workers. On the other hand 89.2% (N=66) were responded not monitored the usage of personal protection tools.

Training on how to deal with medical wastes is another important factor in this study. In training, 68.9% (N=51) were responded workers didn't get trainings in dealing with medical waste and 31.1% (N=23) responded workers get trainings in dealing with medical wastes.

Manuals and guidelines, supervision of workers during waste collection along with the raising workers awareness about knowing and dealing with medical waste facilitates disposal and following up the procedures on each medical waste and this study 63.5% (N=47) responded that there is no medical waste user manual available and 36.5% (N=27) responded that it is available waste user manual guide. On the other hand 71.6% (N=53) were responded there is no awareness on raise workers knowing and dealing with medical waste and 28.4% (N=21) responded that there is awareness on raise workers knowing and dealing with medical waste. Also 68.9% (N=51) were responded there is no supervision of workers during waste collection and 31.1% (N=23) responded that there is supervision of workers during waste collection.

Department responsible for waste available within hospital management, availability of medical waste budget, adequacy of waste allocation cleaning budget within the hospital, number of workers collecting waste and frequency of waste collection are considered important in this study.

The responses towards above factors are as follows; 93.2% (N=69) responded there is no department responsible for waste available within hospital management and 6.8% (N=5) responded there is department responsible for waste available within hospital management. The availability of medical waste budget were available as 66.2% (N=49) but the budget is not adequate waste allocation within hospital cleaning as responses indicated (77%) (N=57) and also number of workers collecting wastes are adequate as responses shown (100%) (N=74). On the other hand frequency of waste were collected three or more times per day as the responses indicated (83.8% (N=62).

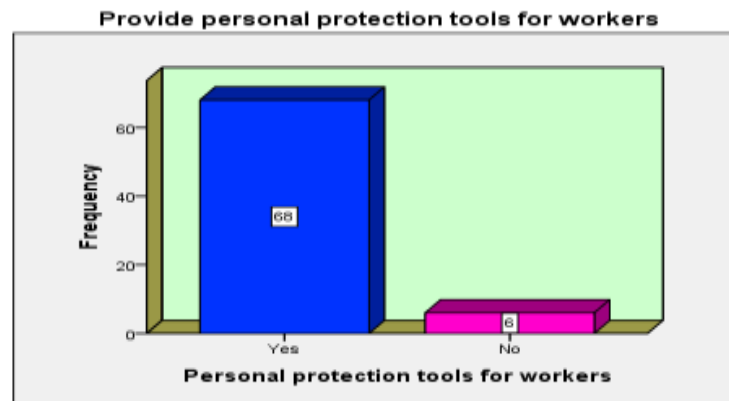


Figure 15: Presentation on providing workers for protection tools

In the above chart shows that 91.9% (68) provided personal protection tools for workers and 8.1% (N=6) responded not provided personal protection tools for workers.

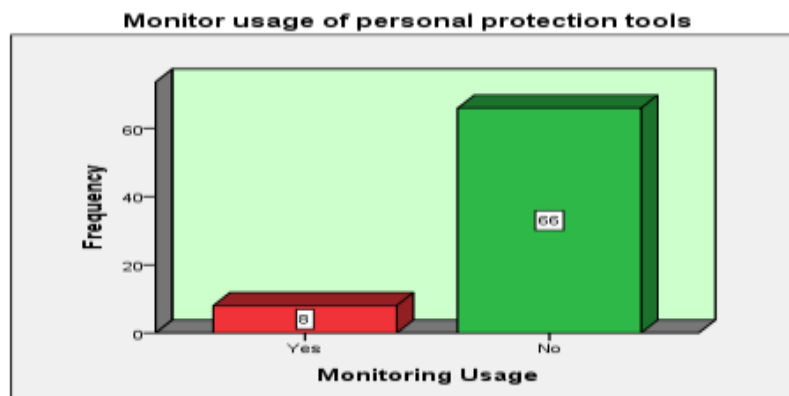


Figure 16: Presentation of monitoring usage of personal protection tools

The above figure shows 89.2% (N=66) were responded not monitored the usage of personal protection tools and 10.8% (N=8) were responded monitored the usage of personal protection tools

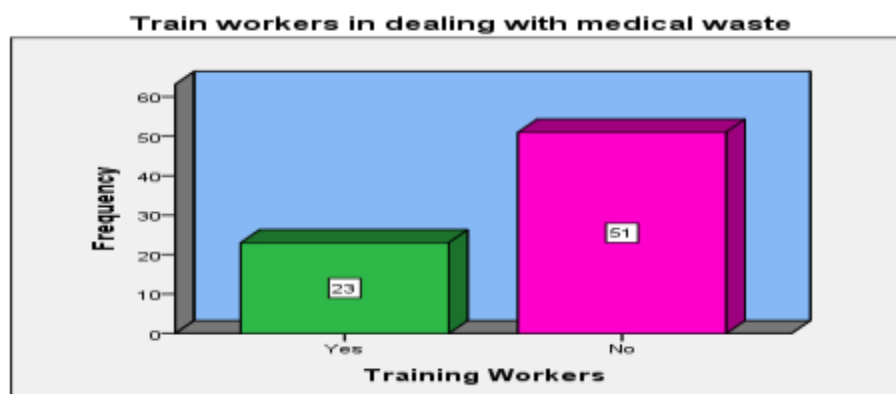


Figure 17: Presentation of workers training in dealing with medical waste

In training, 68.9% (N=51) were responded workers didn't get trainings in dealing with medical waste and 31.1% (N=23) responded workers get trainings in dealing with medical wastes.

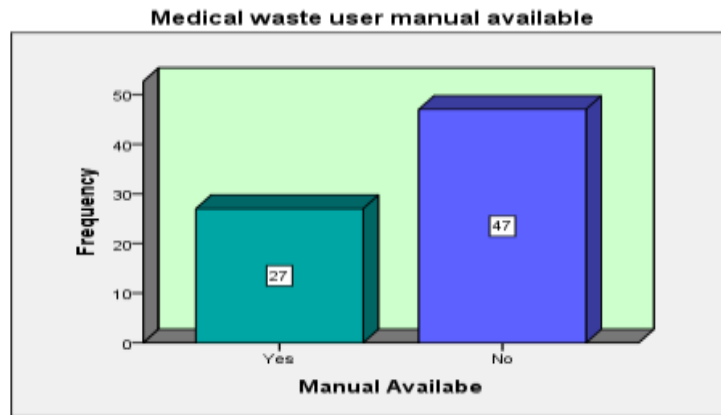


Figure 18: Presentation of availability of medical waste user manual

The above figure shows that 63.5% (N=47) responded that there is no medical waste user manual available and 36.5% (N=27) responded that it is available waste user manual guide.



Figure 19: presentation of availability of department responsible for waste management

As above figure shows 93.2% (N=69) responded there is no department responsible for waste available within hospital management and 6.8% (N=5) responded there is department responsible for waste available within hospital management



Figure 20: Presentation of Collection of waste three or more times per day

The above figure shows that frequency of waste not collected three or more times per day is indicated by (83.8% (N=62)) while 16% agreed that wastes are collected.

Table 5: Waste Segregation, Collection, Storage, and Handling

VARIABLE	FREQUENCY	PERCENTAGE (%)
The type of waste (in any) that is segregated from general waste stream		
Sharps	74	100.0
Pathological waste	0	0
Infectious waste	0	0
Chemical waste	0	0
Pharmaceutical waste	0	0
Segregation area		
In the rooms	49	66.2
Outside the rooms	25	33.8
The type of containers/bags (primary containment vessels) are used to segregate waste		
Cardboard Boxes	31	41.9
Plastic Containers	2	2.7
Metal Containers	41	55.4
Boxes	0	0
Type of labeling, color-coding (if any) is used for marking segregated waste		
Yellow and Red	74	100
Who handles (removes) the segregated waste (designation of the hospital staff member)		
Other staff	15	20.3
Cleaners	59	79.7
Waste handler using any protective clothing (gloves, etc.) during waste handling		
Yes	36	51.4
No	36	48.6
What type of containers is used for collection and internal transport of the waste?		
Bags	72	97.3
Wheelbarrows	2	2.7
Cardboard Boxes	0	0
Trolleys	0	0
Plastic Bins	0	0
Where is the segregated waste stored while awaiting removal from the hospital or disposal		
Bags	8	10.8
Allocated storage boxes	66	89.2
The final disposal of segregated waste?		
Taken to Municipal Landfill	6	8.1
Buried on Hospital Grounds	66	89.2
Open Burned	2	2.7
Incinerated	0	0

Source: Primary

Table 5 above shows the categories of waste segregation, collection, storage, and handling. Different hospital staffs in different sections at the hospital were engaged in this conversation. This was considered important in this study for

identifying the waste segregation method or area, collection method, storage method and area and also who handles all these activities.

Sharps are the only type of medical waste that are segregated from general waste stream as responses shown (100%) (N=74). Most of medical waste segregation takes place inside the rooms/wards 66.2% (N=49) and 33.8% (N=25) responded that waste segregation takes place at the outside of the rooms/wards.

The most common method used to segregate wastes is metal container as indicated the responses (55.4%) (N=41) and the second common type was/is cardboard boxes (41.9%) (N=31). On the other hand yellow and red were/are most the most common color-coding used for marking segregated wastes.

Cleaners or waste workers are those who handles (removes) the segregated wastes (79.7%) (N=59) and also other staffs (*nurses, labs, pharmacists etc*) are hands the segregated wastes (20.3%) (N=15). Most of the waste handlers were used protective clothing (gloves, etc.) during waste handling as responses indicated (51.4%) while most of them not used protective clothing as the responses shown (48.6%) (N=36).

Type of containers is used for collection and internal transport of the waste were bags and Wheelbarrows as indicated by the table (97.3%) (N=72) and (2.7%) (N=2) respectively. After wastes are segregated, the storage area while awaiting removal from the hospital or disposal were allocated storage boxes and bags 89.2% (N=66) and 10.8 (N=8) respectively. The most disposal method of the final segregated wastes is buried on hospital grounds, taken to municipal landfill and open burned as 8.1% (N=6), 89.2% (N=66), and 2.7% (N=2.7) respectively.

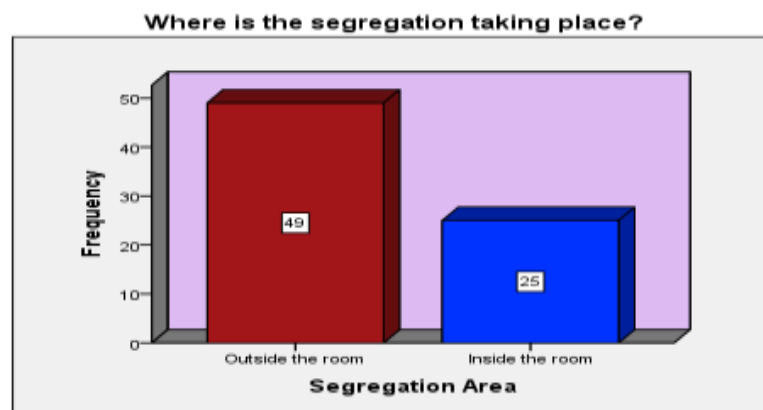


Figure 21: Waste segregation area

Most of medical waste segregation takes place inside the rooms/wards 66.2% (N=49) and 33.8% (N=25) responded that waste segregation takes place at the outside of the rooms/wards.

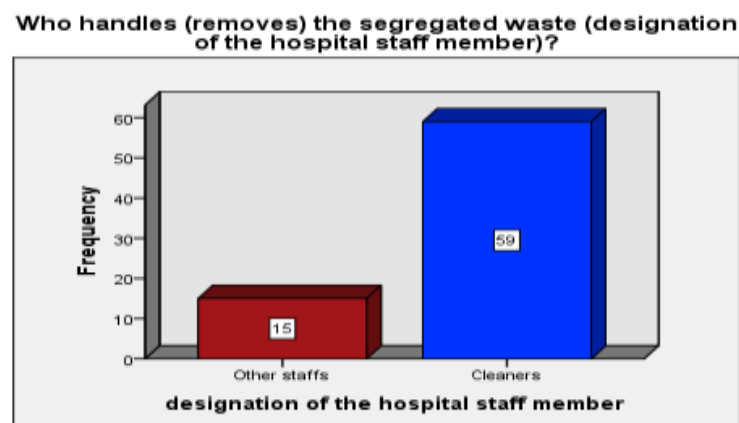


Figure 22: Designation of the hospital staff member who handles the segregated waste

Cleaners or waste workers are those who handles (removes) the segregated wastes (79.7%) (N=59) and also other staffs (*nurses, labs, pharmacists*) are hands the segregated wastes (20.3%) (N=15).

Is the waste handler using any protective clothing during waste handling?

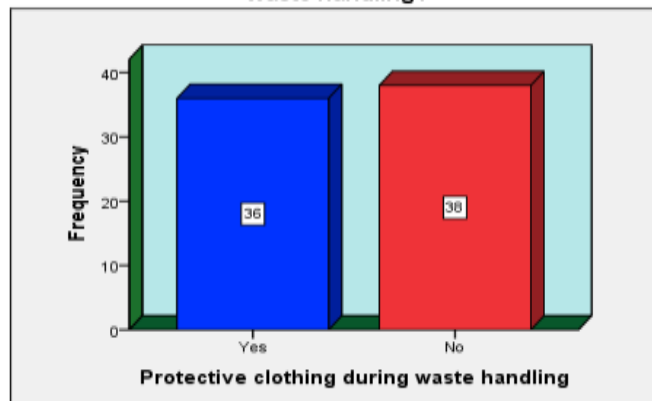


Figure 23: Use of Protective Clothing during waste handling

The above figure shows that the most of the waste handlers were used protective clothing (gloves) during waste handling as responses indicated (51.4%) (N=38) while most of them not used protective clothing as the responses shown (48.6%) (N=36).

What type of containers is used for collection and internal transport of the waste?

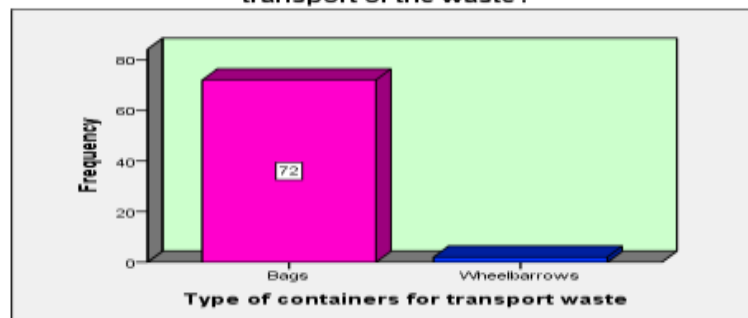


Figure 24: The Type of containers for waste transport

Type of containers is used for collection and internal transport of the waste were bags and Wheelbarrows as indicated by the figure (97.3%) (N=72) and (2.7%) (N=2) respectively.

Describe briefly the final disposal of segregated waste?

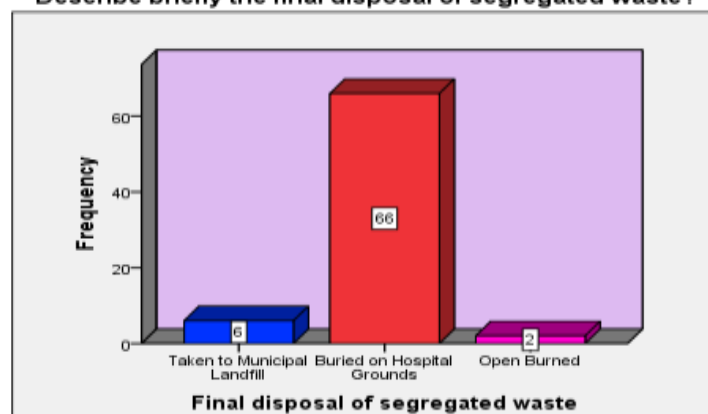


Figure 25: The final disposal of segregated waste

The most disposal method of the final segregated wastes is buried on hospital grounds, taken to municipal landfill and open burned as 8.1% (N=6), 89.2% (N=66), and 2.7% (N=2.7) respectively.

Table 6: Common Waste Disposal Methods

VARIABLE	FREQUENCY	PERCENTAGE (%)
GENERAL/NORMAL WASTE		
Bags	53	71.6
Boxes	11	14.9
Containers	10	13.5
INFECTIOUS WASTE		
Containers	43	58.1
Boxes	9	12.2
Plastic Bins	22	29.7
SHARPS		
Sharp Boxes	70	94.6
Dustbin	3	4.1
Boxes	1	1.4
PATIENTS WASTE/ CULTURE/ SPECIMEN		
Container	18	24.3
Collecting Bags	36	48.6
Dispose in the Toilet	10	13.5
Collecting Boxes	10	13.5
PHARMACEUTICAL WASTE		
Bags	45	60.8
Containers	7	9.5
Boxes	22	29.7
CHEMICAL WASTE		
Bags	19	25.7
Containers	55	74.3

Source: Primary

Table above describes common waste disposal methods or waste management methods. These are all the activities and actions required to manage waste from inception to its final disposal. This includes amongst other things collection, transport, treatment and disposal of waste together with monitoring and regulation. Different medical wastes were listed and asked how they dispose and obtained the above information. As the table presents the general/normal waste disposed by bags, bags and containers on percentage of 71.6% (N=53), 14.9% (N=11), and 13.5% (N=10) respectively. General or normal wastes mostly nonhazardous and contains office activities wastes like papers.

When working with human tissues, blood and other bodily fluids, pathogens, there is likely going to have some infectious waste. This means the waste is (or potentially is) contaminated and can spread diseases, viruses, bacteria, and other things that pose a health risk. The Hospital use as disposal methods of infectious waste containers (58.1) (N=43) and also plastic bins are used as disposal 29.7% (N=22) there is also disposal method of infectious waste which is 12.2% (N=9).

Sharps waste is a subset of infectious *waste* and comprises syringes, needles, lancets, broken glass and any other materials that can pierce the skin. The combination of contamination with pathogens and the ability to break through the skin's protection make them one of the most dangerous *wastes* produced in healthcare. Disposal methods of these are considered important in this study. In this hospital sharps disposed in sharp boxes (94.6%) (N=70), this was the common disposal method in the hospital. The other disposal method was dustbin 4.1% (N3) and boxes 1.4% (N=1).

Patients or specimen wastes are part of infectious wastes which are contaminated and can spread diseases, viruses, bacteria, and other things that pose a health risk. The Patients waste or culture or specimen disposed using collecting bags, container, dispose in the toilet and collecting boxes; 48.6% (N=36), 24.3% (N=18), 13.5% (N=10) and 13.5% (N=10) respectively.

Pharmaceutical waste can result from many activities and locations in a healthcare facility. This category of waste includes expired, unused, and contaminated pharmaceutical products including vaccines and biological products used for therapy. In this hospital, pharmaceutical wastes are disposed using bags, boxes and containers; 60.8% (N=45), 29.7% (N=22) and 9.5% (N=7).

Chemical waste is a waste that is made from harmful chemicals. This type of waste has substantial or potential threats to public health or the environment. Containers and bags are the most common disposal method used in this hospital; 74.3% (N=55) and 25.7% (N=19).

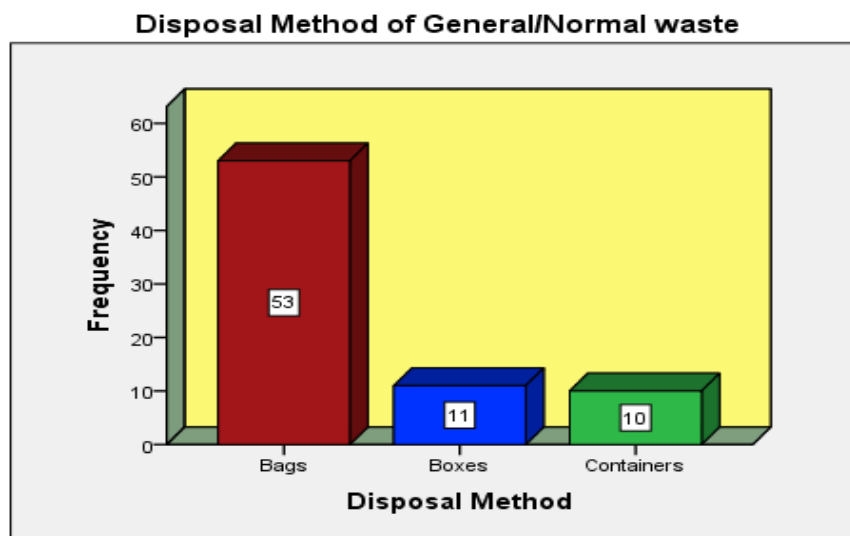


Figure 26: General or Normal waste disposal method

The general/normal waste disposed by bags, bags and containers on percentage of 71.6% (N=53), 14.9% (N=11), and 13.5% (N=10) respectively.

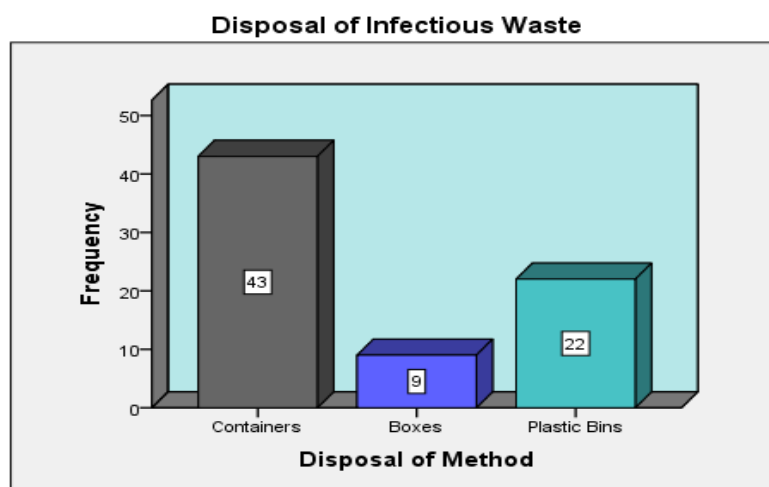


Figure 27: Disposal of Infectious Waste

Disposal methods of infectious wastes are containers (58.1) (N=43) and also plastic bins are used as disposal 29.7% (N=22) there is also disposal method of infectious waste which is 12.2% (N=9).

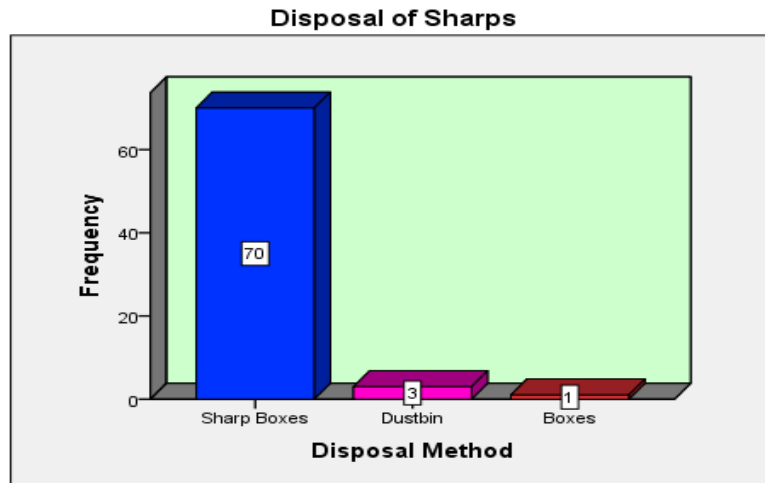


Figure 28: Disposal Methods of Sharps

As above figure shows sharps disposed in sharp boxes (94.6%) (N=70), this was the common disposal method in the hospital. The other disposal method was dustbin 4.1% (N3) and boxes 1.4% (N=1).

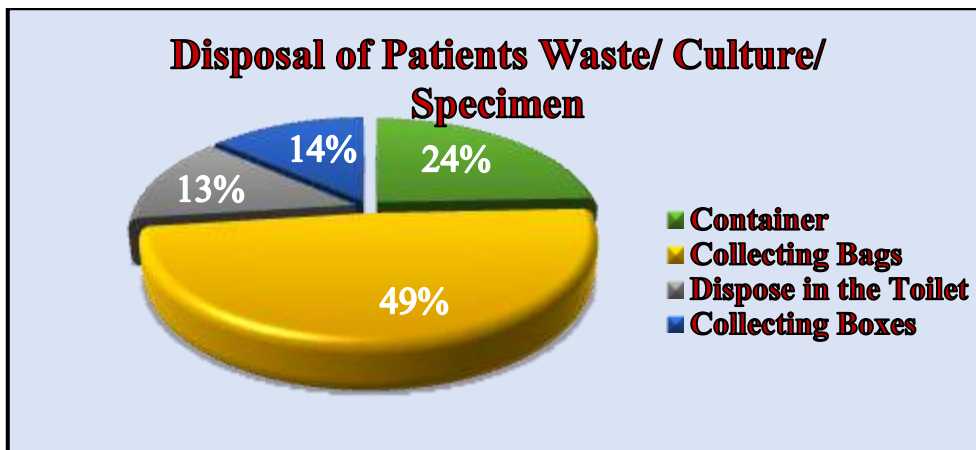


Figure 29: Disposal of Patients wastes

The Patients waste or culture or specimen disposed using collecting bags, container, dispose in the toilet and collecting boxes; 48.6% (N=36), 24.3% (N=18), 13.5% (N=10) and 13.5% (N=10) respectively.

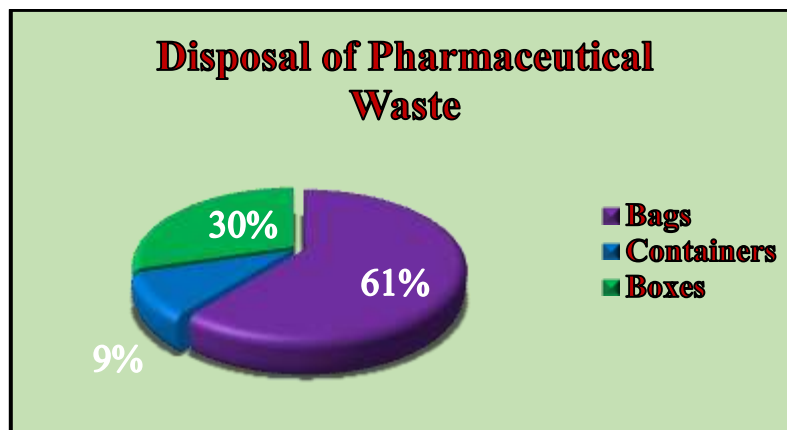


Figure 20: Disposal of Pharmaceutical wastes

The pharmaceutical wastes are disposed using bags, boxes and containers; 60.8% (N=45), 29.7% (N=22) and 9.5% (N=7).

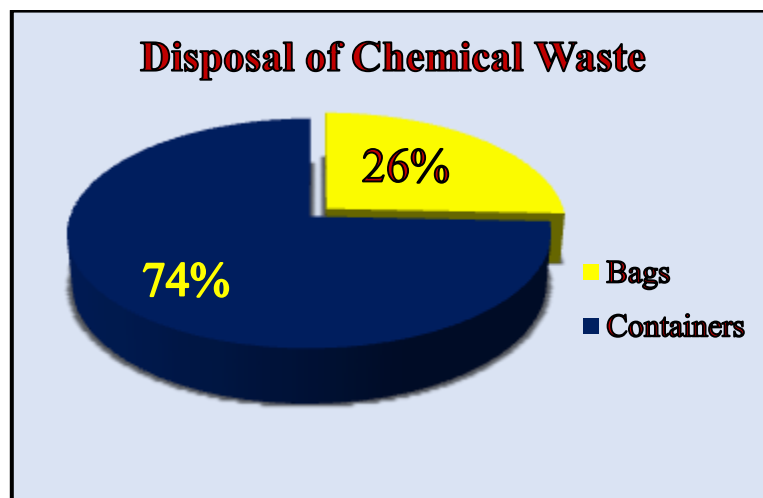


Figure 31: Chemical waste disposal method

The above chart shows that containers and bags are the most common disposal method used in this hospital; 74.3% (N=55) and 25.7 (19).

4. DISCUSSION

The study discovered that waste worker participants are able to identify the nature of medical waste. 100% (N=70) and 80% (N=56) of waste workers had good knowledge of identifying the need to sort medical waste during collection while 20% (N=14) are have not able to identify need to sort medical waste during collection. Most of the workers (81.4% N=57) dealing with the medical waste knows reasons behind sorting medical wastes while 18.6% (N=13) didn't know well on the reasons behind sorting medical wastes. This is really nice attitude knowing the reason behind sorting medical waste. It helps and facilitates to prevent any risk that result from not sorting of the medical wastes. On the other most of workers (51.4%) (N=36) didn't know exactly the adequate quantities for packing medical waste. This may cause to pack the medical waste extra and may result it risks that may threaten patients' health, visitors, outpatients and workers. A similar study conducted in Yemen on assessment of medical waste management in the main hospitals showed that:

“the waste-workers' knowledge about dealing with medical waste 11.5% and 45.9% of workers in government and private hospitals respectively were able to identify the types of medical waste they were collecting. Few of the government hospitals workers (19.5%) and more than half of the private hospitals workers (61.3%) considered it necessary to sort medical waste; and that only 11.5% of the workers in government hospitals and 44.4% of the workers in private hospitals could understand the reasons behind sorting medical waste. Consequently none of the government hospitals' workers and only 25.0% of the private hospitals' workers knew the adequate quantities for packing medical waste” (NC., 2013).

In this case, one can easily tell that global health is at stake. Medical hygiene is not just a problem of Somaliland but lacking in other parts of the world. Collaborative approach to medical waste disposal could minimize possible health disasters.

The study revealed that the most workers live and operate with medical wastes but indicated that the majority workers who deal with the medical wastes are not aware of risks in dealing with medical wastes (51.4%) (N=36). A smaller number of the workers were aware of risks of ignoring medical wastes (48.6%) (N=34) compared to another study conducted in Nigeria on assessment studies on hospital waste management in Imo State stated results which shows that the waste handlers in St. David and General hospital are not aware of the WHO recommendation on hospital waste management; hence it is not implemented while 33.3% of respondents from Federal Medical Centre were aware of the guideline. 100% of respondents from St. David, 60.0% from General Hospital and 53.3% from Federal Medical Centre were aware of health implication of hospital waste. (NC, 2013). What this reveals is that most health workers may be under trained in many areas including medical waste disposal, which could pause a medical disaster.

In addition, Hargeisa Public Hospital does not have a department for waste management as represented by 93.2% (N=69) responses. There is no department responsible for waste available within hospital management as was disclosed by 6.8% (N=5). This is not the only hospital medical waste disposal challenges. A study conducted in Nigeria also showed that (8.3%) private hospitals/clinics do not have sanitation department ... safe waste handling in the hospitals/clinics (78.3%) were mainly in tertiary health (Oruonye, 2012).

5. CONCLUSION

Most workers who deal with the medical wastes are able to identify the nature of medical waste. They know reasons behind sorting medical wastes but could be lazy. The study were also looked at the collection, segregation and handling of medical waste and the findings revealed that there is no effective and active department responsible for waste available within hospital management. Budget for waste management inadequate and thus, impossible to address waste disposal issues within hospital.

In addition to that the type of containers used for collection and internal transport of the waste were bags and wheelbarrows and after wastes are segregated, the storage area while awaiting removal from the hospital or disposal were allocated storage boxes and bags. Such methods still pause the risk to health because they stink in places where they are scattered. Where wastes are segregated and buried in hospital grounds, taken to municipal landfill or open burned, most of the sharp or metallic substances remain harmful to physical health of all people that come or work in the hospital as well as the patients.

6. RECOMMENDATIONS

Medical care is vital for human life and health, but the waste generated from medical activities represents a real problem of living nature and human world. Improper management of waste generated in health care facilities causes a direct health impact on the community. A relatively large amount of potentially infectious and hazardous waste are generated in the health care hospitals and facilities around the world. This requires specific treatment and management prior to its final disposal. For Hargeisa Public Hospital case, I have outlined a number of recommendations that could sort out medical waste disposal challenges.

- The Ministry of Health should orient staff in developing guidelines, providing trainings on how to deal with the medical wastes as recommended by WHO in order to keep safety of the workers, community and patients.
- The Ministry of Health should orient hospitals administrations to keep supervision of workers during waste collection along with the raising workers awareness about knowing and dealing with medical waste disposal facilities while following up on the procedures on each medical waste.
- The Ministry of Health could increase budget for medical waste in order to continue the treatment and management prior till to its final disposal. When the cleaners and medical workers are underpaid, no one cares on disposing off the waste. If government does not have enough funding, they could mobilize community support asking them to contribute a small amount of money to enhance proposal medical waste disposal.
- The Ministry of Health needs to establish a department of waste management at Hargeisa Public Hospital in order to deal with improper management of waste generated in the hospital. This department could be accountable for any medical waste disposal activities and responsibilities.
- If most health workers and cleaners are undertrained, Ministry of Health could consider outsourcing of skilled staff to train them on the job. Acquiring practical knowledge could aid health workers on proper medical waste disposal as well as mitigation of health risks.
- The hospital staffs should keep using protective clothing once dealing with the medical wastes like sharps and dispose directly to their allocated boxes. This could minimize cases of physical harm.

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