

Knowledge, Attitudes and Practices towards Medical Waste Management among Health Workers at Mityana District Hospital, Mityana District. A Cross-sectional Descriptive Survey

Immaculate Namutebi^{a,*}, Zaitune Nanyunja^b

^a Makerere University, Uganda

^b Kyambongo University, Uganda

Abstract

Introduction:

The Ministry of Health (MoH) of Uganda with support from the Government of Uganda highly advocates for proper Hospital waste management, this is because poor medical waste disposal and management pose serious health consequences and significant impact on the health workers, patients, and waste handlers and the environment. However, there is a general paucity of information on the level of knowledge, attitude, and practices of health workers towards medical waste management in Mityana district hospital and Uganda at large.

Objective:

The purpose of the study, therefore, was to ascertain the knowledge, attitude, and practices of health workers towards hospital waste management in Mityana district hospital.

Methods:

A cross-sectional descriptive survey was carried out among 116 health workers at Mityana District hospital. Data were collected using a self-administered questionnaire and were analyzed using SPSS version 21. Statistical significance of association between variables was assessed using the Chi-square test at $p < 0.05$. Ethical clearance was obtained from the Research Ethics Committee of Makerere University.

Results:

All 116 respondents returned the completed questionnaires. sixty-three (54.3%) males and fifty-three (45.7%) females. The mean age of respondents was 36.3 years. 81 (69.8%) had heard of hospital waste management while, 35(30.2%) had never had about it. Out of the total respondents, 83 (71.6%) were aware that medical wastes are classified and segregated into their bags according to colors, although the majority of 74(63.8%) reported storage containers are not cleaned every day. In general, the respondents had average knowledge of medical waste management although 40.5 % lacked some knowledge at all. The majority of 101 (87.1%) use latex gloves when handling waste.

Conclusion:

Most of the respondents knew what healthcare waste management means, but very few practiced appropriate healthcare waste management.

Recommended:

Health education and training are recommended for the health care workers periodically and regularly.

Keywords: Medical Waste Management, Health Workers, Knowledge, Attitude, Practices, Date Submitted: 2022-04-05 Date Accepted: 2022-06-07

1. Background

Health care waste is a special category of waste that needs special precautions while handling. Some types of health care wastes pose a risk to human health as well as contaminate the environment. The scientific Medical Waste Management is of vital importance as its improper management poses risks to health care workers, waste handlers, patients, the community in general, and largely the environment. Globally, health care services inevitably create medical waste that may become hazardous to public health and the environment if not managed well through segregation and disposal (Pandit, Tabish, Qadri, & Mustafa, 2007). According to the World Health Organization, there has been a steady increase in waste generated from health care facilities which if not handled well pose a great danger to the communities around the health facilities and this might lead to a high rate of a disease outbreak that puts a burden to the government it is, therefore, the reason why the researcher will want to assess the knowledge, attitude, and practices among health workers towards medical waste management.

The amount of hospital waste generated in USA hospitals is approximately 6670 tons per day and it is estimated that 20 to 50 million tons of medical waste are generated yearly which indicates a global hazard if not managed well (Perkins, Drisse, Nxele, & Sly, 2014). This was evidenced by a study done by (Windfeld & Brooks, 2015) who found out that the rising concerns over medical waste disposal were stimulated by reports of such waste washing up on the beaches along the east coast from Maine to Florida, the west coast, the Great Lakes, and the Gulf coast. This resulted in several beach closings and a loss in revenues for the tourist industries in those areas.

In Nigeria, there has been a tremendous increase in the volume of healthcare waste generated from the healthcare facilities which has been worsened by the increased number of covid patients (Etim, Academe, Emenike, & Omole,

2021). Despite the huge volume of waste generation, a standardized evaluation framework is currently lacking in the management of medical wastes in Nigerian hospitals and this could be due to a lack of enough knowledge, attitude, and poor practices in medical waste management among health workers.

In Sub-Saharan Africa, hospitals do not quantify medical waste. Segregation of medical waste into infectious waste and non-infectious waste is not conducted according to definite rules and standards (Aseweh *et al.*, 2008). In Tanzania, there is still limited segregation of hazardous medical waste among health workers (Ishijima, Miyamoto, Masaule, & John, 2021). Infectious and non-infectious wastes are both mixed in one bin and the use of different color bins for different medical wastes is not observed among health workers. This could be because of poor attitude and lack of enough knowledge on proper waste segregation this was also evidenced in a study conducted by (Olaniyi, Ogola, & Tshitangano, 2021) in South Africa the challenges identified by healthcare workers include poor understanding of medical waste management guidelines and poor compliance lack of regular training, poor attitudes of medical waste generators, insufficiency of waste management equipment and sub-standard central storage rooms. Most of the challenges were found to be linked to inadequate training of healthcare workers.

In East Africa particularly in Kenya Nairobi city hospitals, the main waste management challenges the hospitals were the mixing of wastes, waste spillage as well as ignorance of waste management procedures by waste handlers (Atieno & Moronge, 2020). Most facilities subcontracted waste disposal to private companies and this gives negligence to health workers as is the case in Ugandan hospitals and Mityana hospital in particular where health workers mix medical waste and dispose of waste on the ground which creates a risk to the health workers and the communities. The purpose of the study, therefore, was to ascertain the knowledge, attitude, and practices of health workers towards hospital waste management in Mityana district hospital.

*Corresponding author.

Email address: immaculate.namutebi20@gmail.com
(Immaculate Namutebi)

2. Methodology

Study design

This study opted and employed a descriptive cross-sectional study design using a quantitative approach because data from the participants was collected at a particular point in time

Study setting

The study was carried out in Mityana District hospital located in Mityana town council, Mityana district central Uganda. The district is located 77km away from Kampala city -Uganda's capital city. The facility serves over 600,000 people with a 100-bed capacity. It is comprised of the current units, Outpatient Department (OPD), casualty unit, female and maternity wards, theatre, mortuary, six-unit staff accommodation, placenta, medical pit, attendant's kitchen, and laundry. Electricity, water, sewerage improvement work, and external works including construction of walkways and compound work among others. It is a public hospital, funded by the ministry of health of Uganda and general care in the hospital is free. Waste disposal and management are not fully applied according to guidelines. Most of the wards do not have enough bins for segregating waste and waste is usually mixed and thrown on the ward floor whereas those who have the bins do not appropriately use them as per standard operating procedure and this causes a risk of infection.

Study population

The study population was health workers working at Mityana District hospital.

Eligibility criteria (Inclusion & Exclusion criteria)

Inclusion criteria

Health workers who work in Mityana District Hospital and, had consented to take part in this study. These included doctors, nurses, laboratory staff, and radiographers who are on direct patient care

Exclusion criteria

Health workers who work in Mityana District hospital but are attending to emergencies and those carrying out operative procedures in theatre by the time of data collection.

Sample size determination

The sample size was determined from a formula established in Sloven 1967. (Tejada & Punzalan, 2012) since the population of health workers was known. The sample comprised health workers at Mityana Hospital

$$n = Z^2 \sigma^2 / (\text{error})^2$$

Is the sample size

σ^2 is the standard deviation = 50% = 0.5

(error)² is maximum error is 5% = 0.05

Is the level of confidence at 95% = 1.96

$$n = (1.96 \times 1.96) \times (0.5 \times 0.5)$$

$$0.05 \times 0.05$$

$$N = 384$$

Since the number of health workers in Mityana District Hospital is known this is 178

Sample size adjusted

$S = \frac{N}{1 + N/Pop}$ Where: S is the sample size

Is the population size = 178 health workers

$$S = \frac{384}{1 + 2.1573}$$

$$= 121.6229$$

The sample size is 122

Sampling Procedure

A simple random technique was used. Different health workers such as doctors, nurses, laboratory personnel, and radiographers on each ward were picked randomly.

Study variables

The independent variables in the study were knowledge, attitudes practices, and demographic factors while the dependent variable is waste management

Knowledge: Is familiarity with something that could include facts or information about medical waste management such as types of medical waste, their disposal, and management (Saunders & Champawat, 1964).

Attitude: this represents an individual's behavior or beliefs about waste management (Di Martino & Zan, 2010). Five items were included to capture Attitudes of HCW on segregation of medical wastes, for example, "are you capable of segregating health care waste.", "segregating medical wastes are useful." This was measured on a 5-point scale with points from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha for this scale was 0.853

Practices: These are acts performed during the process of medical waste disposal and management (Riley & O'Hare, 2000)

Demographic factors: These are factors that are used to define the characteristics of a person or a population (Mamidi et al., 2013). demographic factors include variables such as age, sex, marital status, educational achievement, and cadre ship, among others.

Medical waste management: These are measures carried out to properly manage waste that is produced during patient care.

Measurement of variables

The main variables of interest are knowledge, attitude, and practices among health workers regarding medical waste management. For knowledge, four questions were generated about waste management. Questions on attitude were assessed using a Likert scale and also for practices four questions were generated.

Quality control

A questionnaire was completed and pretested on 10 participants in Magala health center III city council Health Center IV the responses were used to modify the instrument so that it is valid and reliable.

Validity

The questionnaire was pre-tested in a different district which is not part of the study. All questions that are not clear, ambiguous, wrongly responded, etc. were fine-tuned for better clarity and results. The research assistants were selected and trained before any data collection engagements. Content validity was enhanced through a multistage random selection of respondents from the district under study.

Reliability

The data were stratified during analysis to enhance internal consistency for reliability. Also asking more questions in a single dimension to produce reliable results that could enhance internal consistency as per "Rand example of health survey" was used.

Reliability was determined by the "Reliability Coefficient". The reliability coefficient is the proportion of true variability to the total observed (or obtained) variability. The reliability coefficient of 0.85, means 85% of the variability in observed scores is presumed to represent true individual differences and 15% of the variability is due to random error.

Data Collection method and instrument

Data was collected using a self-administered questionnaire because the majority of the health workers are literate and know how to read and write. The tool was closed-ended questions and participants filled the questionnaire and checklists giving their views about the questions asked about their knowledge, attitudes, and practices towards medical waste management.

Data management

Data process plan

During field data collection, the data collection tools were reviewed and necessary edits were done to ensure that appropriate data is adequately collected. After data collection, the tools were coded and then entered into MS Excel. Quantitative data was then migrated to IBM-SPSS Version 24 for further analysis.

3. Data analysis plan

Data were analyzed only univariate. At the univariate level, descriptive tests were run to determine the percentages, and frequencies (proportions) of the different variables such as demographic data, knowledge, attitude, and practices toward medical waste management. Central tendencies were utilized to describe some variables in the demographic data such as age for its mean, median, and mode.

Ethical considerations

Ethical approval was obtained from the Health Tutors' College, Education Department, Makerere University. Participants were asked to voluntarily sign the consent form after having been educated by the investigator. It was communicated that the information obtained from the participants will be kept under lock and key and will only be used for research purposes.

Study limitations

The study was limited by time and the workload or busy schedule of the health workers. The study was also limited to one district and may

not in reality inform the true general situation in Uganda as a whole.

4. Results:

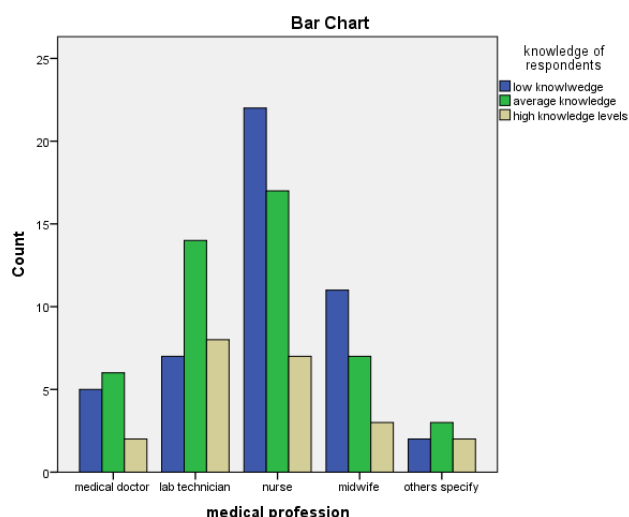
4.1. Response rate

The study targeted 122 respondents and only 116 questionnaires were returned which was approximately 95.1% responses rate.

From table 1 above, 116 respondents were interviewed with a majority of 63 (54.3%) males and 53 (45.7%) females and a mean age of 36.28. Of the respondents 36 (31.0%) were nurses, 22 (19.0%) midwives, 19(16.4%) medical doctors and 33(28.4%) were lab technicians. Regarding education level, the majority 51(44.0%) were certificate holders, 24(20.7%) diplomas and 41(35.3%) had acquired degrees and, many health workers mentioned being single 60(51.7%).

knowledge of healthcare workers towards medical waste management at Mityana District Hospital

In assessing the knowledge of health workers regarding medical waste management, several questions were put forward examining their understanding of waste management and the results are presented in the table below.

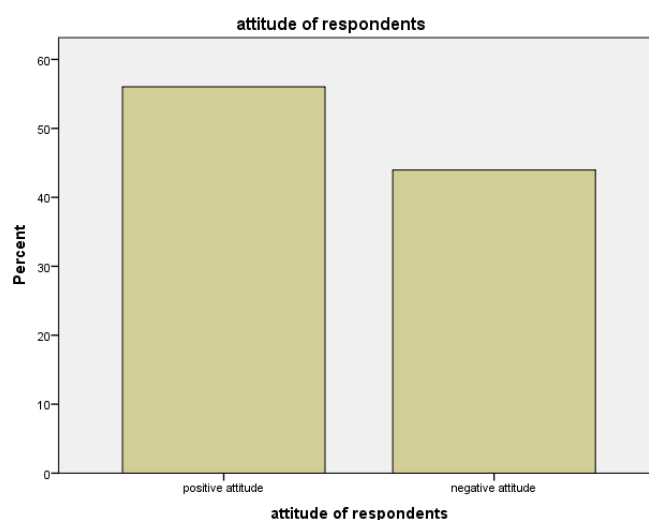


The study further assessed the level of knowledge of health workers in relation to medical profession, the results show that nurses had very low

knowledge levels concerning medical waste segregation and management compared to other professions see table 3 above

5. Attitude of healthcare workers towards medical waste management at Mityana District Hospital.

The results from the study show that majority health workers 65 (56%) had positive attitude towards hospital waste management and only 51 (44.0%) had negative attitude see table 3 below.



The positive attitude among health workers in Mityana district hospital was attributed to the average knowledge of hospital acquired infections which are well known that doesn't only affect patients but also put them at risk of being infected.

Hospital waste management practices by healthcare workers at Mityana District Hospital

From the table below, results show the type of treatment and disposal methods known by the participants which include: burning in pits 78 (67.2%), incineration 20 (17.2%), and recycling 18 (15.5%). Sixty-three (54.8%) of the workers were aware of the use of color-coded containers for waste disposal while 47(40.9%) did not know (Table 6).

One hundred and nine (94.8%) of the participants believed that poor waste management can

Table 1: **Demographic Characteristics**

variable		Frequency (n=116)	percentage
Medical profession	medical doctor	19	16.4 %
	lab technician	33	28.4%
	nurse	36	31.0%
	midwife	22	19.0%
	others specify	6	5.2%
Education level	certificate	51	44.0%
	diploma	24	20.7%
	degree	41	35.3%
Marital status	Single	60	51.7%
	Married	44	37.9%
	Divorced	10	8.6%
	Searching	2	1.7%
sex	Female	53	45.7%
	Male	63	54.3%
Age of the respondent	Mean age	Std. Deviation	
	36.28	10.279	

Table 2: **knowledge of health workers towards medical waste management**

Variable	Frequency (n= 116)	Percentage (%)
Have you heard about waste management		
Yes	81	69.8
No	35	30.2
medical wastes classified and separated into their bags according to colours		
Yes	83	71.6
No	33	28.4
Are the waste storage containers cleaned every day?		
Yes	42	36.2
No	74	63.8

Table 3: hows 81 (69.8%) had heard of hospital waste management while 35(30.2%) had never had about it. Out of the total respondents, 83 (71.6%) were aware that medical wastes are classified and segregated into their bags according to colors, although the majority 74(63.8%) reported storage containers are not cleaned every day. In general, the respondents had average knowledge of medical waste management although 40.5 % lacked some knowledge at all.

knowledge of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
low knowlwedge	47	40.5	40.5	40.5
average knowledge	47	40.5	40.5	81.0
Valid high knowledge levels	22	19.0	19.0	100.0
Total	116	100.0	100.0	

Table 4: Knowledge of respondents towards medical waste management and medical profession

medical profession * knowledge of respondents		Crosstabulation			Total	
		low knowl- wedge	average knowledge	high knowl- edge levels		
medical profession	medical doctor	Count	5	6	2	13
		% of Total	4.3%	5.2%	1.7%	11.2%
	lab technician	Count	7	14	8	29
		% of Total	6.0%	12.1%	6.9%	25.0%
	nurse	Count	22	17	7	46
		% of Total	19.0%	14.7%	6.0%	39.7%
	midwife	Count	11	7	3	21
		% of Total	9.5%	6.0%	2.6%	18.1%
Total	others specify	Count	2	3	2	7
		% of Total	1.7%	2.6%	1.7%	6.0%
		Count	47	47	22	116
		% of Total	40.5%	40.5%	19.0%	100.0%

Table 5: attitude of health workers towards medical waste management and medical profession

medical profession * attitude of respondents		Crosstabulation			Total
		positive attitude	negative attitude		
medical profession	medical doctor	Count	7	6	13
		% of Total	6.0%	5.2%	11.2%
	lab technician	Count	17	12	29
		% of Total	14.7%	10.3%	25.0%
	nurse	Count	24	22	46
		% of Total	20.7%	19.0%	39.7%
	midwife	Count	14	7	21
		% of Total	12.1%	6.0%	18.1%
Total	others specify	Count	3	4	7
		% of Total	2.6%	3.4%	6.0%
		Count	65	51	116
		% of Total	56.0%	44.0%	100.0%

Table 6: Attitude of respondents

Attitude of respondents	Frequency	Percent
positive attitude	65	56.0
negative attitude	51	44.0
Total	116	100.0

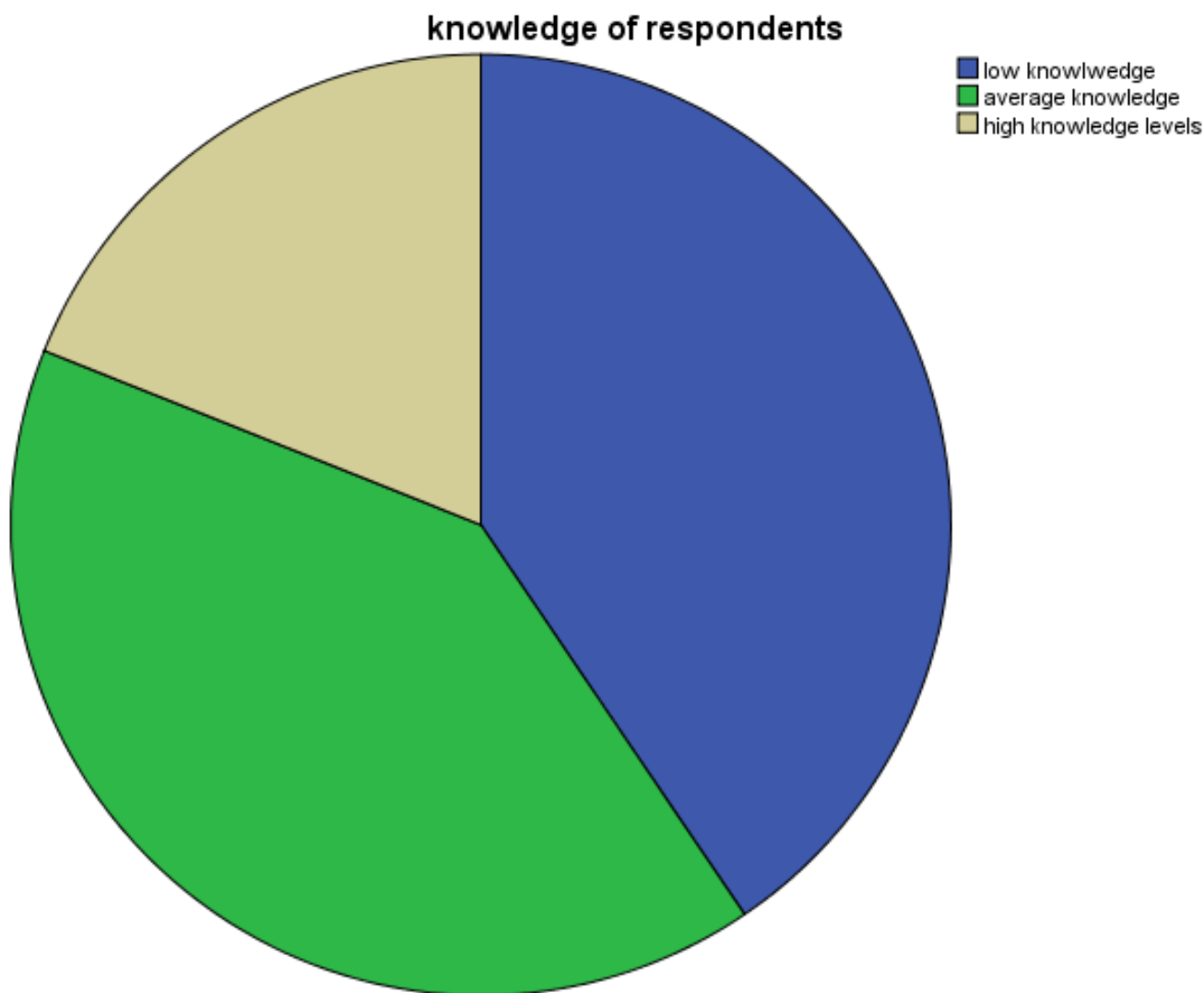


Figure 1: knowledge of health workers towards medical waste management

lead to the transmission of diseases (Table 4) while 25 (21%) of the participants always dispose of waste in specified color coded containers, 43 (37.4%) sometimes, 42 (36.5%) never, while 5 (4.3%) did not respond. Further the results show that 101 (87.1%) of the respondents always used suitable latex gloves when handling wastes and very few, 15 participants reported never using gloves.

6. Discussion, Recommendation, and Conclusion

7. Discussion:

Healthcare waste can cause serious harm if not managed properly. Ascertaining the knowledge, attitudes, and practices of health workers toward hospital waste management (HWM) will curb the dangers associated with poor medical waste disposal. Our study revealed significant problems with hospital waste management at Mityana district hospital.

From this study, 81 (69.8%) of the health workers had ever heard of hospital waste management. This is commendable but differs from the findings

Variable	frequency	percentage
What methods of waste disposal and management do you use at this hospital?		
Recycling	18	15.5
Incineration	20	17.2
Burning in pits	78	67.2
How do you manage infectious waste before disposing?		
Just discard directly in their specific bins	39	33.6
Treat it with chemicals before disposing it	36	31.0
Put in the bin liners and discard in their specific bins	41	35.3
Where is waste stored when the bins are full?		
on the wards	28	24.1
storage rooms	36	31.0
boxes	52	44.8
Do you use suitable latex gloves when handling wastes?		
yes	101	87.1
no	15	12.9
Are there color coded labeled containers at the temporary storage points		
yes	91	78.4
No	25	21.6

in a study on the knowledge of HWM among senior staff nurses working in a selected medical college hospital in Bangladesh, and also in the study done in Kenyatta national hospital where knowledge about hospital waste and its management among staff was poor.

Although the majority of the respondents had ever heard about waste management, the overall knowledge performance was average with 47 (40.5%) having basic knowledge about HWM and 22(19%) highly knowledgeable about hospital waste management.

While the above results are encouraging, the findings in this study reveal that 51(44.0%)

of the health workers had a negative attitude towards hospital waste disposal and management. Although the majority of the healthcare workers 109(94.8%) were aware that improperly managed waste can lead to transmission of disease. This knowledge is commendable as it can assist the workers in their efforts in medical waste management. This finding agrees with a study done at a hospital in Johannesburg, South Africa where most of the health workers (98.5%) knew that

improper management of health care waste could lead to transmission of infections among hospital workers and patients (Okale & Basu, 2009). Eighty-six (74.8%) of health care workers

in our study were aware that hospital waste can be divided into hazardous and non-hazardous wastes. This agrees with a study done at the University of Port Harcourt Teaching Hospital (UPTH) which showed a high level of awareness among health workers of the different wastes and their hazardous nature (Odigie & Siminialyi, 2009). This finding in our study is encouraging as it will influence the staff in the way they handle the waste.

The majority of the respondents 99(86.1%) were aware of waste segregation, many 63 (54.8%) were aware of color coding for different categories of medical waste. These findings are comparable to a study in four hospitals in Lagos where health care workers of 3 of the hospitals gave high priority to the segregation of infectious wastes (Longe & Williams, 2006). The finding in this study differs from that conducted in Northern Jordan where segregation was not practiced (Toy-

obo, Raba, & Oyeniyi, 2012).

In our study, most of the health care workers had a positive attitude towards HWM. 65(56.0%)

agreed that health care wastes should be disposed of properly in the hospital. This positive attitude could be a result of high knowledge of the health hazards associated with hospital waste. It is comparable to a study at UPTH where the majority of the respondents showed favorable attitudes toward the importance of guidelines on medical waste management and training in, and use of personal protective equipment (Odigie & Siminialyi, 2009).

In assessing their practice, only 25(21.7%) of the health care workers used the color-coded containers always. This is rather poor and does not agree with studies done in both Lagos and Johannesburg, South Africa (Okale & Basu, 2009) In Lagos, a study in 3 hospitals noted that high priority was given to waste segregation using color-coded containers, while in South Africa 96% of the correspondents used the bins appropriately (Okale & Basu, 2009)

Most of the workers in our study use sharps-specific puncture-proof containers, but only a small proportion of 42 (36.5%) reported using them always. This practice was poor and could be due to a lack of HCW training on HWM or a lack of safety boxes as was reported in a study in Lagos (Longe & Williams, 2006). There was good practice in the use of latex gloves when handling infectious wastes. All the 101(87.1%) workers who answered the question used gloves.

The use of gloves by the workers in this study agrees with the studies done in Uganda where all the staff was provided with gloves and in South Africa where 95% of the respondents used gloves always (Okale & Basu, 2009). However, 15 (13%) reported not using latex gloves when handling waste which is risky behavior.

the most common method of waste disposal practiced by the health care workers in our study was the use of biomedical companies collecting wastes from collection points. This finding differs from a study done in Lagos where the burning of hospital waste was found to be a common practice (Longe & Williams, 2006). It however showed

similarity to another study done in seven hospitals in Lagos where all the hospitals employ the services of Lagos Waste Management Authority (LAWMA) for final waste disposal and treatment except one hospital that offered on-site treatment of waste with an incinerator (Olufunsho *et al.*, 2016).

The result of this study does not agree with studies done at the University College Hospital (UCH) Ibadan, and Obafemi Awolowo University Teaching Hospital (OAUTH) Ile-Ife where burying was the commonest method of waste disposal (Toyobo *et al.*, 2012). The finding in our study also differs from a study conducted in 21 hospitals in Northern Jordan in which the most frequently used method for solid medical waste was incineration (Fayez, Hani, & Atallah, 2007).

Eight six (74.8%) of the workers had not undergone any training, while 26(22.6%) had received some training on HWM. This poor level of training could account for some of the poor practices witnessed in this study. However, at the same time, this finding contradicts a study conducted in Dhaka City which reported that nurses and laboratory clinicians had no training on the handling and disposal of medical waste (Akter *et al.*, 1999). Our study also agrees with a study in Uganda which reported that none of the staff interviewed received comprehensive training on waste management (Muhwezi *et al.*, 2014).

8. Conclusion

The findings in this study are important for the management of healthcare waste in Uganda and other developing countries. We have examined the knowledge, attitudes, and management of health care waste among health workers. The study revealed that the workers had average knowledge, and a positive attitude but the practice was poor. This poor practice could have been due to little or no health care waste management training.

Our study also revealed that the majority of the health workers were aware of the risks associated with improper waste disposal and, management in the hospital.

Recommendation

Based on the study findings the researcher makes the following recommendations The Hospital administrator should work out ways to provide guidance and counseling towards proper handling of medical waste in order to promote good practices for medical waste management.

The government of Uganda through the Ministry of Health and hospital administrators should ensure that hospital clinics and wards are provided with enough bins sorted in their respective colors and discourage health workers from using plastic sheets for syringes.

All medical workers in hospitals irrespective of the cadre ship should be trained in the proper handling of medical wastes in order to address challenges associated with poor waste management and reduce incidences of hospital-acquired infections.

Policies, legislation, and guidelines on HWM should be put in place, and awareness created on these documents for the workers.

For Further Studies, Other scholars should investigate other factors affecting the proper waste management among health workers in hospitals. In case of this, a qualitative study is recommended.

9. Operational definitions

Source of funding:

This study was not funded.

10. List of Abbreviations and Acronyms

BMW	Bio-Medical Waste
CW	Clinical Waste
HCF	Health Care Facility
HCW	Health care Waste
HCWM	Health Care Waste Management
MoH	Ministry of Healthy.
PPE	Personal Protective Equipment

Appendix A. References:

1) Aseweh Abor, P. and Bouwer, A. (2008), "Medical waste management practices in a Southern African hospital", *International Journal of*

Health Care Quality Assurance, Vol. 21 No. 4, pp. 356-364. <https://doi.org/10.1108/09526860810880153><https://doi.org/10.1108/09526860810880153>PMid:18785461

Etim, M.-A., Academe, S., Emenike, P., & Omole, D. (2021). Application of Multi-Criteria Decision Approach in the Assessment of Medical Waste Management Systems in Nigeria. *Sustainability*, 13(19), 10914.<https://doi.org/10.3390/su131910914>

2) Ishijima, H., Miyamoto, N., Masaule, F., & John, R. (2021). Improvements to healthcare waste management at regional referral hospitals in Tanzania using the KAIZEN approach. *The TQM Journal*.<https://doi.org/10.1108/TQM-10-2020-0254>

3) Olaniyi, F., Ogola, J., & Tshitangano, T. (2021). Challenges of effective management of medical waste in low-resource settings: perception of healthcare workers in Vhembe district healthcare facilities, South Africa. *Transactions of the Royal Society of South Africa*, 76(1), 81-88.<https://doi.org/10.1080/0035919X.2021.1900949>

4) Pandit, N., Tabish, S., Qadri, G., & Mustafa, A. (2007). Biomedical waste management in a large teaching hospital. *JK-practitioner*, 14(1), 57-59.

5) Perkins, D. N., Drisse, M.-N. B., Nxele, T., & Sly, P. D. (2014). E-waste: a global hazard. *Annals of global health*, 80(4), 286-295.<https://doi.org/10.1016/j.aogh.2014.10.001>PMid:25459330

6) Riley, D., & O'Hare, P. (2000). Harm reduction: History, definition, and practice. *Harm reduction: National and international perspectives*, 1000, 1-26.<https://doi.org/10.4135/9781452220680.n1>PMid:10677273

7) Saunders, J. T., & Champawat, N. (1964). Mr. Clark's Definition of 'Knowledge'. *Analysis*, 25(1), 8-9.<https://doi.org/10.1093/analys/25.1.8>

8) Tejada, J. J., & Punzalan, J. R. B. (2012). On the misuse of Slovin's formula. *The Philippine Statistician*, 61(1), 129-136.

9) Windfeld, E. S., & Brooks, M. S.-L. (2015). Medical waste management-A review. *Journal of environmental management*, 163, 98-108.<https://doi.org/10.1016/j.jenvman.2015.08.013>PMid:26301686

Table 7: Operational definitions

Waste	unwanted material or substances capable of being a nuisance if not well handled.
Bio Medical Waste	also known as infectious waste or medical waste, is defined as solid waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals.
Health facility	They include hospitals, clinics, outpatient care centers, and specialized care centers, such as birthing centers and psychiatric care centers.
Waste Management	These are activities and actions required to manage waste from its inception to its final disposal.
Medical Waste Management	These are activities and actions of something as required by health care providers to manage medical waste in health care settings
Knowledge	information, and skills acquired through experience that are used in medical waste management.
Attitude	a settled way of thinking or feeling about something.
Practices	It is the actual application or use of an idea, belief, or method, as opposed to theories relating to it.

10) Okale, T. R., & Basu, D. S. (2009). Healthcare waste management on an academic hospital: knowledge and practices of doctors and nurses. *South African Medical Journal*, 99(6). Retrieved from <http://www.scielo.org.za/scielo.php?pid=50256>.

11) J.O Odigie, I.M Siminialayi (2019) Medical waste management at the University of Port Harcourt Teaching Hospital.

12) E. Ezeoke Uchechukwu, I. Omotowo Babatunde & C. Ndu Anne (2017) Investigating Knowledge, Attitude and Health Care Waste Management by Health Workers in a Nigerian Tertiary Health Institution. <https://doi.org/10.5539/gjhs.v9n4p222>

13) Longe, E. O., & Williams, A. (2006). A preliminary study of medical Waste Management in Lagos Metropolis, Nigeria. *Iran J. Environ Health sci. Eng*, 3(2), 133-139.

14) Toyobo, A. E., Raba, A. O. & Oyeniyi, A. B. (2012). Appraisal of University Teaching Hospital Medical Waste Management in Nigeria; Case studies of Universities College Hospital (UCH) Ibadan and Obafemi Awolowo University Teaching Hospital (OAUTH) Ile-Ife. *Universal Journal Education and General Studies*, 1(9), 290-27.

15) Olufunsho, A., Aishat, A. A., & Azuka, C.

O. (2016). Assessment of medical waste management in seven hospitals in Lagos, Nigeria. *BMC Public Health*, 16, 269. <https://doi.org/10.1186/s12889-016-2916-1>

16) Fayeze, A., Hani, A. Q., & Atallah, R. (2007). Site investigation on Medical Waste Management practices in Northern Jordan. *Waste Management*, 28, 450-458.

17) Akter, N., Chowdhury, M. R., & KGzi, N. M. (1999). Hospital Waste Disposal in Bangladesh with special reference to Dhaka City and its Environmental evaluation. *Special publication*: 87-90.

18) Muhwezi, L., Kaweesa, P., Kiberu, F., & Eiyoku, L. E. (2014). Health Care Waste Management of Uganda - A Case study of Soroto Regional Referral Hospital. *Int. Journal of Waste Management and Technology*, 2(2), 1-2.

Appendix B. Publisher details:

**Publisher: Student's Journal of Health
Research (SJHR)
(ISSN 2709-9997) Online
Category: Non-Governmental & Non-profit
Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256775434261
Location: Wisdom Centre, P.O.BOX. 148,
Uganda, East Africa.**



September 25, 2022