



GLOBAL JOURNAL OF MEDICAL RESEARCH: K
INTERDISCIPLINARY

Volume 18 Issue 4 Version 1.0 Year 2018

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals

Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Knowledge, Attitude, and Practices of Waste Segregation at Kapsabet County Referral Hospital, Nandi County, Kenya

By Justinah Maluni, Benard Omambia, Stephen W Muhindi & Mutuku Chrispus Ngule

University of Eastern Africa

Abstract- Background: Poor management of clinical waste poses a public health risk (Nema et al., 2011). Hence, appropriate Clinical Waste Management (CWM) is a crucial issue for maintaining human and public health and can be achieved through effective and efficient wastes segregation (Nema et al., 2011). The key to effective management of medical waste is segregation (separation) of the waste (Rao et. al., 2004).

Objectives: To assess the knowledge, attitude and practices on medical waste segregation.

Methods: The study was done in November 2015 using quantitative descriptive design. The data from 139 healthcare workers at Kapsabet County Referral Hospital from Nandi County, Kenya was collected through questionnaires and analyzed with SPSS version 20. The knowledge, attitude and practices were assessed through a census and the data was thereafter interpreted at 95% confidence interval.

Results: 32% of the respondents did not know what waste segregation was, 35% said that waste segregation should not be done at the generation point an indicator of poor knowledge on waste segregation. 94% of the respondents believed bin emptying was the responsibility of the cleaners an indicator of a negative attitude towards waste segregation.

Keywords: medical waste, Waste segregation, knowledge, attitude, practices, medical waste management.

GJMR-K Classification: NLMC Code: WY 108



Strictly as per the compliance and regulations of:



Knowledge, Attitude, and Practices of Waste Segregation at Kapsabet County Referral Hospital, Nandi County, Kenya

Justinah Maluni ^α, Benard Omambia ^α, Stephen W Muhindi ^σ & Mutuku Chrispus Ngule ^ρ

Abstract- Background: Poor management of clinical waste poses a public health risk (Nema *et al.*, 2011). Hence, appropriate Clinical Waste Management (CWM) is a crucial issue for maintaining human and public health and can be achieved through effective and efficient wastes segregation (Nema *et al.*, 2011). The key to effective management of medical waste is segregation (separation) of the waste (Rao *et al.*, 2004).

Objectives: To assess the knowledge, attitude and practices on medical waste segregation.

Methods: The study was done in November 2015 using quantitative descriptive design. The data from 139 healthcare workers at Kapsabet County Referral Hospital from Nandi County, Kenya was collected through questionnaires and analyzed with SPSS version 20. The knowledge, attitude and practices were assessed through a census and the data was thereafter interpreted at 95% confidence interval.

Results: 32% of the respondents did not know what waste segregation was, 35% said that waste segregation should not be done at the generation point an indicator of poor knowledge on waste segregation. 94% of the respondents believed bin emptying was the responsibility of the cleaners an indicator of a negative attitude towards waste segregation.

Conclusion: It is important to note that, knowledge and attitude are key determinants of waste segregation practices.

Recommendations: A study should be done on the challenges facing proper waste segregation. Public health policy intervention is required to strictly monitor waste management in health sectors.

Keywords: medical waste, Waste segregation, knowledge, attitude, practices, medical waste management.

1. INTRODUCTION

Medical waste (MW) or Biomedical waste has been defined as any solid waste generated in the diagnosis, treatment or the immunization of human beings and animals while in medical research, this includes the production or testing of biological materials from all types of healthcare institutions,

including hospitals, clinics, doctor's offices (including dental and veterinary) and medical laboratories and in medical research, its wastes in production of vaccines or other substances produced from living organisms (WHO, 1999, 2005). Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well (Mathur *et al.*, 2014). Consequently, hazards of poor management of biomedical waste have aroused the concern world over, in its far-reaching effects on human health and the environment (WHO, 2011). Poor management of clinical waste poses a public health risk (Nema *et al.*, 2011).

According to WHO report, around 85% of the hospital wastes are non-hazardous, 10% are infective [hence, hazardous], and remaining 5% are non-infectious but hazardous [chemical, pharmaceutical and radioactive] (Manoranjini, 2014). A study in Tanzania (Manyele & Lyasenga, 2010) reported that segregation is not perfectly performed, despite the availability of specific containers for waste collection. Moreover, reports have shown that poor segregation is brought to naught by highly inefficient waste transport which is done mainly using wheelbarrows (USAID-Kenya, 2012)

A study done in Kenya by the National Health Care Waste Management plan, 2008-2012, shows that Kenya is still way below the WHO recommended standards, where 80% of waste should be non-infectious and can be recommended to join the municipal waste stream, while 20% is the infectious wastes that require special waste treatment methods. Segregation is not practiced in hospitals by health staff due to lack of training. (Kumar *et al.*, 2015). A study done in Bangladesh showed that questions on knowledge about color coded bins collecting waste, 67 (53.6%) could not give any correct answer and only 58 (46.4%) gave the correct answer (Uddin, Islam & Yesmin, 2014)

Studies in Tanzania (Manyele & Lyasenga, 2010) and Kenya (Kei & Njagi, 2013) have reported that segregation is not perfectly performed, despite the availability of specific containers for waste collection. A study done in Kenya by Kei and Njagi (2013), in public hospitals such as Kenyatta National Hospital (KNH) and Moi Teaching and Referral hospital showed that waste segregation on infectious, pathological, sharps and

Author ^α: University of Eastern Africa, Baraton; Department of Public Health, P.O BOX 2500-30100, Eldoret, Kenya.

Author ^σ: Youngstown State University, Department of Biological Sciences, University Plaza, Youngstown, OH 44555, USA.
e-mail: Muhindi_stephen@yahoo.com

Author ^ρ: Magbio Genomics Africa, P.O BOX 19535-00200, Nairobi, Kenya.

chemical waste was done unsatisfactorily. Moreover, these being referral hospitals in Kenya with unsatisfactory waste segregation methods where the level of knowledge on waste segregation is expected to be high there is need for further research in other health facilities in Kenya to determine the extent of the problem in other hospitals hence there is need for a research to assess the knowledge, attitude and practice on waste segregation among health care workers in Kapsabet County referral hospital.

II. METHODOLOGY

A census study was done at Kapsabet county referral Hospital where all the health workers were issued with a structured closed-ended questionnaire. The questionnaire had questions on knowledge, attitude and practices of medical waste segregation.

All the health workers and cleaners present during the process of data collection were included in

the study. The health workers and cleaners absent during the data collection process and those who did not consent were excluded from the study. Ethical approval was done by the institutional research ethics committee of the University of Eastern Africa, Baraton, (REC: UEAB/21/10/2015) the hospital administrator of Kapsabet County Referral Hospital (Ref; R.I/VOL1/15). The data was collected in November 2015. All the health workers who consented and were willing to participate in the study filled the questionnaires form. The data was coded, entered and analyzed using SPSS Version 20 and excel program. Inferential analysis was done using chi-square test, spearman's correlation, Pearson's correlation and Multiple Linear Regression with a 95% Confidence Interval, and p-value of $p \leq 0.05$ was used to interpret the data. (Oso & Onen, 2005).

III. RESULTS

Knowledge on waste segregation

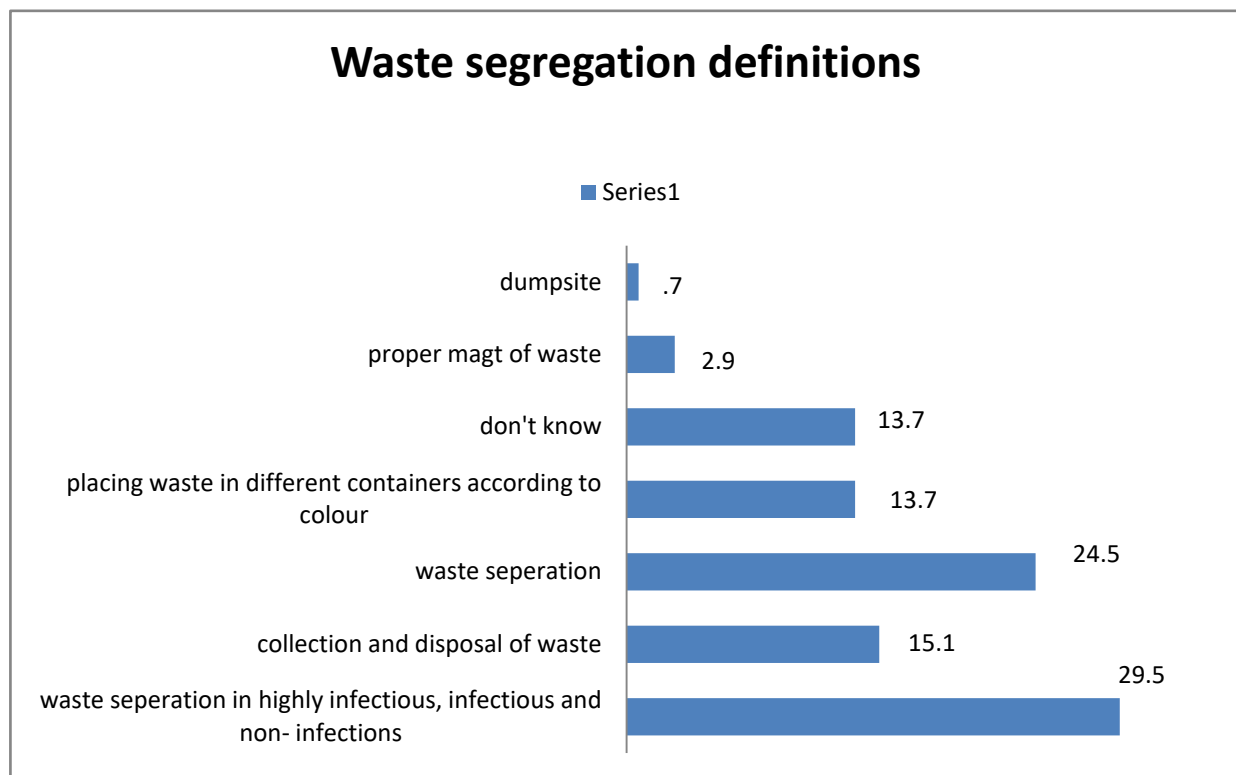


Figure 1: A graph showing definitions of waste segregation by health care workers

Table 1: A table showing results of when waste segregation should be done

Statement	True	False	Don't know
Waste should be segregated during Transport	15%	78%	5%
Waste should be segregated during disposal	28%	65%	7%
Waste should be segregated during generation	72%	21%	7%
Waste should be segregated at collection points	46%	48%	6%

Table 2: Chi-Square tests done to find out the relationship between knowledge (independent) and Practices (Dependent)

Variables	Value	P-Value
Waste food disposed in which bin (Dependent)	48.281*	0.000
Waste segregation generation point(independent)		

Table 3: A table showing results of Spearman's correlation on attitude (independent) and Practices (dependent) on waste segregation and Chi-square test on knowledge and practices on waste segregation

Variables	Value	P-Value
Bin liners provision (independent)	26.429 ^a	0.000
Disposal of used gloves (dependent)		
Provision of sharps box (independent)	14.763 ^a	0.022
Disposal of branulars (dependent)		
Waste segregation is cleaners responsibility (independent)	0.226** (Correlation Coefficient)	0.007
segregate sharps only and mix all other wastes (dependent)		
Waste segregation increases waste management cost (Independent)	0.240**	0.004
Waste segregation reduces the quality of life (dependent)		

*** - significant values

IV. DISCUSSION

The findings indicate that, 32% of respondents had no idea of what waste segregation is, this is closely related to a study done by Abdullah & Al-Mukhtar, (2013) whose study had 29.8% of the respondents indicating that they had no idea about how the process of waste segregation is done hence the need of informing the whole medical staff about the medical waste management plan applied in the hospitals.

An average of 35% of the respondents said that waste segregation should not be done at the generation point. This contradicts with a study done by WHO, (2011) which showed that it is essential that all medical waste materials are segregated at the point of generation and Chartier *et al.*, (2012), who stated that segregation at source is recommended as it makes it easier to prevent spread of infection, helps in making it easier to choose among the options of disposal, and can reduce the load on the waste treatment system and prevent injuries. The study went further to show whether knowledge really influenced the practices on waste segregation and based on the P value ($P=0.000$) knowledge is related to practice (table 2). This indicates that the level of knowledge influences waste segregation practices.

Provision of bin liners and safety boxes is key aspect in segregation of medical wastes. However, according to the findings 14% and 12% of the respondents indicated they were not provided with bin liners and safety boxes respectively. This contravenes with the WHO, that hospitals should provide plastic bags for infectious waste Pruss *et al.*, (1999). It also contravenes Sapkota *et al.*, (2014), who stated that infectious waste bags which are colored or labeled in accordance with the policies or regulations should be provided as it helps the system of segregation of waste

at source, into suitable color-coded high-density polythene bags and bins, for the easy identification and segregation of infectious and non-infectious wastes should be used. It also contravenes a study by Acharya & Singh, (2000), which showed that sharps should be collected in puncture-proof containers. Lack of bin liners and safety boxes might be a contributing factor to poor waste segregation because observations done by the researcher before the study at Kapsabet County Referral Hospital showed that there were syringes along the walk ways and the general waste and infectious waste were disposed together in the dumpsite. A Chi-Square test done shows that there is a relationship between provision of bin liners and sharps box and waste segregation practices with a P-value of 0.000 and 0.022 respectively. This illustrates that provision of safety boxes and the color-coded liners can help improve the practices of waste segregation.

According to the findings, majority of the respondents (94%) indicated that bin emptying was the responsibility of the cleaner. This might affect the waste segregation practices. According to Idowu & Alo, (2010), the absence of effective waste segregation is influenced by poor control of waste disposal by those in charge especially the health workers who leave every task of waste disposal to the cleaners. According to Spearman's Rho on test done, there is small to moderate positive correlation (0.226) between waste disposal perception and the practices ($p \leq 0.007$). This shows that a change of attitude towards bin emptying responsibility can impact the practices positively.

Based on the findings, >20% of the respondents indicated that they placed waste in the wrong bins. This indicates that the practice of waste segregation within the hospitals is not done according to the guidelines. This contravenes the MOH, (2008), which shows that segregation of health care waste (HCW) should be done according to infectious or clinical

waste (hazardous waste), Non-infectious or general waste, highly infectious waste, and sharps waste. The color codes for HCW as recommended by National Environmental Management Authority (NEMA) are; yellow for infectious and sharps waste, black for non-infectious and the WHO recommends red for pathological and/or highly infectious waste.

Findings show that, majority of the respondents (89%) indicated that waste segregation helps control environmental pollution, waste segregation reduced hospitals acquired infections, waste segregation reduces the death /diseases due to repackaging, waste segregation reduces the incidence of occupational health hazards, waste segregation reduces the waste management cost, and waste segregation improves the image of health facility. This agrees with WHO, (2011), that poor management of health care waste potentially exposes health care workers, waste handlers, patients and the community at large to infection, toxic effects and injuries, and risks polluting the environment. Improper medical waste management causes environmental pollution, unpleasant smell, and may lead to transmission of diseases (Coker & Sridhar, 2010; Yitayel, Tamrat & Adane, 2012). However, a 44% which indicated that waste segregation increases incidence of occupational health risks, 24% indicated that waste segregation increases waste management cost, 21% indicated that waste segregation reduces the quality of life and this shows that there is a negative attitude among some of the health workers towards waste segregation which might affect their practices. According to a Spearman's Rho on test done, there is moderate positive correlation (0.240) between attitude and practices ($P=0.004$) (table 3). Therefore, a change in attitude on waste segregation may impact the practices of waste segregation positively.

According to the findings, 26% of the respondents agreed that waste segregation is the cleaner's responsibility; this shows that there is a negative attitude towards waste segregation. The perception that waste segregation is the cleaner's responsibility might be a contributing factor to poor waste segregation. This concurs to a study by Madhukumar & Ramesh, (2014), that waste handling and disposal is often considered only the job of cleaning workers. Based on the statistical test there is a small to moderate correlation (0.226) between the attitude and practices ($P= 0.007$) (table 3). This indicates that a change in the attitude of the responsibility of waste segregation can improve the practices of waste segregation.

V. CONCLUSIONS

The study investigated knowledge, attitude and practices on waste segregation among health workers at Kapsabet County Referral Hospital. It was intended to

assess the knowledge, attitude and practices on waste segregation among health workers at Kapsabet County Referral Hospital. This was in relation to improper waste segregation practices observed at the hospital before the study which showed that infectious waste and non-infectious waste were disposed together in a dumpsite. The study specifically sought to find out if there was a relationship between knowledge, attitude and practices on waste segregation. The study established that knowledge and attitude on waste segregation affects the practices of waste segregation. In view of the findings, the study concludes that it is important to note that knowledge and attitude are key determinants of waste segregation practices. Ideal knowledge and positive attitude towards waste segregation are not yet to perfection and as a result, there are poor waste segregation practices.

VI. RECOMMENDATIONS

With focus on the findings and the supportive literature review the study recommends the following:

- The health workers in Kapsabet county referral hospitals should be trained more on waste segregation practices and the impacts of improper waste segregation to their health, the community and the environment at large.
- The public health officer in charge of sanitation should ensure that continuous training and strict supervision should be made compulsory for all healthcare personnel working in Kapsabet County Referral Hospital.
- The medical staff should also be informed that bin emptying is a responsibility of every person and not only the cleaners because this encourages improper waste segregation
- The whole medical staff of Kapsabet county referral hospital should be informed on the best methods of medical waste separation/segregation

Recommendations for further study

- A further study should be carried out on the factors contributing to improper waste segregation.
- A study should be done in the private hospitals within Nandi County to determine their practices in waste segregation
- A study should be done on the challenges facing proper waste segregation.

VII. DECLARATIONS

a) Ethics approval and consent to participate

This study commenced after ethical approval had been received from *the institutional Research Ethics Committee of the University of Eastern Africa, Baraton, (REC: UEAB/21/10/2015) the hospital administrator of Kapsabet County Referral Hospital (Ref; R.I/VOL1/15).*

Informed consent was obtained from all participants. The nature, purpose, and procedure of the study together with the time commitment required were explained to each participant on an information sheet. Participants were made aware that they were at liberty to refuse to answer any questions or drop out of the study at any time and that it would not affect them. Consent was then obtained from each participant in the study where they appended their signatures. All participants were assured that their responses would be treated with utmost confidentiality.

The study was conducted in the participants own environment. There was no threat of potential risk since no drugs or chemicals that were administered and handled. Participants would benefit from the study since interventions on improvement of waste segregation was to be put in place.

b) Conflicts of interest

The authors declare that they have no competing interests.

c) Authors' contributions

JM and BM conceived, designed and drafted manuscript. All authors read and approved the final manuscript. The corresponding author had full access to the study data and had final responsibility for the decision to submit manuscript for the publication.

d) Disclaimer

The findings and conclusions presented in this manuscript are for the authors and do not necessarily reflect the official position of University of Eastern Africa, Baraton. The corresponding author had full access to the study data and had final responsibility for the decision to submit for the publication.

ACKNOWLEDGEMENTS

We are grateful to the health workers of Kapsabet County Referral Hospital for their participation in this study and to Madam Asenath Barongo for instilling research knowledge.

REFERENCES RÉFÉRENCES REFERENCIAS

- Acharya, D. B., & Singh, M. (2000). *The Book of Hospital Waste Management*. New Delhi: Minerva Press.
- Chartier, Y., Emmanuel, J., Pieper, U., Pruss, A., Rushbrook, P., and Stringer, R., (2014). *Safe management of wastes from healthcare activities*. Switzerland: 2nd Ed WHO Press.
- Coker, A., & Sridhar, M. K. (2010). Increase in healthcare facilities and rapid environmental degradation: A technological paradox in Nigeria's. *African Journal of Environmental Science and Technology*, vol. 4(9), pp. 577 - 585.
- Idowu, I., & Alo, B. (2010). Clinical waste management practice in Nigeria and England. A comparative study. *Communications in Waste and Resource Management. Waste Management and Research*, Vol. 10: 17 -21.
- Kei, R. M., & Njagi, A. N. (2013). Management of Health - Care waste: A Case Study of Two National Teaching and Referral Hospitals in Kenya. *Journal of Emerging Trends in Engineering and Applied Sciences (JETEAS)*, (ISSN: 2141 - 7016).
- Kumar, R., Samrongthong, R., & Shaikh, B. T. (2013). Knowledge, attitude and practices of health staff regarding infectious waste handling of tertiary care health facilities at metropolitan city of Pakistan. *Journal of Ayub Medical College, Abbottabad: JAMC*, 25(1-2), 109 - 112.
- Madhukumar, S., & Ramesh, G. (2014). Study about awareness and practices about health care waste management among hospital staff in a medical college hospital, Bangalore. *International Journal of Basic Medical Science*, Vol:5, Issue 1.
- Mathur, V., Dwivedi, S., & Hassan, M. A. (2011). Knowledge, attitude, and practices about biomedical waste management among healthcare personnel: A cross-sectional study. *Indian Journal of Community Medicine*, 36: 143 - 145.
- MOH. (2008). *The National Health Care Waste Management Plan - 2008-2012*. Nairobi: Republic of Kenya.
- Nema, A., Pathak, A., Bajaj, P., Singh, H., & Kumar, S. (2011). A case study: biomedical waste management practices at city hospital in Himachal Pradesh. *Waste Management and Research*, 29(6), 669 - 673.
- Pruss, A., Giroult, E., & Rushbrook, P. (1999). *Safe Management of Waste from Health Care Activities*. Geneva, Switzerland: World Health Organization.
- Sapkota, B., Gupta, K. G., & Dhiraj, M. (2014). Impact of intervention on healthcare waste management practices in a tertiary care governmental hospital of Nepal. *BMC Public Health*, 14:1005.
- WHO. (1999). *Management of Wastes from Healthcare Activities*. Geneva: World Health Organization.
- WHO. (2005). *Management of Solid Health - Care waste at Primary Health - Care Centers; A Decision - Making Guide*. Geneva, Switzerland: WHO Document Production Services.
- WHO. (2011). *Health-care waste management*. Geneva: WHO.
- Yitayel, S., Tamrat, A., & Adane, M. (2012). Sharps injuries and exposure to blood and bloodstained fluids involving waste handlers. *Waste Management and Research*, vol. 30, pp. 1299 - 1305.
- Amin, M. E. (2003a). Overview of the methodology of research. A paper presented at a seminar on Overview of Educational research methodology for teachers of the School of Education, Makerere University, Kampala.