

Review the Prevalence of Health Care Waste Management (HCWM) In Ethiopia and Describe the Factors for Poor Management

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Abstract

Introduction: wastes in the medical institutions can harm Health care professionals, waste handlers, and the community. They are all at risk for infections, harmful effects, and injuries due to improper management of medical waste. Additionally, ineffective medical waste management has the potential to release drug-resistant bacteria from healthcare facilities into the environment. (WHO, 2018)

Objective: Review Prevalence of Health Care Waste Management (HCWM) In Ethiopia and Describe Factors for Poor Management.

Design: Review of different published studies including systematic reviews from 2013 to 2022 including relevant and eligible studies for analysis that are studies in Ethiopia.

Result: The review reveal that there was a high production of waste that are hazardous. It shows poor health care waste management (HCWM) in Ethiopia. The reasons for this serious problem were the knowledge, Attitude and Practice on health care providers, cleaner and waste handlers. it'sbecause of luck of training, budget, commitment, health care waste management or infection prevention manual, committee and weak monitoring and evaluation gap by the authorized bodies.

Conclusions and recommendations:

Ethiopian minister of health prepares different guidelines and rules and regulations on health care waste management and infectious waste, but there is a huge gap on implementation.

Developing countries like Ethiopia must strength the waste reduction strategies, allocate proper budget, continuous training and capacity building, distribution of HCWM and infection prevention manual and guide lines, organizing infection prevention committee, build suitable work environment, effective follow-up on implementation and recognition for well-implemented facilities.

Recommend further studies on association factors for poor practices and Furthermore, it must be the burning issues by public activists, politicians, policy makers and human and environmental rights related organizations.

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I. Introduction

wastes in the medical institutions can harm Health care professionals, waste handlers, and the community. They are all at risk for infections, harmful effects, and injuries due to improper management of medical waste. Additionally, ineffective medical waste management has the potential to release drug-resistant bacteria from healthcare facilities into the environment. (WHO, 2018).

Types of waste Wastes generally fall into three categories:

General wastes - including materials such as packaging or unwanted paper. This waste is generally harmless and needs no special handling; 75–90% of the waste generated by healthcare facilities falls into this category.

Hazardous wastes- including infectious waste (except sharps and waste from patients with highly infectious diseases), small quantities of chemicals and pharmaceuticals, and non-recyclable pressurized containers.

Highly hazardous wastes-wastes includes sharps, highly infectious non-sharp waste, stools from cholera patients, bodily fluids of patients with highly infectious diseases, large quantities of expired or unwanted pharmaceuticals and hazardous chemicals and radioactive wastes, genotoxic wastes (affecting genetic composition and multiple generations), or teratogenic wastes (affecting development of the exposed individual). (USAID, 2015)

The 3 Waste minimization Approach

Waste minimization is described as the avoidance and/or reduction of waste creation. Waste reduction generally helps the waste producer by lowering the cost of items purchased. It entails particular management and behavioral change tactics. Waste avoidance method is at the top of the waste minimization alternatives.

Changing work methods is required to achieve this aim. How we go about our business typically determines how much garbage we produce. (Nepali Government, 2014)

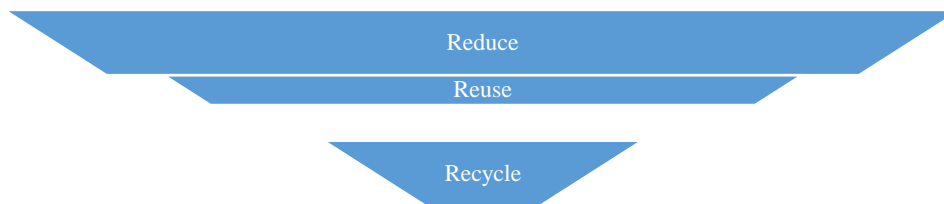


Figure 1- Waste minimization approach

The Basic three-bin system: The simplest and safest waste segregation system is to separate all hazardous waste from non-hazardous general waste (which is generally of a larger quantity) at the point of generation. (WHO, 2018)

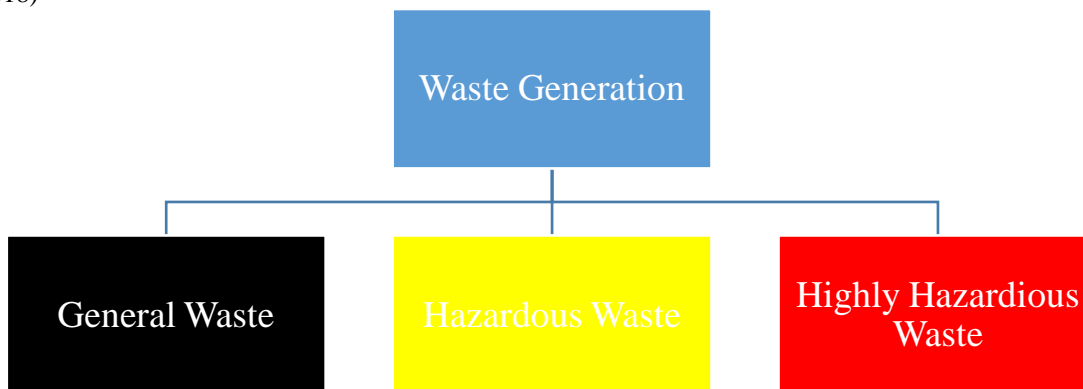


Figure 2- waste segregation diagram

Health care waste management process

The process of good waste management system processes can be categorizing in to waste segregation and collection, storing of waste, transporting, treatment and the last one is disposing. Those each processes including detail and various types of procedure to success the process successful (ICRC, 2011)

Health care waste management process diagram



Figure 3- Health care waste management process diagram

According to statistics, the contamination by HIV/AIDS caused by the manipulation of contaminated health care waste accounts for around 0.2 % of all contamination worldwide. This is a severe public health issue

as well as an environmental concern in the fight against HIV/AIDS. Significant amounts of health care waste are generated as a result of health care services, including sharps (needles, scalpels, blades, etc.), non-sharps (blood and other body fluids, infected or not, chemicals, pharmaceutical goods), and medical equipment. (Federal Democratic Republic of Ethiopia Ministry of Health, 2019)

Materials utilized in health care, such as thermometers, blood pressure devices, gastrointestinal and other mercury-containing medical goods, Fixatives, preservatives, laboratory chemicals, cleansers, and other items contain mercury since it is a big issue. Mercury vapor has the potential to damage cognition and be lethal. special concern for fetuses, infants, and children because it impairs neurological development at extraordinarily low doses. (Healthcare without Harm, 2017).

Approximately 85 % of the garbage generated by health-care providers is equivalent to household waste and is commonly referred to as "non-hazardous" or "generic health-care waste.". The other 15% of health-care waste is classified as "hazardous," posing a range of health and environmental dangers, in addition due to inadequate health care waste management, it is possible for drug-resistant bacteria to escape from medical facilities and enter the environment.(WHO, 2018)

According to estimates from the WHO, injections with infected syringes resulted in 260 000 new cases of HIV infection, 2 million new cases of hepatitis C, and 21 million new cases of hepatitis B in 2000. (5% of all new infections) According to epidemiological research, the risks of contracting HBV, HCV, and HIV increase by 30%, 1.8%, and 0.3%, respectively, after one needle-stick injury from a needle used on an infected patient. (Federal Democratic Republic of Ethiopia Ministry of Health, 2019)

II. Method

Published articles were searched in PubMed, and Google Scholar using a combination of keywords; "healthcare waste" OR "medical waste" OR "infectious waste" OR "hospital waste" OR "healthcare facility waste" OR hazardous waste" OR "biomedical waste" OR "infection prevention" AND "Ethiopia". and screened for duplication.

III. Literature Review

An assessment of the generation and management practices of healthcare waste in Addis Ababa health centers revealed that the mean (SD) waste generation rate was 9.61kg/day, of which (38%) 3.64 kg/day was general or non-hazardous waste and 62% kg/day was hazardous, which is a very high rate. Additionally, they used safety boxes for the collection of sharp waste, and all health centers used plastic buckets. None of the health centers used pretreatment for infectious trash. For the disposal of pathological waste, all health centers had placenta pits and incinerators, but only seven out of ten pits had the required covering material. Pretreatment of infectious waste was not practiced by any of the health centers.(Menelik Legesse Tadesse and Abera Kumie, 2014)

The study conducted in Adama reveal that Adama referral hospital average daily waste generation rate was 1,23 and 0.02-0.03 kg/patient/day from health centers in addition the general waste accounts around 34.9% and 75% from Adama referral hospital and studied health centers respectively, the factors are segregation, pretreatment and awareness.(Hayleeyesus Cherinete, 2016)

According to a study conducted in the Bench Maji zone, 57.9% of waste is general waste and 41.0% is hazardous healthcare waste. The factors that contributed to this high waste generation were economy, patient flow, service provided, poor waste management practice, poor waste management system, and seasonal factors. The highest waste generation departments were from the delivery ward, 6.74 kg/day with a mean (SD) of 0.6740.23, and the TB follow-up room contributed the lowest portion of total healthcare waste generated.(Asrat Meleko, et al, March 2018)

According to the Study conducted in Addis Ababa medical laboratory Medical laboratory waste generation rate, management practices and associated factors indicate that biomedical wastes was 4.9 ± 3.13 kg/day per medical laboratory.(74.3%) had proper biomedical waste management practice, which is significantly associated with professionals' knowledge of biomedical waste management policies and guidelines, the availability of separate financial sources for biomedical waste management, and the level of training of professionals.(Salem Endris et al, 2022)

During the COVID-19 pandemic, a study was conducted at Tepi General Hospital in Ethiopia on the status and management of medical waste. The average daily weight created was $492.5 + 11.5$ kg, with 61.9% being general trash and 38.1% being hazardous waste. The wastes associated with COVID-19, according to the study, are handled as normal rather than according to the waste management methodology designed specifically for COVID-19. Lack of resources and inadequate resource management were to blame.(Besufekad M et al, 2021)

A study conducted in six hospitals in Addis Ababa The assessment of the health care waste generation rates and its management system shows poor waste management practice and that the median waste generation

rate was found to be varied from 0.361–0.669 kg/patient/day, comprised of 58.69% non-hazardous and 41.31% hazardous waste. Public hospital waste is higher than private, which is 59.22% and 40.48%, respectively. The amount of waste was positively correlated with the number of patients. The waste separation and treatment practices were very poor. Other alternatives for waste treatment rather than incineration, such as a locally made autoclave, should be evaluated and implemented.(Debere Mesfin Kote,et al, 2013)

According to the study's in Addis Ababa findings, the majority manage hazardous waste in a responsible manner. The most frequent issues with healthcare waste management include lack of awareness of the health risks associated with medical waste, inadequate training, a lack of waste management and disposal systems, inadequate financial and human resources, low priority given to the issue, and ignorance of applicable laws.(Fikirte Demissie, 2014)

In 2013, only 68.5% of the 11 health care facilities included in a cross-sectional study in Gonder, north-east Ethiopia, practiced HCWM; the reasons are insufficient training and a lack of application-related materials.(Azage Muluken et al, 2013).

Research on KAP on biological waste management and related issues among medical professionals working in hospitals, health centers, and private clinics was undertaken in DebreMarkose town in north Ethiopia. When we include linked elements, educational level and color-coded trash container, they lead to excellent attitude and practice on HCWM, with 77.6%, 66.1%, and 56.6% scoring acceptable practice, attitude, and knowledge, respectively.(Teshale Dersse,et al, 2018)

Only 48% of hospital waste handlers in research at Gonder University had low knowledge. Factors influencing knowledge included educational level, job department, and experience; this implies that as educational level rises, experience levels rise, and exposure to HCWM knowledge improves the problem.(Daniel Haile Chercos et al, 2018)

According to research by Esayas and his students, only 29.3% of health workers in Ethiopia's south Omo zone had safe practice in HCWM. The study also found that color-coded containers and shorter workdays pushed for better practice than non-coded and longer workdays of 8 hours.(Esayas Gizalew, et al, 2018)

The subject of a systematic review paper is "Healthcare waste management: current status and prospective concerns in Ethiopia." There were 17 studies in the review. The results indicate that the overall HCWM practice were bad, with high rates of hazardous waste production ranging from 21 to 70% and the related factors including excessive waste generation, inappropriate waste segregation, staff knowledge gaps in the healthcare industry, and regulatory authorities' monitoring and assessment gaps.(Yazie et al., 2019)

A facility-based comparative study in Bahir Dar found that 65% of participant's had good HCWM practices, but when private and state hospitals were compared, the prevalence were 72.5% and 53%, respectively. Having an HCWM committee and a guideline or manual is a crucial component to successful practice. (Dereje Mesfin Assemu, 2020)

Study in Addis Ababa Results showed that 38.8% of the surveyed clinics had good healthcare waste management practices, when it comes to waste segregation, collection, transportation, storage,treatment, and disposal systems, 56.8%, 55.0%, 85.6%, 63.3%, 61.9%, and 57.9% of the private clinics had poor procedures respectively. Budget allocation, weakness of norms, and regulatory body inspection were all factors. (Berhanu W et al, 2021)

A study of cleaners at TikurAnbassa Specialized Referral Hospital in Addis Ababa, Ethiopia, came to the conclusion that overall cleaner knowledge was very low but that they had a positive attitude. The study found that 98% of the cleaners had not attended pre-employment training, 53% of them had needle stick injuries, and waste was seen in an open container that was also not segregated. (Gebreeyessus Getachew, 2022)

A research conducted in four health facility's on 'Unused and Expired Medications' Awi zone, Amhara regional state, Ethiopia. Indicate that 56 types of medication were found unused at health facility,36 % anti-infective drugs,173 medications at in patient department and 605 were wasted at pharmacy stores (Ebrahim Awol Jemal, et al, 2019)

A study in Ethiopia by Berhe and his colleagues indicate on their systematic review article that on "prevalence of antimicrobial resistance was high" this might be caused by poor waste management practice.(Berhe et al. , 2021)

According to the study, south-west Ethiopia on blood/body fluids exposure/sharp injuries among nurses working in public hospitals shows a 78.3% overall prevalence with 62.6% and 58.8% of blood/body fluids and needle stick/sharp injuries, respectively. This prevalence is associated with the factors of being male, being single, and having no training on infection prevention.(Yeshitila Belay Belachew, et al, 2017)

According to a study on health care waste handlers in eastern Ethiopia, 20.4% are Hepatitis B virus positive, and one of the associated factors is being unvaccinated against Hepatitis B virus.(Mengiste DA, 2021)

Summarization of finding's

Table 1- summary of waste generation and type of waste

Studies Area	Year	Public or Private	volume of Waste	General Waste	Hazardous Wastes
Addis Ababa	2013	Both	Median 0.361–0.669 kg/patient/day	58.69	41.31
Addis Ababa	2014	Public	Daily Average 9.61 and 3.28 kg/day	38	62
Adama	2016	Public	Daily Average 1.23 and 0.02-0.03 kg/patient/day	34.9	65
Bench Maji	2018	Public	Daily Average 6.74 kg/day	57.9	41
Tepi	2021	Public	Daily Average 492.5 kg 1.88 kg/bed/day	61.9	38.1
Addis Ababa	2022	Public	Daily average 4.9 kg/day		

Table 2- summary of common factors for poor HCWM

No	Commonly Listed Factors for Poor HCWM
1	Lack of budget and poor resource utilization
2	Lack of training
3	Lack of HCWM manual
4	Lack of HCWM
5	Weak waste minimization system
6	Weak the 3 - bin system
7	Weak monitoring and evaluation system

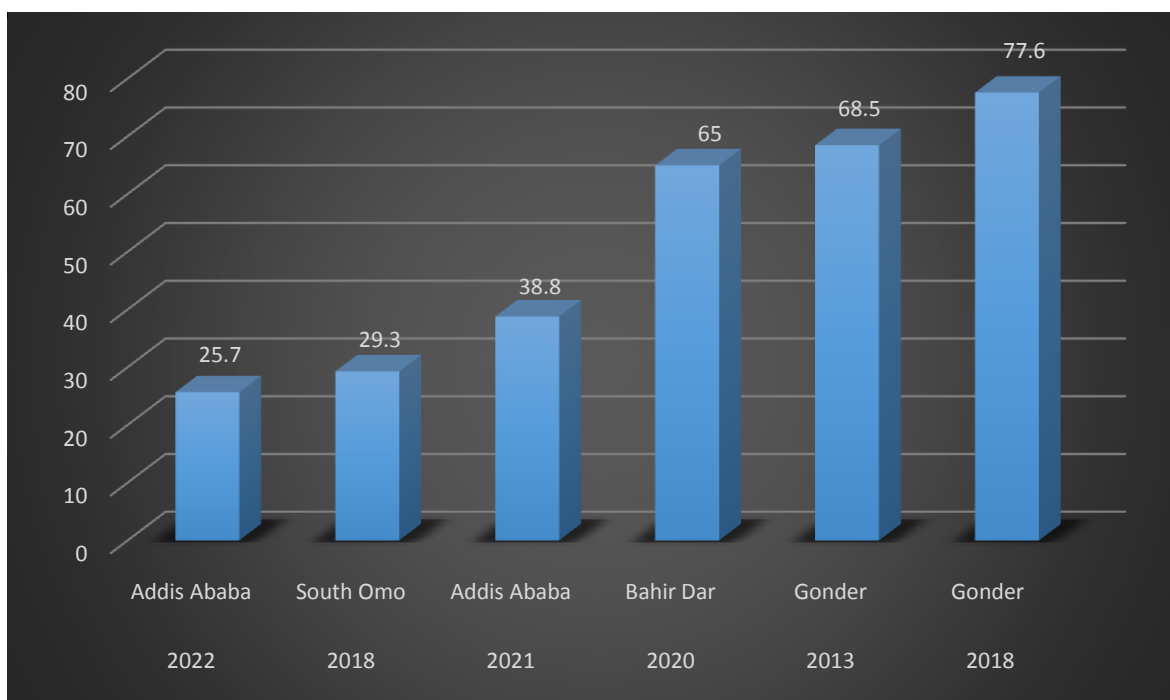


Figure 4- percent of HCWM practice with study area and year

IV. Discussion

This review indicates that a high volume of waste production from health care in Ethiopia. related to this fact The volume of waste is directly related with the patient flow, types service provides, type of service department. The study in Tepi general hospital indicate Daily Average 492.5 waste produce during Covid-19 pandemic which is very large also scarcity of resources. this means there is a mismanagement of resource, method of waste treatment and poor adherence to the three waste minimization procedure in addition, this review indicate there is poor prevalence of knowledge, Attitude and Practice in the health professionals, cleaners

and waste handlers. some of the reasons are lack of training, manual or guideline, poor allocation of budget, lack of enough attention by the government and weak monitoring and evaluation system is the major factors.

This review concludes that there is a highly poor health care waste management system in Ethiopia. The health care system generates large volume of wastes and majority of wastes are hazardous 61.9%,41.0%, 65.1%62%,43.1% when compare to the WHO guideline 85 % non-hazardous and 15 % hazardous and this is strongly associated with poor waste management practice.

Figure 4 showed that study areas like Bahir Dar and Gonder are better practice than Addis Ababa and South Omo. Ethiopia had a very similar poor result with other countries like 10.5% Uganda(Josephine Babirye et al, 2020), 49.4% in Nigeria(John Oluwatosin Makanjuola et al., 2021), 56.9% in Zambia(Colleen M. Leonard et al, 2022), 59.0% in Kenya(M.W. NJIRU et al., 2013) and 35.7% in Swedish(Asomugha Adaora Uloma, 2022) however other studies in Delhi 97.4%(Soyam GC et al. , 2017) and Hungary 84.0%(Asomugha Adaora Uloma, 2022) showed a very good practice.

The health care wastes that are not properly managed it causes serious health and environmental threat to the health profession, cleaner, waste handlers and transporter are directly affected by exposing them to different hazards, 62.6% blood and body fluid and 58.8% needle stick/sharp hazards exposed study on nurses who are working in public hospitals (Yeshitila Belay Belachew, et al, 2017). Needle stick, splash and aerosols are cause easily transmissible disease like Hepatitis A, B and C, HIV, Tuberculosis, Meningitis, Corona, Influenza, Salmonella and Amoeba in the community. This describe by (Mengiste DA, 2021) ,study conducted on waste handlers for hepatitis B prevalence, then the result showed 20.4% of participants are positive.

There is also high percent of Anti-infective medications are weasted on the study conducted by(Ebrahim Awol Jemal, et al, 2019),which is one of the reason for high prevalence of drug resistance development and poisoning. it can be well managed by using proper forecasting, utilization, development of treatment guidelines and improve the linkage between the health care provider with the pharmacy and between pharmacy-pharmacy to transfer drugs to shortage areas.

Mercury also highly dangerous poison that are neglected by health care facilities it must be removed by creating the awareness, proper disposal system and substitute materials that are not use mercury like blood pressure and temperature monitoring device can be replaced by digitals and chemicals must be used based on material safety data sheet protocol at all times.

V. Conclusion and Recommendation

Ethiopian minister of health prepares different guidelines and rules and regulations on health care waste management and infectious waste, but there is a huge gap on implementation. Developing countries like Ethiopia must strength the waste reduction strategies, allocate proper budget, continuous training and capacity building, distribution of HCWM and infection prevention manual and guide lines, organizing infection prevention committee, build suitable work environment, effective follow-up on implementation and recognition for well-implemented facilities.

Furthermore, it must be the burning issues by public activists, politicians, and human and environmental rights related organizations.

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Conflict of interest

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