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Healthcare waste management in district hospitals of Madhesh province: A key stakeholder's perspective

Jot Narayan Patel,[1,3*] Shambhu Kumar Upadhyay[2], Ajay Rajbhandari[2]

[1]MPH student (former) & [2]Professor; Department of Public Health, Patan Academy of Health Science, Lagankhel, Lalitpur, Nepal, [3]Chairman; Priyapratyu Health Concern Pvt. Ltd., Mahalaxmi Municipality-2, Lalitpur, Nepal.

ABSTRACT

Background: Healthcare waste is special waste produced in healthcare institutions, including hospitals. Healthcare waste management guideline adherence was low (16.3%) in Kenya. Nearly half (49.2%) of healthcare waste handlers had low knowledge of healthcare waste management, and 43.0% had negative attitudes toward it. In a sub-regional hospital, all healthcare waste management handlers were injured in a year; among them, 42.0% were injured less than 5 times. It contains a high potential for infection and injuries. Till the commencement of this study, published evidence on adherence to healthcare waste management guidelines 2014 in Madhesh province was not found. The study aimed to assess the adherence to healthcare waste management practices and knowledge among waste handlers at the government district hospitals of Madhesh province, Nepal.

Materials and Methods: A cross-sectional qualitative method study was employed to interview ten key stakeholders from ten government district/level hospitals in Madhesh province with key informant interview guidelines for key stakeholders. A thematic analysis was done using R-Package Qualitative Data Analysis (RQDA) version R-3.6.1.

Results and Discussion: The government of Nepal has amended the policy for supportive staff in Nepal. The healthcare waste handlers are also grade-less staff for government hospitals. However, the local management committee of government hospitals has a provision to hire supportive staff from their local income. It has increased the chance of low retention of healthcare waste handlers in hospitals. The numbers of trained healthcare waste handlers in hospitals were not properly found. The majority of hospitals have no proper mechanism to treat and store healthcare waste before deposing the healthcare waste. Most of the hospitals do not have enough healthcare waste, and many healthcare waste handlers were not motivated to work due to low payments from the hospital.

Conclusion: There is a need to enforce the legislation on healthcare waste management. In addition, regular training on healthcare waste management for healthcare waste handlers in healthcare facilities is required to improve the use and implementation of Healthcare Waste Management Guidelines 2014, Nepal.

Keywords: healthcare waste management, waste handlers, knowledge, practice, district hospital

***Corresponding author**
Mr. Jot Narayan Patel
Chairman
Priyapratyu Health Concern Pvt. Ltd.
Mahalaxmi Municipality-2, Lalitpur,
Nepal.
Email: jotnarayanpatel@gmail.com

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INTRODUCTION

Healthcare waste is becoming a global public health concern, particularly in low- and middle-income countries (LMICs), including Nepal.[1] Healthcare waste management (HCWM) training is essential to healthcare waste handlers (HCWHs) and helps to improve the knowledge and practice of healthcare waste handlers. Around 90.4% of cleaning staff had received training on HCWM as well, and doctors, nurses, and students had also received training on HCWM in the academic hospital of Pretoria. Around 64% of participants knew the policies, legislation, and guidelines of HCWM.[2] The vital few root causes to contribute to the HCWM problem are interim storage (50%), fatigue (25%), lack of supply (10%),

segregation (7.5%), sharp disposal (6%), and timeliness/training (1.5%).[3] A study conducted in Wakiso district, Uganda, in 2019 reported that adherence to HCWM among healthcare workers (healthcare workers at the hospital level and healthcare workers at the HCIV level) was 10.5%, fully adhered, and 85% partially adhered; these are below the WHO standard, which requires a minimum of 89% adherence.[4] With the steady increase in the number of healthcare institutions in Nepal, the amount of medical waste generated is also increasing. For safe and scientific management of biomedical waste, handling, segregation, mutilation, disinfection, storage, transportation, and finally disposal are vital steps for any healthcare institution.[5] A range of initiatives have been pursued by various governmental and non-governmental bodies, including the Solid Waste Management Act-2011 AD,[6] HCWM guidelines-2014 AD,[7] to address the waste challenge in Nepal. However, compliance with HCWM has not been consistent with Nepal's recommended guidelines for most healthcare institutions. It is, therefore, possible that staff working in health facilities and people living nearby may be exposed to unnecessary risks, including possible environmental contamination. Therefore, the present study was conducted to assess the adherence to HCWM practices among waste handlers of all government district hospitals in Madhesh province, Nepal.

MATERIALS AND METHODS

Study design, setting, and participants: A hospital-based cross-sectional qualitative method design was employed among ten government district hospitals of Madhesh province of Nepal.

The Madhesh province is situated in the southern part of Nepal. Geographically, it is the plain region. It is the second most densely populated province in the country. The total population of the province was 5,918,972 at the time of study. It includes eight districts from Saptari (east) to Parsa (west). The province extends to Koshi province in the northeast, Bagmati province in the north, Lumbini province in the west, and the international border between Nepal and India (Bihar state) in the south. The majority of people here speak Maithili, Bhojpuri, Bajjika, and Nepali. There are a total of 136 local government bodies consisting of 1 metropolitan city, 2 sub-metropolitan cities, 73 municipalities, and 59 rural municipalities.[8]

Around 34% of households in the Madhesh province did not have a water supply or any cleaning agents for hand washing. Birth registration is less (45%) in comparison to other provinces. The percentages of women and men with more than secondary education are the lowest in Madhesh province (3% and 8%, respectively). Fewer women (39%) were employed than in other provinces during the National Demographic Survey 2016.[9] The estimated growth rate of GDP in Madhesh province was 2.3 percent for 2019/2020.[10]

There are 790 government health facilities; among them, 742 are health posts, 35 are primary healthcare centres, 10 district-level hospitals, 1 provincial hospital, 1 federal hospital, and 1 regional hospital.[8] Recently, the regional hospital has been upgraded as an autonomous academic health institution (Gajendra Narayan Singh Swasthya Prathisthan). Besides, there are 80 private hospitals and two private medical colleges in the province. There are different sanctioned posts of health workers and other support staff in each district hospital. The total sanctioned posts of staff of ten district hospitals of the province were two hundred forty-two, which includes medical superintendents, MD/MS, medical officers, nursing officers, staff nurses, auxiliary nurse midwives (ANMs), paramedics, administrative staff, and support staff at the study period then.[11] According to a new organogram of district hospitals, there is no sanctioned post for healthcare waste handlers.

The major act of Nepal for health system management was endorsed in 1996 based on the National Health Policy of 1991. It was amended in 2018. Since then, the government has given the authority to hire the HCWHs either on a contract or wage basis, that is, per day payment through the hospital operating committee or hospital management committee rather than the permanent service entry system. They hire required manpower and manage them with the income from the hospital operating through management committees.[12,13,14] The hiring of temporary staff is not a sustainable way for HCWM in district hospitals because of frequent turnover. After that, the hospital must hire new HCWHs and should provide training to them before involving them in work. A short training of HCWM is provided by the quality in-charge of the hospital, that is, registered nursing staff of the management division of the Department of Health Services. A complete enumeration method was used to collect the data from ten district government hospitals in the province.

According to the HCWM guideline (2014 AD), each hospital has an HCWM committee that includes the chiefs/directors of the health facility, the department head, the matron, the waste management officer, and representatives from supportive staff. Medical superintendents are mostly available in district hospitals, and they act as authoritative as well as regulatory bodies for healthcare waste management.

There is a provision to keep a set of healthcare waste dustbins (at least three different colours) in each section/department at a hospital or health clinic for healthcare waste segregation (non-risk waste, non-risk biodegradable waste, infectious waste, and hazardous waste) where direct patient care is allowed. The HCWHs or nursing staff keep a record of the production of healthcare waste, its amount, and frequency regularly. The HCWHs tie the bag of healthcare waste to the healthcare waste generation area, then they transport the bag of healthcare waste by using a cart or trolley to the healthcare management plant site or at the dumping site. After that, they disinfect the healthcare waste by heating or using chemicals and store it separately according to the nature of healthcare waste (3 Rs: Reduce, Recycle, and Reuse). It is a quality parameter and indicator that lies under the Quality and Infection Prevention guideline of Nepal.[15]

Tools and techniques for data collection: An open-ended interview guideline was used to take information from key informant interviews (KIIs) of 10 government district hospitals in the province. The data collection period was from November 2020

to December 2020.

Data management and analysis: The data collected from KIIs were transcribed and translated to English. The translated data was copied from the notepad and transported to RQDA version 3.6.1 software. All the transcriptions were repeatedly reviewed, and using the add option of RQDA, the pieces of code were highlighted in RQDA. After that, the theme was generated according to the deductive method. After that, the HTML file was generated; the code description according to the suitable theme and qualitative finding was generated.

Validity and reliability of tools: The data collection tool was mainly adapted from a report on the assessment of biomedical waste management practice among healthcare institutions by the Nepal Health Research Council-2012 AD,[16] and the HCWM rapid assessment tool (WHO).[17] Tools used in similar research carried out in low-income countries were also taken into consideration.[18] Tools were prepared in English first and then finalised in the Nepali language after discussion with an expert, guide, and co-guide. The primary codes were generated by the researchers themselves, as well as being coded by other independent researchers. The percentage agreement method was used to calculate the inter-coder reliability. The inter-coder reliability score was 74.13%. The member checking was done for KIIs. All ten interview transcriptions along with records were sent to participants for reviewing any difference between transcription and recording. The suggested feedback was incorporated into the transcriptions.

Inclusion and exclusion criteria

Inclusion criteria: The chief of each hospital working in government district hospitals in Madhesh province with at least six months of involvement in the job of waste handling.[19]

Exclusion criteria: Medical Superintendent or chief of hospitals who were on leave or official deputation within the data collection period for two months.

Ethical statements: Ethical approval for the study was obtained from the IRC of Patan Academy of Health Sciences (IRC-PAHS Ref: PHP2011171469). Similarly, formal approval was also taken from the Provincial Health Directorate, Madhesh province. The approval for the study was also received from the respective government district hospitals. Informed consent was taken verbally on the phone, and audio recordings were done. The privacy and confidentiality of the information provided by the participants were maintained by using initials during data entry and analysis. The recorded data have been stored on the hard drive of the computer with coding by the name of the hospital and respondent.

RESULTS

Sociodemographics of Participants

The mean age of participants was 35.80±6.86 years of the total ten participants in the study. Among them, 90% were male, and the rest were female. Regarding marital status, 70% were married, and 40% of participants were completed post-graduate (**Table 1**).

Table 1: Socio-demographic characteristic of Participants

Variables	(Mean ± SD)	n (%)
Age		
Mean age (years)	35.80±6.86	
Age groups		
≤ 30		3 (30)
31- 40		4 (40)
41 - 45		2 (20)
>45		1 (10)
Gender		
Male		9 (90)
Female		1 (10)
Current Marital Status		
Unmarried		3 (30)
Married		7 (70)
Widow		0 (00)
Education		
Secondary Level		0 (00)
Bachelor level		6 (60)
Master level		4 (40)
Working Experience		
Mean Experience	7.60±4.427	
≤5 Years		4 (40)
>5 years		6 (60)

For the qualitative data analysis, key informant interviews (KIIs) were performed. A total of ten participants were selected for the KIIs from the district hospitals. The average time for an interview was 30-35 minutes. The major 54 areas of KIIs were issues related to steps of HCWM, challenges of HCWM guidelines, implementation and issues related to monitoring and evaluation of HCWM, issues related to occupational health and safety, planning and organisation, and importance of training and awareness. The six-phase qualitative data analysis process was used to analyse the qualitative data, which includes data familiarisation, generating initial codes, generating themes, reviewing potential themes, defining and renaming themes, and producing the report.[20]

Theme and Codes:

Table 2: Study themes and codes

Theme	Codes
Steps HCWM	Segregation, Collection, Transport, Sterilisation, Store, Disposal, and Periodically Collection
Challenges of Guidelines	Staff transfer, train resources, purchasing mechanism, hospital premises, laboratory waste,
Monitoring and evaluation	Checklist, Manpower, Recording, Logbook,
Training and Awareness	Environmental effect, facilitation
Occupational Health	ART service, vaccine, insurance, personal protective equipment (PPE), supply for waste handlers,
Planning and organizational issues	Planning implementation, policy, manpower, and budget allocation

Steps of healthcare waste management:

It was perceived that segregation, transportation, sterilisation, and storage of healthcare waste (HCW) were major issues related to the step of HCWM.

"Patient parties mix up a different type of healthcare waste together, like mixing needles, cotton, and blood cotton." - ***KII 1***

"Patients and visitors put all kinds of waste in one bucket; this is the first issue, and another issue is not a sufficient place to store the HCW at hospital premises. So, HCW mixed at one place after collection." KII 2

In district hospitals, there were neither central waste collection areas nor healthcare waste treatment facilities in many hospitals.

"There is a problem in the centre of the collection site; the municipality is helping, but they are

Helping only for non-hazard sample waste." KII 9

"All infectious HCW should be disposed of only after autoclaving. However, it has not

done at district hospitals". KII 1

Challenges of Guidelines: In this study, it was perceived that some activities create challenges in managing HCWM practices. The challenges of HCWM were the attitude of staff, hospital premises, placenta pit, staff transfer, procurement, annual plan, HCWM officer, and laboratory waste.

"Behaviour change and the discipline of the top to bottom workers are equally important in HCWM at district hospitals". KII 5

"Till now there is no placenta pit at our hospital to manage the placenta." KII 2

Monitoring and Evaluation: The documentation and regular follow-up from higher authorities are initial for monitoring and evaluation. However, it was not found properly done in district hospitals for healthcare waste management.

"We do not have any checklists and logbooks for the waste generated by the hospital." KII 9

"Persons doing monitoring might have confused and less knowledge regarding monitoring, lack of understanding due to temporary placement." KII 10

Training and Awareness: As well, many respondents said that HCW handlers were not trained in HCWM. So, there is a problem with HCWM in district-level hospitals.

"This training program is very important for cleaning staff to ensure participation of every staff, and the training program should be conducted frequently (2–3 participants at one session)." ***KII 10***

Occupational health and safety: The study shows that many HCW handlers were not aware of healthcare waste, and most of them have not received training. However, few hospitals supply PPE sets to waste handlers regularly.

"We are providing PPE such as masks and gloves to ensure the safety of the waste handlers in our hospital daily." KII 4

"We are providing PPEs, masks, and gloves to the waste workers regularly. But the main issue we need is proper training and awareness programs." KII 5

Moreover, certain hospitals provided vaccination and post-exposure services to their staff, including healthcare waste handlers.

"The ART for prophylaxis and HIV have been provided to HCWHs after exposure. KII 1

"We have a regular vaccination program and provide it to HCW handlers after any injury, e.g., TT, Hepatitis B vaccine." KII 9

"Treatment should be done without any formality to HCWHs after

Exposure by government. However, it is not applicable for HCW handlers." KII 3

Planning and organisational issues: The salary of the HCWHs was very low. So, they were not fully motivated by their responsibility. On the other hand, the involvement of all staff in the HCWM committee enforces the effective implementation of HCWM in district hospitals.

"Government must understand that the salary is very low, which demotivates staff in managing waste at the district hospital." KII 6

"If so, we will include the emergency in-charge, heads of all departments, indoor in-charge, medical recorder, lab in-charge, administration, and finance head in HCWM planning." KII 4

DISCUSSION

In the current study, it was found that the steps of HCWM were not properly followed by the waste handlers in the hospital. Mainly, there were many issues related to waste segregation, transportation, sterilisation, and storage of healthcare waste. Also, the patient visitors and patients did not properly put the waste in the different colour-coated waste bins.

"Patient parties mix up a different type of healthcare waste together, like mixing needles, cotton, and blood cotton." ***KII 1***

"Patients and visitors put all kinds of waste in one bucket, despite different colour-coated waste bins being the top issues, and storage of healthcare waste within hospital premises is another issue. So, HCWHs mix it at one place after collection of waste." KII 2

In a similar study, it was reported that in many hospitals in Nepal, all waste, such as potentially infectious waste, office and general food, construction debris, and hazardous chemical materials together, was generated, collected, transported, and finally disposed of.[21] Another similar previous study reported that staff did not follow the appropriate transport practices in the hospital.[22]

HCWM guidelines are a vital document that suggests HCWHs and hospital key stakeholders to do activities properly. It is related to the attitude of staff, hospital premises, placenta pit, staff transfer, procurement, annual plan, HCWM officer, and laboratory waste. In the current study, it was reported that hospitals did not have all these facilities, including staff's behaviour.

"Behaviour change and the discipline of the top to bottom workers are equally important in HCWM at the district hospital, which is not found in our hospital." KII 5

"Till now there is not a placement pit at our hospital to manage placenta." KII 2

A similar study regarding HCWM also reported that some hospitals did not handle ionising waste properly. They claim that there were no clear ways of handling ionising waste.[22] Regarding policy and legislation, many countries in Asia do not have a provision or written policy for waste management.[23] A similar study also reported that few clinical staff were concerned about HCWM in hospitals.

Monitoring and evaluation from higher-level officials to district-level staff can increase the desire to work properly by HCWHs in a hospital. However, the current study found that many hospital staff do not follow the checklists and logbooks to keep records for waste generation and disposal. Also, due to the high turnover of trained staff, there is less knowledgeable staff for monitoring and evaluation. Sometimes, they confuse themselves about how to monitor and evaluate the healthcare waste handlers.

"Persons doing monitoring might have confused and less knowledge regarding monitoring, lack of understanding due to temporary placement." KII 10

A mini-review reported that the rule and implementation of waste segregation were strictly and widely practiced in developed countries. However, in Asian developing countries there was a lack of proper practices of waste segregation and the implementation of standards, which also vary from place to place. According to the standards and local rules for healthcare waste management, healthcare waste is supposed to be contained in colour-coded and labelled bags or containers. It mainly occurred due to ignorance of handling of staff and somewhat owing to a lack of maintaining the records.[24]

A current study reported that the training on HCWM for waste handlers was not properly provided by the hospital due to the high turnover of waste handling staff. In a mini-review, it was found that many Asian countries such as India, Pakistan, and Bangladesh lack proper waste treatment facilities, training programs, and safety measures.[24] Overall, there was also not good management of PPEs for waste handlers. However, certain hospitals provide vaccination and post-exposure services to their staff, including HCWHs in Nepal.

In the current study, it was found that the salary of waste handlers was very low, and it did motivate the waste handlers to work perfectly for healthcare waste management. Many participants claimed that these issues should be understood by the government of Nepal. Regarding planning issues, some hospitals have done good HCWM in the hospital.

In a similar study, it was reported that the main duty of the hospital was operational planning for training HCWHs as well as facility visitors. It was also found that fewer healthcare workers in hospitals created challenges in HCWM.[25]

LIMITATIONS

There are certain limitations in the study. First, the study was conducted during the peak time when COVID-19 was spreading rapidly. So, the research had taken an interview through telegram and cell phone. The total number of district-level hospitals in Madhesh province was ten. So, fewer key interview informant views were analysed in this study.

CONCLUSION

The healthcare waste management guideline 2014 of Nepal has created a road map for healthcare waste management. However, it has not been followed by healthcare waste handlers and hospital managers. The low payment to HCWHs and retention of HCWHs, including a lack of training about HCWM for HCWHs, are common problems to adhere to the guidelines.

ETHICAL CONSIDERATION:

This study was conducted to fulfill a Master's level thesis requirement for a Public Health Department of Patan Academy of Health Science entitled "Adherence of Healthcare Waste Management Practices among Waste Handlers at Government District Hospitals of Province Number 2, Nepal".

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CONFLICT OF INTEREST

Authors declare no conflict of interest among stakeholders and authors.

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Nil

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