

# Knowledge, Attitudes and Practices of Healthcare Workers in Private Clinics on Healthcare Waste Management in Kawempe Division, Kampala District, Uganda

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## Abstract

Healthcare waste poses great risks to healthcare workers, waste handlers, communities and the environment if not properly managed. The study assessed knowledge, attitudes and practices on healthcare waste management among healthcare workers in private clinics in Kawempe Division, Kampala, Uganda. A descriptive cross-sectional study employing both quantitative and qualitative data collection methods was conducted. A self-administered questionnaire was used to collect quantitative data in 137 private clinics among different cadres including doctors, nurses, midwives, clinical officers, laboratory technicians, and dentists, while an observational checklist was used in 20 clinics to establish practices. Quantitative data was entered and cleaned in EPI DATA 3.0 and analysed in STATA 13. An interview guide was used to collect qualitative data among eight key informants from private clinics, local authority practitioners, and health care waste researchers which was analysed thematically. All the 137 healthcare workers (100%) knew about healthcare waste management, and agreed that healthcare waste management was not only important but was, their responsibility. Among the respondents, 73.0% and 69.3% agreed that burying and burning healthcare waste respectively could cause harm. In addition, 47.4% of the respondents reported injuries due to healthcare waste particularly from needle sticks (64.6%). Lastly, 74.5% of the respondents reported using personal protective equipment during work activities. Most private clinics were limited by space, and poor enforcement of waste management guidelines by authorities was identified. Strategies to improve practices among healthcare workers in private clinics are needed for proper management of healthcare waste.

**Des Connaissances, des attitudes et des pratiques des agents de santé dans les cliniques privées à propos de la gestion des déchets de soins de santé dans la division de Kawempe, district de Kampala, Ouganda**

## Résumé

Les déchets de soins de santé présentent de grands risques pour les travailleurs de la santé, les gestionnaires de déchets, les communautés et l'environnement s'ils ne sont pas correctement gérés. L'étude a évalué des connaissances, des attitudes et des pratiques sur la gestion des déchets médicaux parmi les agents de santé dans les cliniques privées de la division

de Kawempe, Kampala, Ouganda. Une étude transversale descriptive utilisant à la fois des méthodes de collecte de données quantitatives et qualitatives a été menée. Un questionnaire auto-administré a été utilisé pour rassembler des données quantitatives dans 137 cliniques privées parmi différents cadres, notamment des médecins, des infirmières, des sages-femmes, des agents cliniques, des techniciens de laboratoire et des dentistes, tandis qu'une liste de contrôle d'observation a été utilisée dans 20 cliniques pour établir les pratiques. Les données quantitatives ont été saisies et nettoyées dans EPI DATA 3.0 et analysées dans STATA 13. Un guide d'entretien a été utilisé pour rassembler des données qualitatives auprès de 8 informateurs clés de cliniques privées, de praticiens des autorités locales et de chercheurs sur les déchets de soins de santé qui ont été analysés de manière thématique. Tous les 137 agents de santé (100 %) connaissaient la gestion des déchets de soins de santé et ont convenu que la gestion des déchets de soins de santé était importante et de leur responsabilité. Parmi les répondants, 73,0% et 69,3% ont convenu que l'enfouissement et le brûlage des déchets de soins de santé respectivement pourraient mener aux dommages. De plus, 47,4 % des personnes interrogées ont signalé des blessures dues aux déchets de soins de santé, en particulier des piqûres d'aiguilles (64,6 %). Enfin, 74,5 % des répondants ont déclaré utiliser des équipements de protection individuelle lors des activités de travail. La plupart des cliniques privées étaient limitées par l'espace et une mauvaise application des directives de gestion des déchets par les autorités a été identifiée. Des stratégies visant à améliorer les pratiques parmi les travailleurs de la santé dans les cliniques privées sont nécessaires pour une bonne gestion des déchets de soins de santé.

## Introduction

Healthcare services inevitably generate waste that may be hazardous to health as well as the environment. Healthcare waste is hazardous because it contains certain substances such as sharps, pharmaceuticals and infectious waste generated during healthcare services (Hangulu and Akintola, 2017; Teshiwal *et al.*, 2019). If not handled or disposed of properly, healthcare personnel, waste handlers, and the community are at risk of being affected by the nature of the waste such as sharps and corrosives, or by the pathogens harboured by this waste. The hazardous effects of healthcare waste are mild to severe including needle pricks to infections. As part of an organised approach to infection control and environmental protection, handling and disposal procedures should be strictly followed by all healthcare workers in healthcare facilities (WaterAid, 2011).

Healthcare waste management has become a big challenge for healthcare facilities in Kawempe

Division in Kampala District, Uganda (Wafula *et al.*, 2019). The problem of exposure to hazardous healthcare waste is aggravated by inadequate knowledge and poor attitudes of healthcare workers which may consequently lead to undesirable and harmful practices in healthcare waste management (Sanjeev *et al.*, 2014; Teshiwal *et al.*, 2019; Yazie *et al.*, 2019). Since private clinics are more in number than government health care facilities in Kampala with a ratio of 9.6:1 (MoH, 2018), they are likely to generate more waste which in turn can be injurious to the healthcare workers, the community and environment. In Kawempe division, there were 293 private clinics by 2019, each having an average of 1-2 healthcare workers (KCCA, 2019). During the handling of healthcare waste, healthcare workers and support staff can be injured if healthcare waste has not been safely packed or handled incorrectly (Ndejjo *et al.*, 2015).

The disposal of healthcare waste in non-designated areas commonly practised by private healthcare facilities in Kampala District has a

direct environmental effect of contaminating soil and ground water. Poor waste disposal is also a source of infections and injuries to the community from sharps (OWT, 2019), particularly children who are very likely to play around dumping sites.

Adequate knowledge, positive attitudes, and proper practices of staff of private healthcare facilities play an important role in the proper management of healthcare waste (Rao *et al.*, 2018).

The most recent studies on management of healthcare waste in Kampala District were conducted in public facilities (Mugambe *et al.*, 2012; Komilis *et al.*; 2012; Gupta *et al.*, 2016), hence a paucity of literature from studies carried out in private clinics. In addition, private clinics are utilised by a large section of the population due to their proliferation, hence the easy access to their facilities rather than the challenges faced in accessing services from public health facilities. These challenges at government facilities include long waiting times to access services, frequent out of stock as regards medication, and poor health worker attitudes towards patients (Musinguzi

*et al.*, 2018). There was therefore need to conduct this study on knowledge, attitude and practices of healthcare workers in private clinics on healthcare waste management in Kawempe Division, Kampala District, Uganda.

## Materials and Methods

### Study area and setting

The study was conducted in Kawempe Division, Kampala District, Uganda (Figure 1). Kampala, the capital city of Uganda located in the central region, has five divisions of Kawempe, Central, Nakawa, Rubaga and Makindye. Kampala has 1,392 healthcare facilities with 1,332 being private. Of the private healthcare facilities, 1,321 are clinics (MoH, 2018). Kawempe is the largest division in Kampala hence its selection for involvement in the study, with majority of its land being privately owned. Kawempe Division comprises of 746 villages within 19 parishes, most of which are informal settlements (Kinobe *et al.*, 2015; Wafula *et al.*, 2019). There were

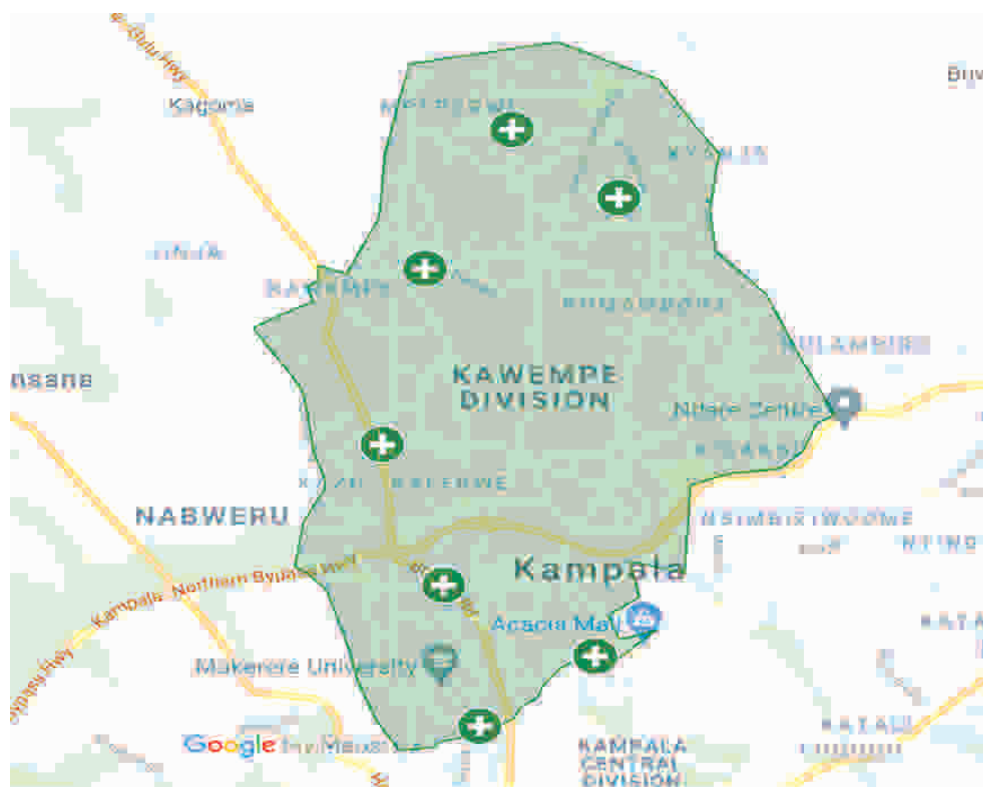


Figure 1: A map of Kawempe Division, Kampala

approximately 290,500 people in Kawempe Division during the 2014 census (Mutimba, 2018), with several settlements whose sole use is commercial such as private clinics. Kawempe Division is composed of 293 private clinics distributed in all its parishes (KCCA, 2019).

### Study design

A descriptive cross-sectional study was carried out using both quantitative and qualitative methods of data collection.

### Study population

The study population was healthcare workers working in private clinics in Kawempe Division, Kampala District. These included nurses, doctors, clinical officers, laboratory technicians, and midwives. For the qualitative part of the study, the key informants included private clinic owners / managers, local authority officials, and health care waste researchers.

### Sample size and sampling procedure

Using a formula for cross-sectional studies by Kish and Leslie (1965), an estimated prevalence of health workers with satisfactory practices in private clinics ( $p$ ) of 74% (Wafula *et al.*, 2019), and a 95% confidence interval, adjustments of the sample size in relation to the population size was done using the Cochran's formula to obtain a sample size of 147 healthcare workers. Using the list of all private clinics in Kawempe Division obtained from Health Management Information System (HMIS) of KCCA, a systematic sampling technique was done using the list as a sampling frame and considering 2 as the  $N^{\text{th}}$  value to sample 147 out of 293 clinics. All private clinics were in the order of counting numbers from 1 to 293 according to the KCCA health facility master-sheet. The starting value was obtained by simple random sampling through tossing a coin where the head represented an even number and the tail represented an odd number. Within the health care facilities, one healthcare worker was selected per private clinic by simple random sampling. For qualitative data, eight key informant interviews were conducted which were enough to reach data

saturation in line with the study objectives. Key informants were selected purposively due to their knowledge and positions in relation to health care waste management.

### Data collection procedure

Health workers in Kawempe normally have a high workload, as a result quantitative data was collected using a self-administered questionnaire which gave the respondents time to fill the tool at their own convenience. The completed questionnaire was collected from the respondents after one week. For the observational checklist, data was collected through observation of healthcare workers' routine practices and facilities upon seeking permission from the health facility administrators or staff. A key informant interview guide was used during key informant interviews, and audio recording was done. Health facility owners / managers were interviewed within their health care facilities, while local authority personnel and healthcare waste researchers were interviewed on scheduled appointments at their workstations. The data collection tools were validated by making reference to previous studies carried out on healthcare waste management. In addition, the tools were pretested in some clinics in Kawempe Division that were not involved in the study.

### Data analysis

Quantitative data entry was done in Epi data 3. Different study variables both continuous and discrete were measured, and descriptive univariate analysis on different variables were used to determine frequencies, proportions and percentages, together with measures of central tendency such as mean and median.

Qualitative data was manually analysed, guided by thematic analysis. Transcription took an average of 45 minutes per audio, and each transcript note was read at least three times, while identifying and highlighting the key points to generate codes. Similar codes were then grouped together into sub-themes, and overarching themes emerged from the sub-themes, which are presented in the results.

**Ethical considerations**

Prior to data collection, the study received approval from Makerere University School of Public Health as part of the Bachelors’ degree in Environmental Health Sciences programme. Furthermore, permission to conduct the study was obtained from Kampala Capital City Authority. Permission from the clinics' administrators for the participation of their health care workers in the study was also obtained. All participants were adults (18 years of age and above) and signed an informed consent form before taking part in the study.

**Results**

**Demographic characteristics of participants**

The study had 137 respondents who completed the questionnaire, yielding a response rate of 93.2%. Among these, 29.9% (41/137) were nurses, 27.7% (38/137) were midwives, and 17.5% (24/137) were clinical officers. Females were the majority of respondents 58.39% (80/137), diploma holders constituted 43.8% (60/137), while more than half 54.0% (74/137) had never been married. Among the respondents, the largest proportion 43.0% (59/137) were aged 19 – 25 years, 77.4% (106/137) had working experience of 1 – 5 years, and 66.4% (91/137) worked for 11 – 15 hours per day (Table 1).

Table 1: Social-demographic characteristics of healthcare workers

Variable	Frequency (n = 137)	Percentage (%)
<b>Gender</b>		
Male	57	41.6
Female	80	58.4
<b>Professional cadre</b>		
Nurse	41	29.9
Midwife	38	27.7
Laboratory technician	14	10.2
Clinical officer	24	17.5
Doctor	17	12.5
Others*	3	2.2
<b>Highest level of education</b>		
Certificate	52	38.0
Diploma	60	43.8
Degree	25	18.2
<b>Marital status</b>		
Single	74	54.0
Married	60	43.8
Separated / widowed	3	2.2
<b>Age (years)</b>		
19 – 25	59	43.0
26 – 30	52	38.0
31 – 35	6	4.4
= 36	20	14.6
<b>Average time spent at workplace per day (hours)</b>		
4 – 10	41	29.9
11 – 15	91	66.4
16 – 18	5	3.6
<b>Years of experience</b>		

\* Dentists, consultants

Table 2: Effects of poor health care waste management and who was affected

Effects of poor health care waste management	Frequency (n = 137)	Percentage (%)
Injuries	101	73.7
Infections	126	92.0
Environmental pollution	83	60.6
Others*	1	0.7
<b>Those affected by poor health care waste management</b>		
Health care workers	111	81.0
Waste handlers	99	72.3
Patients	77	56.2
Community	103	75.2
Others**	4	2.9

\* High costs of management

\*\*Cleaners, government

### Knowledge on healthcare waste management

The study found that all respondents 100% (137/137) had at one time or the other heard of healthcare waste management. On assessing the healthcare workers sources of information on healthcare waste management, majority 73.0% (100/137) reported learning institutions, followed by training and workshops 48.9% (67/137), media 12.4% (17/137) and co-workers, 17.5% (24/137). Majority of the respondents 96.4% (132/137) were aware of the benefits of proper healthcare waste management. Infections 92.0% (126/137) and injuries 73.7% (101/137) were the major known effects of poor healthcare waste management. Healthcare workers 81.0% (111/137) and the community 75.2% (103/137) were reported as the most affected by poor health care waste management (Table 2).

From the key informant interviews, health care workers from private facility settings were not very knowledgeable about health care waste management because those in private facilities rarely had the opportunity and time for capacity building through attending trainings and workshops due to financial constraints. In addition, health care workers from private facilities majorly relied on knowledge obtained from their former academic institutions of learning.

*"Healthcare workers from private clinics are not as knowledgeable about proper healthcare waste management as those in government facilities. Most private clinics rarely sponsor their workers to attend trainings on proper healthcare waste management thus they end up using only the studied knowledge from their former schools of training." Local authority personnel*

### Attitudes on healthcare waste management

The attitude of healthcare workers towards health care waste management was commendable based on the indicators used in this study. The majority of respondents 94.9% (130/137) agreed that infections due to poor healthcare waste management can be prevented. Burying (73.0%) and burning (69.3%) of healthcare waste were thought to have the highest potential to cause health hazards. All respondents 100% (137/137) agreed that health care waste management was important, and that every healthcare worker should have broad and sufficient knowledge about healthcare waste hazards and the associated legislation. Most of the respondents 96.4% (132/137) agreed that proper healthcare waste management was their responsibility, whereas about two-third 63.5% (87/137) agreed that healthcare waste out of their custody was their responsibility. Majority of the

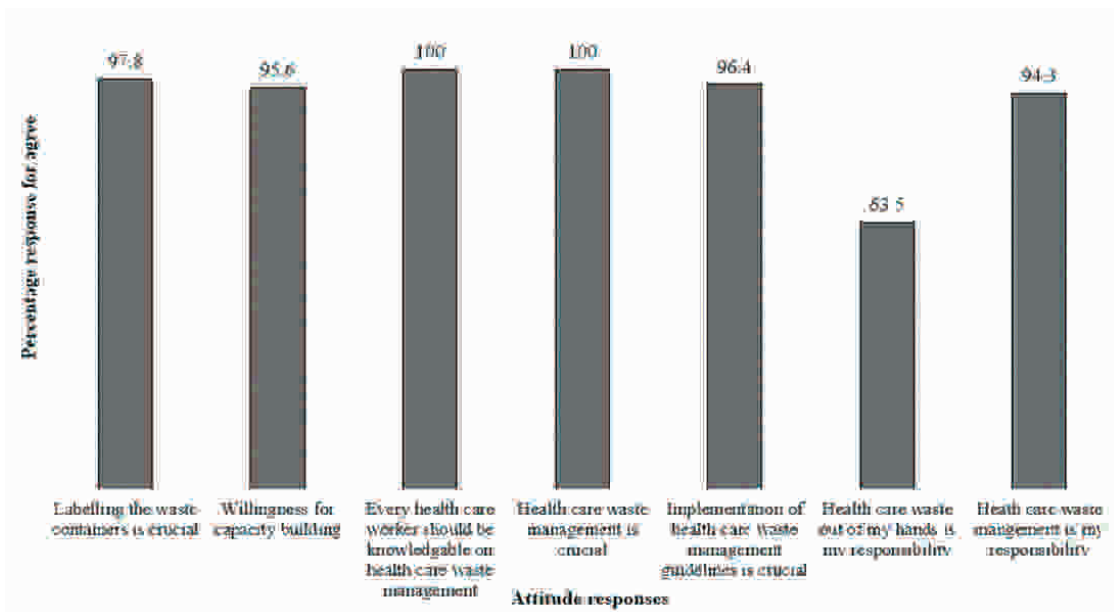


Figure 2: Attitudes of health care workers on health care waste management

respondents 96.4% (132/137) agreed that strict implementation of healthcare waste management guidelines and policies was necessary for proper healthcare waste management. As regards labelling containers before filling them with healthcare waste, 97.8% (134/137) of the respondents agreed that it was of clinical significance (Figure 2).

Some key informants reported that different health care workers had various attitudes towards health care waste management. Also, they perceived the different components of healthcare waste management differently as indicated below.

*"With the number of healthcare workers I have worked with, different healthcare workers have different attitudes towards healthcare waste management based on their varying backgrounds."* Private clinic owner

### Healthcare waste management practices

Slightly less than half of the respondents 47.4% (65/137) reported to have ever been affected due to poor healthcare waste management. The effects experienced by the healthcare workers reported were needlestick injuries 64.6% (42/65), followed by sharp injuries 44.6% (29/65), infections

27.7% (18/65), and environmental pollution 26.2% (17/65). More than half of the respondents 55.5% (76/137) reported that they disposed of expired drugs in waste containers through private companies, while some 27.0% (37/137) reported that they returned them to the National Medical Stores. On the other hand, 11.0% (15/137) of the respondents reported that they burnt waste, while 6.6% (9/137) either buried it or used other methods. The majority of respondents 63.5% (87/137) used polythene bags for the storage of healthcare waste, followed by those who used buckets 24.1% (33/137). According to the observations conducted, some waste bags were inserted in buckets, not following colour coding, and the healthcare waste was rarely segregated. For disposal of sharps, the majority of respondents 89.8% (125/137) reported using safety boxes. Healthcare workers mainly disposed of their healthcare waste through private companies 71.5% (98/137) and the local authority 21.2% (29/137), while a small proportion 7.3% (10/137) either burned or buried their waste. With regard to personal protective equipment (PPE). Majority of the respondents used gloves 99.3% (136/137) followed by gumboots 35.8% (49/137), clinical coat/apron 25.6% (35/137) and others 16.1%

(22/137) such as hairnets, goggles and face masks. The majority of respondents 74.5% (102/137) reported that they always used PPE when handling healthcare waste.

From key informant interviews, owners of private clinics reported that the local authorities did not provide adequate monitoring and supervision to private waste collection companies during their activities to ensure efficient collection, treatment and final disposal. In addition, waste collection companies were non-compliant in regular collection of waste since their supervisors prioritised collecting their payments.

*"Waste collection companies are not committed to promotion of healthcare waste management practices among private facilities due to absenteeism and poor compliance to timely waste collection. On top of that, their services are not fully supervised and monitored since the authorities mainly mind about healthcare waste management payment."*

Private clinic owner

The size of the clinics contributed to the health care waste management practices of healthcare workers. Indeed, clinics with relatively large space had enough room for assembly of different waste bins compared to those with small space. From the observations, most of the smaller clinics (a reception, a dispensary and a maximum of two wards) had improper healthcare waste management practices due to the limited space to accommodate the waste bins for the different categories of healthcare waste. Larger clinics with more than two wards had relatively better healthcare waste management practices such as improved waste segregation since waste bins were present at all stations.

*"In these small clinics, we have relatively limited space for assembly of different waste bins thus hindering our waste segregation practices."* Private clinic owner

In addition, key informants reported that most of the healthcare workers in private clinics did not

properly maintain their healthcare waste in comparison with government health facilities due to limited monitoring from the local authorities. In addition, healthcare waste management laws, guidelines, policies and standards were not followed by the majority of private clinics in remote areas of the division due to ineffective supervision and enforcement.

*"Health care waste management laws and guidelines are not followed by all private clinics particularly those in remote areas of Kawempe division. There is therefore need for regular supervision and enforcement of health care waste guidelines in all private clinics."* Local authority personnel

On the other hand, some key informants reported that a number of private clinics, especially the larger ones, managed healthcare waste better than government health facilities because of their reliable budget for this activity unlike government ones which had to use a limited primary health care budget. In addition, it emerged from the interviews that proper healthcare waste management in private facilities was further promoted to maintain a conducive environment and positive image of the facilities before the customers.

*"Private clinics use their own generated funds to manage healthcare waste hence maintaining their image. However, government facilities rely on the primary healthcare budget which then turns out, not to be enough for all the facility requirements."* Healthcare waste researcher.

From the observations, out of the 20 private clinics sampled: 55.0% (11/20) disposed sharps in safety boxes; only 10.0% (2/20) followed colour coding at the point of waste generation; 40.0% (8/20) had waste bins at all stations of the facility irrespective of their size, nature or material; 15.0% (3/20) had waste bins with covers that were foot operated; and 85.0% (17/20) had secured onsite waste collection areas and with limited access to unauthorized people.



## Discussion

Most of the healthcare workers exhibited good knowledge and attitudes, coupled with fair practices towards healthcare waste management. Findings from the study showed that the majority of participants were females and diploma holders. The biggest proportion of healthcare workers knew the hazardous effects of healthcare waste. Needlestick injuries, sharps and infections were the prominent results from poor waste management. Healthcare workers' knowledge and attitudes about health care waste management are key in the management of healthcare waste in private clinics for the safety of the healthcare workers, support staff, patients, waste handlers, the community and the physical environment.

More than half of the respondents were aware of the effects of poor healthcare waste management, with major concerns being on infections 92.0%, injuries 73.7% and environmental pollution 60.6%. This was in harmony with results obtained in a study conducted in southeast Nigeria, another sub-Saharan country, where the healthcare workers in selected private facilities had significant knowledge in relation to more training they had on healthcare waste management (Oli *et al.*, 2016). Although there is increased global awareness among healthcare professionals about healthcare waste management, the level of awareness in some parts of the world is unsatisfactory due to differences in accessing information (Teshiwal *et al.*, 2019; Abhishek *et al.*, 2016). The high level of knowledge among healthcare workers on healthcare management in this study can be used to improve healthcare waste management at the facilities. Healthcare waste management is an integral part of hygiene and infection prevention and control within private health facilities (Mugambe *et al.*, 2012). Therefore, proper management of health care waste should be maintained as it is essential to prevention of nosocomial infections, injuries and environmental pollution.

All the respondents agreed that healthcare waste management was important and regarded it as a serious issue. This is similar to results from a study conducted in primary health centres in

Lucknow, India where almost all health workers (98.9%) agreed that proper management of healthcare waste was important (Gupta *et al.*, 2016). Furthermore, 96.45% of the respondents in this study agreed that strict implementation of guidelines and policies was necessary for proper healthcare waste management. However, key informants reported that implementation and enforcement of these guidelines and policies was weak. Some regulations, guidelines and policies such as the duty of care principle provide detailed requirements for segregation, handling, storage, transport, and treatment of waste, whereas other regulations have minimal provisions. Compliance with regulations, guidelines and policies by many healthcare workers remains a problem in several countries due to lack of proper enforcement regimes (Titto *et al.*, 2012). According to studies carried out in other parts of Africa, healthcare workers portrayed a desire to improve their attitudes towards healthcare wastes management (Anozie *et al.*, 2017; Awodele *et al.*, 2016). Such commendable attitudes could be used by managers of private clinics to improve healthcare waste management in their facilities.

In this study, over half (55.5%) of the respondents disposed of expired drugs in the recommended waste bins, while the others made use of disposal methods such as burning and burying that were not recommended. Such undesirable methods of waste disposal are hazardous to the community and environment. This finding is similar to other studies within Uganda and other countries that demonstrate that compliance with healthcare waste management regulations and guidelines in many health facilities remains a challenge (Babanyara *et al.*, 2013; Hakim *et al.*, 2014; Isaac, 2016; Kajubu, 2014; Mashao, 2015). To minimise the health risks and hazards of healthcare waste management, it ought to be mandatory for all clinics to adopt full PPE for health workers (USAID, 2011). Findings from this study showed that, the use of PPE was unsatisfactory as only 74.5% of the respondents reported always using PPE when handling health care waste. A study conducted in Kenya showed that an increase in the number of staff who used PPE resulted into

fewer incidences of injuries and infections from the health care waste (Nkonge *et al.*, 2012). It is important to note that one of the common barriers to effective healthcare waste management in private clinics is poor practices such as lack of waste segregation at waste generation point (Katusiime, 2018). There is need for local authorities to ensure compliance to healthcare waste management guidelines so as to combat the likely negative effects to the healthcare workers such as needle stick injuries and nosocomial infections.

One of the limitations of the study is that it used a relatively small sample. This may therefore affect the generalizability of the findings to other contexts. However, the findings can be used to inform larger studies within Uganda and other low- and-middle income countries. In addition, the responses were self-reported which could have led to social-desirability bias. A key strength of the study is that it employed both quantitative and qualitative methods which enabled triangulation of findings.

## Conclusion

The healthcare workers were generally aware of the importance of proper healthcare waste management and the effects of poor management of healthcare waste. Although the healthcare workers' attitudes towards health care waste management were commendable, gaps in practice were identified in segregation, collection, treatment, onsite storage, and use of personal protective equipment. Strategies to improve practices among healthcare workers in private clinics are needed for proper management of healthcare waste. In addition, there is need for healthcare workers to fully utilise systems in place within health facilities for proper management of healthcare waste such as waste bins, safety boxes, and waste collection service providers.

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