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Biomedical Waste Management (BMW) In Kinshasa "Case Of The Kalembe-Lembe Pediatric Hospital" In The Democratic Republic Of The Congo

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Abstract –Biomedical waste management is a major concern in the health and environmental fields. This interest is justified on the one hand by the importance of the risk linked to the production of healthcare waste, and on the other hand by the nuisances that can be caused by treatment techniques for human health and the environment . This is how a study was conducted in Kinshasa precisely within the KALEMBE-LEMBE Pediatric Hospital to verify the level of knowledge and attitudes of the healthcare staff of the said health structure on the safe management of biomedical waste. This study is also of capital importance in the sense that it will allow decisions to be made and guide the agents of a health structure towards responsible biomedical waste management. It will also serve as a research tool for further investigations. The health sector in the Democratic Republic of Congo in general and Kinshasa in particular plays a major role in the protection and promotion of health. Although necessary, it unfortunately produces special waste with risks of infection, contamination, toxicity and risks of mechanical accidents. This study is also of capital importance in the sense that it will allow decisions to be made and the agents of a health structure to be guided towards rational management.

Keywords – Biomedical waste, KALEMBE-LEMBE Pediatric Hospital, Kinshasa.

1. INTRODUCTION

According to WHO (2010), healthcare activities help protect health, cure patients and save lives, but they generate waste (around 20%) and represent a danger to health and the environment. Healthcare waste management methods can also pose a health risk if the various stages of the management process are not carried out correctly**.** In addition, waste disposal is one of the essential steps in ensuring compliance with hygiene rules, not only within facilities but also in the general environment; atmospheric emissions from municipal and medical incinerators are identified as sources of dioxin and furan emissions from the combustion of plastics, such as PVC, which are increasingly used in medical packaging.

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According to MASIKINI (2024), it states that 70% of biomedical waste is infectious and responsible for serious, often incurable diseases. Indeed, the production of infectious risk health care waste (sharp, sharp objects) poorly managed is responsible for approximately 8 to 16 million infections by viral hepatitis B, 2.3 to 4.7 million of hepatitis C and 800,000 to 1,600,000 cases of HIV/AIDS infections according to WHO (2014). A cross-sectional study published by SANOGO et *al* (2007) cited by MASIKINI (2024), estimates the daily quantity of solid biomedical waste (DBM) produced during health care activities at 30.5 kg, i.e. an annual production of 111,132 kg. It reveals that no treatment is carried out in 78% of cases and confirms that 90% of health workers in a certain health facility have no idea how to treat DBM. Biomedical waste presents many risks, including those related to hospital or nosocomial infections in hospitals. They constitute a major public health problem because of their dangerous and harmful nature for humans and ecosystems. Thus, they must be managed daily in an efficient and sustainable manner.

It is true that the KALEMBE-LEMBE Pediatric Hospital has a DBM management system but limitations that can cause negative impacts on human and environmental health are noted. LETAO (2023), illustrates that under these conditions, sustainable management of this waste is essential in order to minimize the risks which are indirect risks, diseases (respiratory, skin) and various nuisances (odors, mosquitoes) and direct occupational risks (infectious, traumatic). Considering the issues related to the management of biomedical waste at the KALEMBE-LEMBE Pediatric Hospital , it is important to understand the waste management process in this hospital. Given the risk that they represent for both human health and the environment, Biomedical Waste deserves special attention. In view of the findings, our research question is: How to evaluate the current management of biomedical waste at the KALEMBE-LEMBE Pediatric Hospital in Kinshasa? Given the concerns mentioned above, we put forward the following hypotheses: (i) the lack of knowledge of the agents of the KALEMBE-LEMBE Pediatric Hospital on the sorting of biomedical waste is one of the key factors in the poor management of this waste, (ii) the availability of financial resources, the renewal of equipment and adequate waste management equipment will reduce the risks of diseases and would positively influence the hygiene and health habits of healthcare personnel. To answer our research question, it therefore seemed necessary to us to carry out an evaluation of the management of biomedical waste at the KALEMBE-LEMBE Pediatric Hospital through a descriptive study of the practices of managing this waste in order to help decision-making in a context of significant population growth in the city of Kinshasa. This work specifically aims to (d'):

(i) describe the socio-demographic characteristics of medical personnel exposed to the dangers linked to the management of biomedical waste;

(ii) describe the management of biomedical waste at the KALEMBE-LEMBE Pediatric Hospital;

(iii) determine the different types of waste produced at the KALEMBE-LEMBE Pediatric Hospital in Kinshasa;

(iv) determine the risk factors and health complications linked to the management of biomedical waste;

(v) provide suitable solutions for the improvement of biomedical waste at the KALEMBE-LEMBE Pediatric Hospital in Kinshasa in order to reduce contamination and contribute to preserving the health of populations and the environment.

Collaboration with biomedical waste management stakeholders during this assessment can facilitate discussions on the subject and allow interviews to collect enough vital information for the study.

2. METHODOLOGICAL APPROACH

2.1. Type and period of study

Our study is of a descriptive and cross-sectional type which focuses on the management of DBM at the KALEMBE LEMBE Pediatric Hospital in Kinshasa. It took place from February 14 to July 14, 2024.

2.2. Study framework

The KALEMBE LEMBE Pediatric Hospital is located in the Commune of Lingwala on KALEMBE LEMBE Avenue, no. 193, 195, 197, 199 and 201, which gives it its name; it is bordered to the East by Kwilu Avenue , to the West by Oubangui Avenue, to the North by Kalembe Avenue Lembe and to the South by Kabambare Avenue . The hospital is thus landlocked, which makes its

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surface extension almost impossible. Its surface area is 6,000 m². Several construction and rehabilitation works were carried out during the year 2009. The Pediatric Hospital of KALEMBE LEMBE was created in **1948** by the former Red Cross of Congo/Belgium by decree of May 14, 1926 of the King of the Belgians, supplemented by the ordinance law n°69/039 of February 25, 1969 approving the statutes of the Red Cross of the Democratic Republic of Congo (DRC). Like the hospitals of the country, the Ministerial Order n°DS-1250/024/80 of 05/08/1980, of the decision n°DS-CCE /024/80 of the Executive Council of February 16, 1993, will grant the autonomy of management of the Pediatric Hospital of Kalembe Lembe. The KALEMBE LEMBE Pediatric Hospital is a health institution specializing in the management of illnesses in children aged 0 to 12, according to the standards of the World Health Organization (WHO). The number of staff at the KALEMBE – LEMBE pediatric hospital can be summarized in the form of a table below:

Table 1. Categories of professional personnel

No.	CATEGORIES	STAFF	OBSERVATION
01	Doctors	23	4 Pediatricians
			19 General practitioners
03	Nurses	96	L 2 3 people
			For 160 people
			For 2 25 people
			A3 8 people
04	Administrator Manager	4	All licensed
05	Administrative	88	3 licensees
			5 graduates
			12 graduates
			68 clerks and workers
06	Technicians	23	3 radiologists
			10 laboratory technicians
			2 Nutritionists
			3 Physiotherapists
			2 Pharmacists
07	Total	231	agents

The minimum package of activities of the KALEMBE LEMBE Pediatric Hospital is provided by 231 technical agents.

2.3. Study population

The population of our study consists of:

- From the medical staff of the KALEMBE LEMBE Pediatric Hospital in Kinshasa;

- From the hygiene and sanitation service

2.4. Sampling

Given the size of the workforce involved in DBM management, we have opted for departments with a workforce greater than or equal to five (05) people in 12 departments, with an average of 5 people per department.

The survey will focus on a non-probability sample of 133 people made up of health workers (130 out of 142) or 91.5% and hygiene and sanitation service workers (5) or 3.7%.

We have retained the variables below taking into account:

- socio-demographic characteristics;
- the means available for collection, the collection procedure, training, evaluation as well as the strategies to be adopted for rational management;
- training and evaluation of staff involved in DBM waste management at the KALEMBE-LEMBE Pediatric Hospital.

2.5. Data collection methods and techniques

2.5.1. Descriptive methods

It allowed us to describe the KALEMBE LEMBE Pediatric Hospital in Kinshasa in its organizational and functional aspects without forgetting its assigned missions.

2.5.2. Statistical methods

It will allow us to quantify and quantify the results of the questionnaire data collection.

2.5.3. Analytical methods

It will allow us to analyze the results. Indeed, this method is useful in the interpretation of the results obtained during our investigation.

2.5.4. Questionnaire technique

It allowed us to collect information on the knowledge and attitude of health workers at the KALEMBE LEMBE Pediatric Hospital on the management of DBM.

2.5.5. Observation technique

It allowed us to see for ourselves the poor practices of health workers in some health structures regarding the management of biomedical waste (BMW) in the Democratic Republic of Congo.

2.5.6. Documentation technique

To supplement the data collected in the field, we consulted journals, articles, thesis dissertations and other reports relating to DBM management**.**

2.5.7. Ethical consideration

Local, health, customary and administrative authorities were informed of the study. Individual informed consent was obtained from each participant. Participation in the study was free and voluntary. Confidentiality was respected.

2.5.8. Data entry and analysis

The data were collected on a pre-established survey form. Data entry and analysis were carried out using Access and SPSS software.

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2.6. Data processing

We transformed the data occurrence frequencies into percentages for better presentation using the following formula:

$\% = \frac{Fo}{Fa} \text{x } 100$

With :

% : Percentage

Fo: Observed frequency

Fa: Expected frequency

The percentages thus calculated have been rounded up or down to attribute real results to our data.

3. RESULT AND DISCUSSIONS

3.1. Socio-demographic characteristics of respondents

A total of 135 people received a questionnaire and all answered the questions addressed to them.

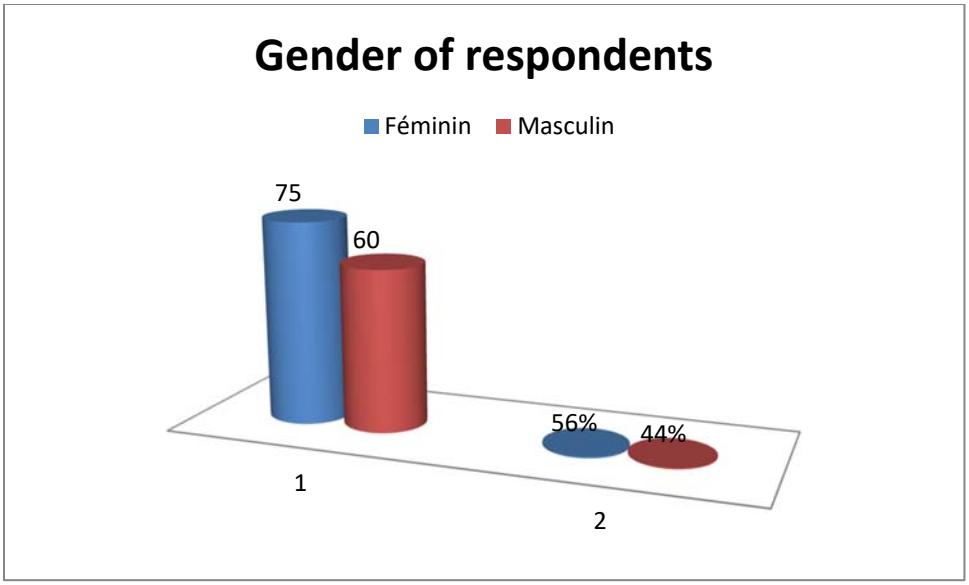

Figure 1. Distribution of respondents by gender

Looking at this table, the results show that:

- 56% of respondents are female;
- 44% of the male sex.

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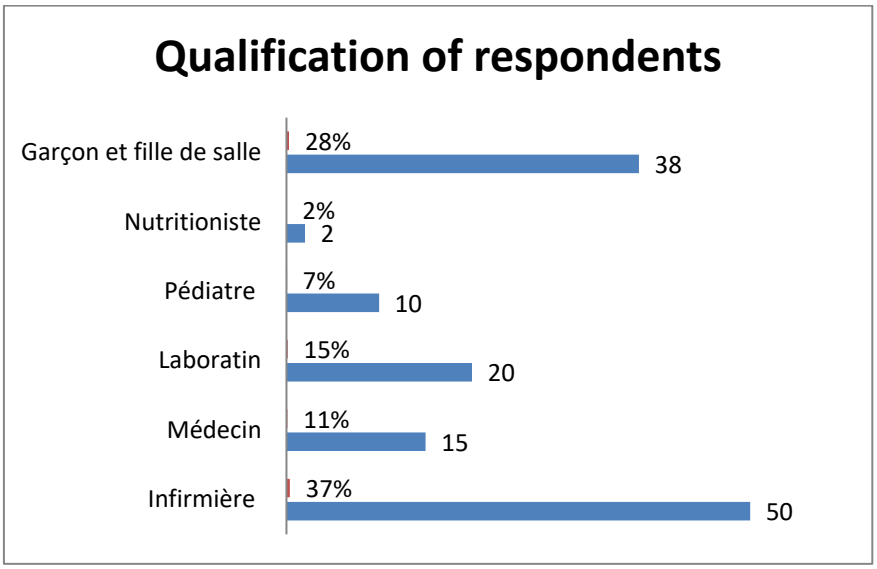

Figure 2. Distribution of respondents according to their qualifications

The majority of our study population was nurses and 50% of final year students each.

3.2. Distribution of respondents according to the means available for collection, the collection procedure, training, evaluation as well as the strategies to be adopted for rational management of biomedical waste (DBM)

Table 2 : Data relating to the type of waste encountered in some rooms of the KALEMBE LEMBE Pediatric Hospital

Room	**Type of waste produced**
Consultation	Packing, sweepings Paper, cardboard, tongue depressor….
Bandage	Needles, catheters, blades, tubes, syringes , broken glass, ampoules, scalpels, serum bottles, compresses and bandages….
Pharmacy	Expired pharmaceutical products, plastics, packaging, cardboard, etc.
Laboratory	Pipette, contaminated glass debris, petri dish, culture bottle…

It is clear from this table that the simplified classification is justified by the fact that all the different types of waste at the level of KALEMBE LEMBE Pediatric Hospital can be summarized as follows:

0. **Sharp or pointed waste:** needles, broken glass, blades, bulbs, scalpels, etc.
1. **Infectious waste:** tampons, compresses, human tissues, blood, etc.
2. **Anatomical waste:** placentas, fetuses , amputated limbs; the management of this type of waste by health services continues to face resistance from socio-cultural practices.
3. **Chemical and pharmaceutical waste:** medicines and other disinfection products.

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4. **Waste similar to household waste:** office waste (paper and others), hotel, kitchen and accommodation waste , sweepings, incineration ash, sterile packaging paper.

Figure 3. Representative photo of some of the colors of trash cans identified at the Kalembe-lembe Pediatric Hospital

Table 3 : Distribution of the study population according to the level of identification of biomedical waste

Identification level of biomedical waste	**Staff (n)**	**Percentage**
DBM production room	15	11%
Production room and color of trash cans	12	9%
Production room, bin color and labeling	5	4%
Color of trash cans	90	67%
Bin Color and Labeling	9	7%
Labeling	4	2%
Total	**135**	**100%**

According to this table, we say that the majority of the study participants identified biomedical waste through the color-coding system of the bins at 67% or 90/120.

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Table 4: Average daily production of DBM per unit.

Types of waste	Average daily production per unit in kg	
Units	Non-sharp healthcare waste	Sharp/pointy healthcare waste
ADMINISTRATIVE AND FINANCIAL DEPARTMENT	0.14	0.000
MEDICAL DEPARTMENT	6.12	0.034
BIOTECHNICAL DEPARTMENT	29.15	0.78
PHARMACY DEPARTMENT	11.51	0.029
DEPARTMENT OF INFECTIOUS DISEASES	4.44	0.0000
Total	**51.36**	**0.843**

It emerges from this table that the highest daily production of non-sharp non-cutting Biomedical Waste (BMW) in the KALEMBE-LEMBE Pediatric Hospital in the city of Kinshasa is recorded in the Department of Biotechnology with 29.15 kg per day.

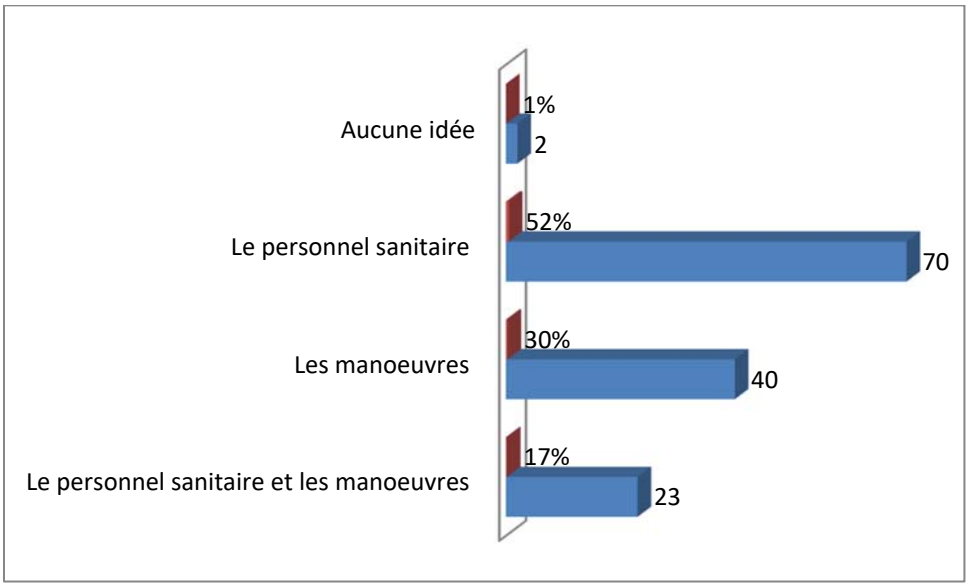

Figure 4. Distribution of the study population according to the way in which sorting is carried out in the health structure

It emerges from this figure that the staff surveyed affirmed that the sorting of biomedical waste is done by health workers at 52% (70/135) only.

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Table 5: Distribution of the study population concerning personnel having received training in biosafety and biosecurity

Existence of capacity building regarding biomedical waste on the themes of biosafety and/or biosecurity	**Staff (n)**	**Percentage**
Yes	60	44%
No	75	56%
Total	**135**	**100%**

Out of 135 respondents at the KALEMBE-LEMBE Pediatric Hospital:

- 56% or 75% of respondents say that they have not followed any training related to the topic of biosecurity and/or biosafety;
- And only 44% of our study population underwent training on the biomedical waste management system.

Table 6: Distribution of the study population according to knowledge of the existence of an incinerator in their structure

Knowledge of the existence of an incinerator within the establishment	**Effective**	**Percentage**
No	8	6%
Yes	127	94%
Total	135	100.0

Our study showed us that 6% of respondents are unaware of the existence of an incinerator within the KALEMBE LEMBE Pediatric Hospital to burn the biomedical waste they produce when treating patients.

Table 7: Distribution of expired pharmaceutical products according to management method

How do you manage expired pharmacy products?	**Staff (n)**	**Percentage**
Destroy	25	38%
Burned	39	60%
Others	1	2%
Total	**65**	**100%**

This table shows us that more than 60% of our study population burn expired pharmaceutical products as a method of pharmaceutical waste management.

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Table 8 : Distribution of the study population according to the method of needle and syringe management

How do you manage needles and syringes in your facility?	Staff (n)	Percentage
Mixed with other waste	2	5%
Burned	28	74%
Others	8	21%
Total	**38**	**100%**

21% of the workers say they do not know how the needles and syringes were managed.

Table 9: Opinion of the study population on the rate of disposal of biomedical waste

The rate of waste disposal	Effective	Percentage
Every day	112	83%
Every other day	13	10%
Once a week	10	7%
Total	135	100%

Within the KALEMBE-LEMBE Pediatric Hospital, the majority of respondents indicated that the evacuation of biomedical waste is carried out every day at 83% (112/135) in their health structures.

3. 3. Distribution of respondents according to training and staff assessment

Table 10: Distribution of the study population regarding compliance with the schedule for removal of biomedical waste

Compliance with the schedule for the evacuation of biomedical waste	Effective	Percentage
No	35	26%
Yes	100	74%
Total	135	100.0%

The respondents indicated that the DBM waste disposal schedule is well respected at 74% (100/135).

Table 11: Distribution of the study population according to the use of personal protective equipment PPE

Use of protective equipment against biomedical waste	Effective	Percentage
No answer	10	7%
No	40	30%
Yes	85	63%
Total	**135**	**100.0**

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The surveyed personnel used protective equipment against DBM waste at 63% (85/135).

Table 12: Distribution of the study population according to knowledge of the harms caused by the presence of biomedical waste

Knowledge about the harms caused by the presence of DBM	Effective	Percentage
Bad smell	44	32%
Proliferation of harmful insects	90	67%
Others	1	0.7%
Total	**135**	**100.0**

Table 12 tells us that 32% said that this waste gives off a bad smell and 67% mentioned the proliferation of harmful insects in their living environment.

Table 13: Perception of the study population regarding the current state of biomedical waste management

Perception	Effective	Percentage
Bad	54	40%
Good	81	60%
Total	**135**	**100%**

40% (54/135) of the staff surveyed stated that biomedical waste is not well managed.

Table 14: Distribution of respondents according to difficulties encountered in the management of biomedical waste

The difficulties encountered	Effective	Percentage
No answer	80	59%
Sorting is not well respected, especially in the case of on-site transport; needles fall on the ground.	28	21%
Insufficient sorting equipment	2	1.5%
Late evacuation of DBM	2	1.5%
Lack of training of staff in DBM management and non-compliance with sorting	6	4.5%
No training for DBM management personnel and insufficient bins for sorting	2	1.5%
Lack of a protocol for managing poisoning	1	0.7
No garbage bag to separate and create the seal of the DBMs	1	0.7
Primary storage and waste transportation problem	10	7.4
Non-existent DBM waste management system and absence of a waste management officer	1	0.7
Not all bin colours are present and late removal of DBM	2	1.5%
Total	**135**	**100%**

41% of those involved in biomedical waste management reported non-compliance with the sorting of biomedical waste.

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Table 15: Distribution of respondents on the effectiveness of the DBM management system and compliance with standards and compliance with DBM standards and regulations

An effective DBM management system requires:	**Effective**	**Percentage**
Existence of an environmental health and safety department	**19**	**14.1%**
State management of DBM waste	**8**	**6%**
Support from the Supervisory Authority for environmental sanitation	**17**	**13%**
Raising awareness among workers about the harmful effects of waste and taking precautionary measures for sanitation	**45**	**33.3%**
Creation of an adequate structure to deal with biomedical waste	**10**	**7.4%**
Valorization of biomedical waste	**30**	**22.2%**
Seeking funding to support sanitation activities within the Hospital	**6**	**4%**
Total	**135**	**100.0**

It emerges from the respondents' proposals on the management of DBM in the table above that

- 33.3% proposed raising awareness of the harmful effects of biomedical waste and taking precautionary measures for sanitation ;
- 22.2% of respondents think about waste recovery;
- 14.1% mention the layout of trash cans;
- 13% propose DBM support by the Supervisory Authority ;
- 7.4% proposed the creation of an adequate structure to deal with DBM;
- 6% think that the State should support the population in cleaning up the environment;
- 4% proposes the search for funding to support sanitation activities.

3.4. Discussion of results

- **On socio-demographic characteristics:**

In our present study, the female sex was the most represented, i.e. 56% , with a difference of more than 8% of the male sex. This is due to the fact that there were fewer men than women in the services surveyed. This result is different from the study by Mr. Mamadou DIAKITE (2023) out of a total of 120 respondents were included in his work, of which 75.8% (91/120) were male. Among the actors who responded to the call: nurses and terminal students were in the majority at 50% each. This result is different from the study by Souleymane SINALY TRAORE (2020) where the majority of study participants were nurses at 40% . Doctors and nurses are all agents involved in the DBM waste management process from the place of waste production.

- **Distribution of respondents according to the means available for collection, the collection procedure, training, evaluation as well as the strategies to be adopted for secure management**

In relation to the quantification of biomedical waste, it was noted that the highest daily production of non-sharp non-pointy Biomedical Waste (BMW) in the KALEMBE-LEMBE Pediatric Hospital in the city of Kinshasa is recorded in the Biotechnology Department with 29.15 kg per day. This is justified by a high attendance of the unit with a very high average bed occupancy rate, since this is the period when the case of malaria is high and consequently children are the most vulnerable. At this time, the average bed occupancy was four children per bed. The lowest production was recorded in the Administrative and Financial Department because the services of these units are less in demand. As for sharp and/or pointy waste, the laboratory (Biotechnology Department) is the largest producer with 0.78 0 kg/day on average. This could be explained by the fact that most of their activities involve blood sampling . Meanwhile, the secretariat and accounting management units (Administrative and Financial Department) and the Infectious Diseases Department, it is noted that these units do not produce sharp waste because they do not carry out care activities. The quantification carried out for seven days made it possible to know the daily production at the KALEMBE-LEMBE Pediatric Hospital in the city of Kinshasa

Regarding the distribution of the study population according to the way in which sorting is carried out in this health structure, our study showed that the staff surveyed affirmed that the sorting of biomedical waste is done by health workers at 52% (70/135) only.

- **On the training and evaluation of staff involved in DBM waste management at the KALEMBE-LEMBE Pediatric Hospital :**

Out of 135 respondents at the KALEMBE-LEMBE Pediatric Hospital:

- 56% or 75% of respondents say that they have not followed any training related to the topic of biosecurity and/or biosafety;
- And only 44% of our study population received training on the biomedical waste management system.

Our study meets that of BAKARY SAYON KEÏTA, a study carried out in Sikasso in Mali in 2010 of which more than half had not received training, or only 74.10% . This rate is different from 38.3% where health workers received training on the DBM waste management system according to the study conducted by Mr. Mamadou DIAKITE (2023) . This situation could be explained by a lack of responsibility taken by the various DBM waste management managers at different levels of DBM waste production. This also proves that hospital workers are unaware of the techniques that they should respect for better DBM waste management in different health structures in Kinshasa in particular and the Democratic Republic of Congo in general.

The above results from our surveys (Table XIV) sufficiently demonstrate that the people involved in the management of biomedical waste within the KALEMBE LEMBE Pediatric Hospital should benefit from a series of training in biosafety and biosecurity because they are unaware of the entire DBM management chain, standards and protocols, they reported that the only operation was non-compliance with the sorting of biomedical waste .

The existence of Law No. 11/009 of July 9, 2011 on fundamental principles relating to the protection of the environment in the Democratic Republic of Congo but its applicability is lacking within our entity because it is not known by the population, i.e. 97% of the population. Which is consistent with the JICA report (2018). In view of this, we confirm our first hypothesis that the lack of knowledge of the agents of the Pediatric Hospital of KALEMBE-LEMBE on the sorting of biomedical waste is one of the key factors in the poor management of this waste.

In relation to Tables 10, 11, 12, 13 and 15, it is shown that the management of biomedical waste (BMW), in particular, the inappropriate handling of equipment (especially that soiled by blood contaminated by HIV/AIDS) poses serious threats to the health of several categories of stakeholders. The handling of this waste is a factor in the aggravation of health and environmental risks (pollution of water, air, soil, etc.). Wastewater from healthcare activities can also cause chemical, biological and bacteriological pollution of water and soil. The uncontrolled disposal of sharp objects from healthcare activities can cause injuries

to healthcare staff, cleaning staff, but also children and other waste pickers in landfills and garbage dumps. The use of radioactive products in healthcare can generate residues that, if not managed, can cause the dispersion of radioactivity into the environment, thus increasing the number of cases of cancer, leukemia and malformations. The problems posed by poor management of DBM are very acute.

biosecure management system for biomedical waste, as well as the opinions of the respondents as shown in these tables, which support the majority of the improvement of sanitation and hygiene services and environmental awareness. These comments confirm our second hypothesis according to which the availability of financial resources, the renewal of equipment and adequate waste management equipment will reduce the risks of diseases and positively influence the hygiene and health habits of healthcare personnel.

4. CONCLUSION AND RECOMMENDATIONS

Our work focused on the **problem of biomedical waste management at the KALEMBE-LEMBE pediatric hospital in Kinshasa,** Democratic Republic of Congo . The objective of this study was to carry out an assessment of the management of biomedical waste at the KALEMBE-LEMBE Pediatric Hospital through a descriptive study of the practices of managing this waste in order to help with decision-making in a context of significant population growth in the city of Kinshasa. Collaboration with stakeholders in biomedical waste management during this assessment can facilitate discussions on the subject and allow interviews to collect enough vital information for the study.

The discussion generated by the results of the surveys carried out allows us to conclude:

- that the management of DBM is very problematic in our various health structures;
- that the female sex was the most represented, i.e. 56% , with a difference of more than 8% of the male sex;
- that nurses and final year students were in the majority at 50% each were cited more;
- that the majority of study participants identified biomedical waste through the bin colour coding system at 67% or 90/120;
- that the highest daily production of non-sharp, non-cutting Biomedical Waste (BMW) in the KALEMBE-LEMBE Pediatric Hospital in the city of Kinshasa is recorded at the Department of Biotechnology with 29.15 kg per day;
- that the staff surveyed stated that the sorting of biomedical waste is done by health workers at 52% (70/135);
- that 56% or 75% of respondents state that they have not received training related to the topic of biosafety and/or biosecurity and 44% of our study population have received training on the biomedical waste management system;
- that 6% of respondents are unaware of the existence of an incinerator within the KALEMBE LEMBE Pediatric Hospital to burn the biomedical waste they produce when treating patients and 60% of expired products are burned;
- that 21% of the workers say they do not know how the needles and syringes were managed;
- that the evacuation of biomedical waste is carried out every day at 83% (112/135) in health structures;
- that the people surveyed indicated that the DBM waste removal schedule is well respected at 74% (100/135);
- that the staff surveyed used protective equipment against DBM waste at 63% (85/135);
- that 32% said that this waste gives off a bad smell and 67% mentioned the proliferation of harmful insects in their living environment;
- that biomedical waste is not well managed at 40% (54/135);

- that 41% of people involved in the management of biomedical waste reported non-compliance with the sorting of biomedical waste;
- that 33.3% proposed raising awareness of the maneuvers on the harmful effects of biomedical waste and taking precautionary measures for sanitation.

The observation of the process of DBM management by the recommendations inspired by Law No. 11/009 of July 9, 2011 on fundamental principles relating to the protection of the Congolese environment, sets out the general principles that serve as a basis for specific laws to govern the different sectors of the environment , from production to elimination of DBM shows that the management of DASRI (waste from risky activities) in the centers studied is lacking. In order to contribute to the improvement of the current system of biomedical waste management in health establishments in the city of Kinshasa in the Democratic Republic of Congo, we could propose some strategies such as:

- Provide adequate and sufficient personal protective equipment and materials;
- Develop a good practice guide for hospital waste management;
- Strengthen the human resources of the DBM and hospital hygiene management unit;
- Implementation of periodic training programs on biomedical waste management for the personnel concerned;
- Monitor staff in respect of compliance with sorting standards from the source of DBM production.

And finally, the limits of the present work (a sample composed of staff from the Pediatric Hospital of KALEMBE LEMBE, a reduced number of success factors identified) invite other in-depth research with the new orientations.

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