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Knowledge, Attitude and Practice of Health Personnel of the Regional Hospital of Ngaoundere about the Management of Hospital Waste Products

Connaissances, attitudes et pratiques des personnels de l'Hôpital Régional de Ngaoundere à propos du traitement des déchets hospitaliers.

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ABSTRACT

Hospital waste products are solids, liquids or gaseous substances generated from health care activities, whether diagnosed or not, produced by healthcare facilities. They constitute a risk for pollution of the environment and a vector of germ propagation. This study aimed at analyzing the circuit of waste products and their management in the regional hospital of Ngaoundéré. This was a descriptive cross-sectional study going from September 1st to November 30th, 2016. 65 personnel participated to the study. 40 % of them were nursing auxiliary. 49% of the participants knew the selection approach of waste products. Waste products were eliminated by incineration in a hole in an archaic manner or by burying or given to family at their request, for elimination. Liquid wastes were discharged in bidets (75.4%) or in sewers (4.6%) or they were led directly to the evacuation system of used waters. We conclude that the management of waste product in the regional hospital of Ngaoundéré is a major preoccupation both for the environment and for the populations.

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RÉSUMÉ

Les déchets hospitaliers sont des matières solides, liquides ou gazeuses issues des activités de soins, de diagnostic ou non, produites au niveau des formations sanitaires. Ils constituent un risque de pollution pour l'environnement et un vecteur de propagation de nombreuses pathologies. La présente étude visait à analyser le circuit des déchets et leur gestion à l'Hôpital Régional de Ngaoundéré (HRN). Il s'agit d'une étude transversale descriptive s'étendant sur 3 mois allant du 1^{er} septembre 2016 au 30 Novembre 2016. Durant ce travail, une enquête a été menée auprès de **65** personnels. Nos résultats ont révélé que les aides-soignants (**40%**) étaient le grade de personnel le plus représenté de l'étude. **49%** des enquêtés connaissent la démarche de tri des déchets. Les déchets étaient éliminés par incinération dans une fosse à déchets de façon archaïque, par enfouissement et pour la plupart, les pièces anatomiques sont remises aux familles des malades à **75%** des cas qui se chargent de leur élimination. Les déchets liquides sont déversés dans des bidets dans **75.4 %** des cas et dans les égouts à **4,6 %** des cas où ils rentrent dans le système d'évacuation des eaux usées. Il en ressort que le système de gestion des déchets hospitaliers à l'HRN constitue une préoccupation majeure tant pour l'environnement que la population.

INTRODUCTION

Waste products are synonymous to residues, reject, drops, shaving, dirt's, and filth. The waste is rejected after production or usage because it is of no use any more (loss of ability). Hospital waste represents "all waste products generated through the functioning process of a hospital whether at the level of hospitalization and healthcare or paramedical administrative services and their dependency" [1]. Hospital waste products can either be solids and/or liquids. Liquid wastes do not only concern hospital waste

water but equally chemical wastes, such as laboratory reactive, solvents, fixation products, radiographic film development liquids (fixator and revelator), blood and by-products. Hospital waste merits hence a particular attention taking into account the risks they represent on the environment as well as on human health [2]. The management of waste products is not well handled in our hospitals. A study of the WHO in 2002 next to 22 developing countries showed that 18% to 64% of healthcare establishments do not eliminate correctly their

waste products. Recently, a study carried out next by 443 sanitary facilities of the republic of Rwanda shows that 89.8% of the healthcare facilities do not have the capacities to manage effectively their waste products [3]. This situation makes hinders the steps of the management process of hospital waste and as such, hospital wastes are thrown in the nature or in public waste disposals places by healthcare facilities constitutes as such a potential source of pollution, of development of diseases such as cholera, typhoid, hepatitis, dysentery...[4]. Hence forth, the problem of quality management of hospital waste is set with sharpness as well as its coordination, follow up and evaluation of sanitary facilities. Yet, according to WHO, in 2012, 20% of waste products in hospital milieu are risk infectious wastes.

Total annual production of biomedical waste products in Cameroon is estimated at 42 810 kg/day [6]. The proliferation of nosocomial infections, the degradation of the environment are the main risks related to the mismanagement of hospital waste products. Nevertheless, methods of treatment and elimination require important technical and financial resources.

Our study aimed at assessing the knowledge, attitudes and practices of nursing personnel of the Ngaoundere towards hospital waste products;

METHODOLOGY

Setting

Regional hospital of Ngaoundéré, Adamaoua Region, Cameroon.

Type of study

Descriptive cross-sectional study

Period

April 1st to July 31st, 2016.

Population

Our target was the hospital personnel of any type (medical, paramedical, support staff) of the 10 services of the regional hospital of Ngaoundéré who accepted to take part to the study.

Procedure

We used for data collection and information, analysis and interpretation of results, the following instruments:

- Questionnaires for investigation containing direct and indirect questions on the basis of dependent variables and their indicators. Indirect investigation permitted us to collect data by observation.
- The technical of interview that concerned agents of hospital hygiene due to oral communication so as to get objective information

Study variables

- Dependent variables: information canals, knowledge of code colors, quantity of materials, modes of elimination of solid and liquid waste products, modes of elimination of anatomic organs.
- Independent variables: length of service, category, service unit

Analysis and treatment of data

Quantitative and qualitative data were collected and then analyzed by the following software: Sphinx plus² edition, Lexica V.5.1.0.7, Microsoft Word and Excel 2010.

Limits of the study

- Insufficient documents present for the research in the hospital;
- None implication of hospital personnel concerning the questions of waste management;
- Absence of traceability of waste product management in the hospital.

RESULTS

65 personnel accepted to participate. Nursing auxiliaries (43.32%) and state nurses (21%) were mostly represented; No medical personnel accepted to participate.

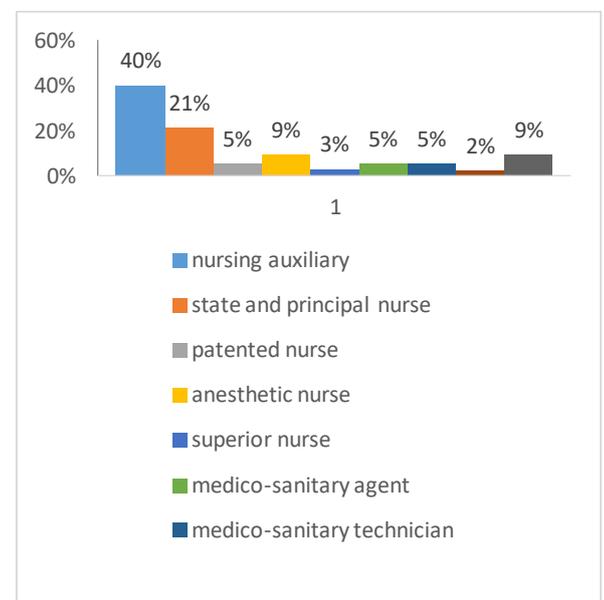


Figure 1: distribution of population sample following grade rank

Knowledge of healthcare personnel on the management of waste products

Knowledge of personnel concerning the approach of selection of waste products

The approach of selection of waste products was known at 49.2% by our personnel against 50.8% of the personnel with no knowledge.

Approach selection knowledge with grade rank

There was no statistical significant relation between the knowledge approach selection of waste products and the grade of personnel.

Grade	Selection knowledge	
	YES	NO
Nursing auxiliary	30.8%	69.2%
State and principal nurse	78.6%	21.4%
Patented nurse	66.7%	33.3%
Anesthetic nurse	66.7%	33.3%
Superior nurse	100%	0
Medico-sanitary agent	100%	0
Medico sanitary technician	66.7%	33.3%
First-aid agent	0	100%
Surface agents	0	100%
TOTAL	49.23%	50.76%
P= 0.5%	Chi2=21.75	ddl=8(TS)

Approach selection knowledge with length of service

The approach was known by 49% of the personnel. On the other hand, we noticed in the class of [5-10] length of service that 64.8% of them knew nothing about the approach selection and in the class of more than 10 years, 43% of them had no knowledge about selection of waste products.

Knowledge	Length of service			%
	[0-4]	[5-10]	> 10	
Yes	16	12	4	49.23
No	8	22	3	50.76
Total	22	34	7	100
P= 0.057				

There was no statistical significant relation between the length of service and approach selection knowledge.

Practice of the management of hospital waste products' by the personnel

Materials used for the collection of waste products by service

The materials used in the regional hospital of Ngaoundéré for waste collection is mainly made up of plastic bowls with covers and security box, boxes and plastic bowls without covers.

The presentation of the conditions of stocking of waste products at the regional hospital of Ngaoundéré from care directors in different services affirms at 72.72% that the stocking zones are inappropriate, labeling of waste products are also inappropriate and are stocked sometimes more than 24 hours.

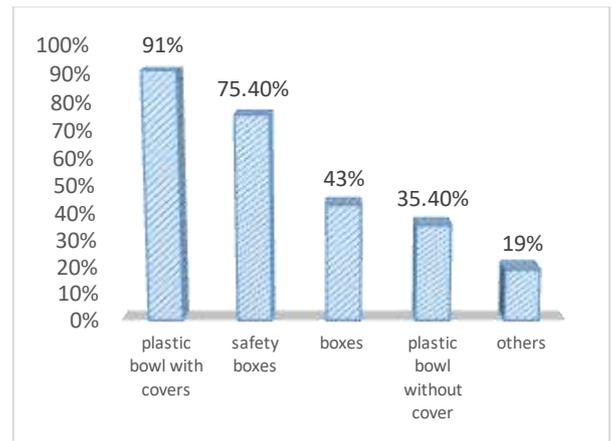


Figure 3: materials used for waste collection

Elimination modes

Hospital waste products generated from healthcare activities are eliminated by incineration, by burying and sometimes family members eliminate their waste products (placenta, amputated organ or member)

Liquid waste elimination mode

They are being discharged or poured in bidets build for that before regaining the system of used waters. Yet there exist services where these waste products are thrown directly in the nature and in dustbin

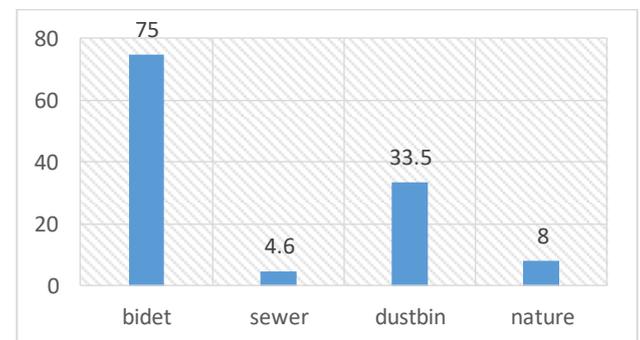


Figure 4: liquid waste product elimination mode at the regional hospital of Ngaoundéré

Solid waste products elimination

Solid organs are usually burned or eliminated by burying

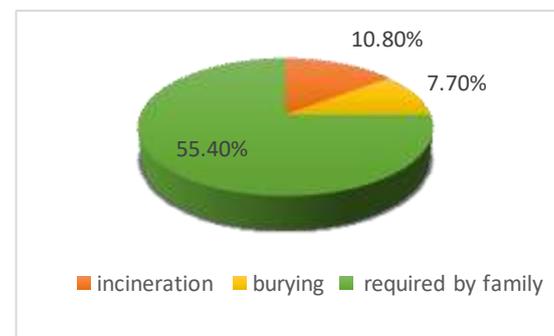


Figure 5: Solid waste product elimination

DISCUSSION

Socio-professional characteristics of the personnel

This design study reveals that, nursing auxiliaries were most represented. This may be as a result of their representation in the hospital and their responsibility concerning care delivery and thus waste production. Nevertheless, it is deplorable to notice the complete absence of physicians in this study. The distribution of personnel by services is not related to the quantity of waste products produce. In fact, the services of surgery, room theater and medicine produces the great majority of waste products while the service of gynecology, “haut standing” and reanimation produces less waste.

Knowledge of personnel concerning the management of waste products

Selection of waste is the first step in the process of management of waste products. The distribution of the knowledge approach of selection following the grade rank of personnel shows that 49% of them knew the approach process of selection. Even though of the results obtained we cannot associate this knowledge to personnel grade rank because there are still some of this rank that do not have any idea about selection of waste products apart of surface agents. There exist no statistical significant relation between the length of service and the knowledge approach of selection justified by the values $p=5.7\%$ and $\chi^2=5.74$. On the other hand, the approach selection knowledge and length of service are not associated. It may be of a negative aspect in the process of waste product management.

Practice of waste product management

The materials used for the collection of waste products in course of this study mainly concerned security boxes, plastic bottles for cutting objects and sharp ones, plastic dustbins with covers or without cover for solid wastes. It does not respect norms.

The use of color codes for the selective separation of wastes is not a reality at the regional hospital of Ngaoundéré, because during this study, all the personnel affirms not using color codes for the separation of wastes to distinguish infectious from non-infectious wastes, though recommended and even more because containers of different colors are also required [17].

Furthermore, waste products after collection are disposed in none fit out areas that do not respond to the criteria the stocking zones prescribed by WHO which indicates that the stocking zones must be situated in less frequentable places by users.

Incineration is carried out in holes in an archaic manner without any respect of environmental rules. This archaic method is not common to the regional hospital of Ngaoundéré because anterior studies reported that 72% of hospitals in Africa practice artisanal incineration sometimes ending up in incomplete combustion of wastes. The application of this artisanal method is

justified by the great lack of means in our hospitals and on the other hand by the bad orientation of priorities from leaders [21].

This study showed that the liquid waste products are for the most discharged after then conducted in the evacuation waste water systems. There exist no structure in the hospital for the treatment of waste waters, yet waste waters rejected in the environment must respect the quality norms of water rejection prescribed by WHO 2009 [24, 20].

Concerning anatomic pieces, they are sometimes given to the families but sometimes buried or incinerated. This may be explained due to the socio cultural habits of the population where anatomic organs have to be buried respecting certain customs and habits; hence families take care of their solid anatomic waste products.

CONCLUSION

Coming to the end of this study, we note that, the management of waste products is a chain of activity that suffers from many difficulties related to several factors. We noticed that waste products were not separated following their types. Moreover, they are stocked after collection in their respective services in the nature and sometimes in containers without cover before carried to incineration. All this without taking into account the rules and regulations governing nature protection of the environment. Thus, we recommend to:

- Reinforce the legislative framework governing the management of waste products in our hospitals;
- Implement a stocking system of treatment and management of infection waste products;
- Increase the use of incinerators with a gas filtration circuit;
- Engage the process of training and sensitization of healthcare personnel concerning the management of waste products

All this measures may bring additional tools to the management system of waste products in our hospitals.

Contribution of the Arthurs

Ngaroua et Joseph Eloundou Ngah : conception and planification

Djibrilla Yaouba, Nahodo Zap Nephthalie, Dah'Ngwa Dieudonné. review and writing .

Conflits of interest

None

REFERENCES

- [1] **D Gabarda, et Oliva**, Aide au tri des déchets d'activité de soins, Paris, septembre 2000 p 88
- [2] **P. Billau**, Estimation des dangers de déchets biomédicaux pour la santé et l'environnement au Bénin en vue de leur gestion, Maitrise en sciences environnementales Sherbrooke, Québec, Canada, Août 2008
- [3] **W. Nzamuye**, "CAP sur la *Gestion des déchets hospitaliers dans les Fosa de la République du Rwanda*," *Maitrise en Santé Publique, mémoire inédit, UNR-ESP/Rwanda, 2007-2008*.
- [4] **J Ndié, H. Nguendo**, *European Scientific Journal* Avril 2016 édition vol.12, No.11
Étude De La Gestion Des Déchets Hospitaliers Dans Les Structures Sanitaires De Référence De La Région Du Nord-Cameroun pp 3 -8
- [5] **F. Timizar, B. Boussouar, F. Soualmia, A. Mahnane, M. Hamadouche, A. Meliani, H. Boukaabeche, S. Guergouri, N. Khemari, N. Bounechada**, 'Les déchets hospitaliers, formation des correspondants d'hygiène, C.H.U de Sétif', 2009, pp 3-6.
- [6] **B.L Manga**, Étude sur les systèmes appropriés de traitement des déchets médicaux dans le cadre du programme national de développement participatif. *Rapport du Programme National du Développement Participatif. Yaoundé – Cameroun 2009*
- [7] **Fikri**, Exposé sur "la Gestion des déchets hospitaliers", médecine sociale. Maroc, Aout 2009
- [8] Comité International de la Croix-Rouge (CICR), Genève, Suisse "Manuel de gestion des déchets médicaux le Comité international de la Croix-Rouge", Mai 2011. PP, 10-18, 20-30,35-59
- [9] Report of High Power Committee on urban Solid Waste Management, Planning Commission, Govt. Of India, 1995 Hospital Waste Management: 35-47.
- [10] **J. Lefebvre**. "Le traitement des déchets d'activités de soins en Ile de France". Techniques hospitalières, n° 582, Lyon, Mars 1994, pp 56-58.
- [11] **C. David**, "Déchets infectieux – Elimination des DASRI et assimilés- prévention et réglementation", Association française de normalisation, Paris, Juin 2004, p50.
- [12] **S. Alouimine**, "Contribution à la gestion des déchets et outils d'aide à la décision", Thèse Nouakchott (Mauritanie), 2006, p. 43.
- [13] **N. Abdelsadok**, "Etude d'accompagnement pour de la gestion des déchets médicaux au Maroc, capitalisation de l'expérience française", Mémoire de Fin d'Etudes pour l'obtention du Mastère Spécialisé en Gestion, Traitement et Valorisation des Déchets, Casablanca 2010, p. 18.
- [14] **M. HeurT, et al**, Nouveau cahier de l'infirmier pour l'Hygiène, 2002 p.98
- [15] Organisation Mondiale de la Santé (OMS), Gestion des déchets d'activités de soins solides dans les centres de soins de santé primaires Guide d'aide à la décision Genève 2005 p.18.
- [16] **R Estrada**, Gestion des résidus hospitaliers, Espana principado d'Asturis, 1999, p123
- [17] **R Belkahia**, Traitement des déchets des soins de santé humaine, Bruxelles, 2000
- [18] **V Desportes al**, Hygiène dans les institutions des soins de santé en situation précaire, Bruxelles, 1996
- [19] Organisation Mondiale de la Santé (OMS), Traitement et élimination des déchets, OMS, Genève, 1976
- [20] **SOURCE Anonyme**, 2008. Plan national de gestion des déchets hospitaliers. MINSANTE, Yaoundé. pp.1-96.
- [21] **Kambau**, Les méthodes de gestion des déchets médicaux des hôpitaux de Kinshasa, 1997
- [22] **MSF**, Technicien sanitaire en situation précaire, 1994
- [23] **Manuel d'Aide à la Décision Préparation des Plans Nationaux de Gestion des Déchets de soins médicaux en Afrique Subsaharienne Secrétariat de la Convention de Bâle Organisation Mondiale de la Santé**
- [24] Organisation Mondiale de la Santé OMS. (2009). Recommandations pour améliorer la gestion des déchets médicaux. pp 24-33
- [25] MINEPDED (2012). Plan national de mise en œuvre de la convention de Stockholm sur les polluants organiques persistants au Cameroun. République du Cameroun.
- [26] **Y. Azzouz et all 2014** La gestion des déchets d'activités de soins à risque infectieux : Tri et conditionnement, dans la région de Gharb au Maroc 2014
- [27] **World Health Organization** Geneva, Safe management of wastes from health-care activities. 1999. Pp22
- [28] **F Nemathaga, et all**, "Hospital solid waste management practices in Limpopo Province, South Africa: A case study of two hospitals" Waste Management, vol. 28, pp. 1236-1245, 2008.
- [29] **M Askarian, et all** "Results of a hospital waste survey in private hospitals in Fars provinces, Iran," Waste Management, vol. 24, pp. 347-352, 2004