

Health care waste management in the hospital of Batna city (Algeria)

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Abstract. The management of Health Care Wastes (HCW) is receiving greater attention because of the risks to both human health and the environment caused by inadequate waste management practices. In the past health care waste was often mixed with municipal solid waste and disposed of in residential waste landfills or improper treatment facilities (e.g. inadequately controlled incinerators). In recent years, many efforts have been made by environmental regulatory agencies to better manage the waste from healthcare facilities. Medical waste incineration is identified as the most preferred disposal method. In Algeria, the statistics on the health care waste worry, especially since their treatment does not join in an ecological approach. This waste is considered dangerous for the public health and source of pollution for the environment. This situation requires an organized system of health care waste management to curb public health risks as well as occupational hazards among health care workers as a result of poor in waste management.

This paper presents an overview of the current management practices of health care waste in the hospital of Batna city. Data were collected via surveys, interviews, and on-site observations. Information regarding generation, composition, segregation, transportation, and disposal of health care wastes is provided and discussed. Also, this study focused on the impact of poor management of HCW to handlers, public health and the environment¹.

Keywords: waste, health care waste, management, risks, health, environment.

1. Introduction

Health care waste (HCW) includes all the waste generated by hospitals, other large health care establishments, diagnostic centers, relevant research facilities, laboratories and small health care facilities. Health care waste or Medical waste contains a large component of domestic type and a smaller component of hazardous waste [1]. The management of health-care waste requires source-separation of the hazardous fraction and sorting of this into infectious and/or toxic sub fractions [2]. Algeria produces every year 124 611 tons of Health care waste among, which 25 % are constituted by waste of health care waste at infectious risks. Indeed, the legislative framework set out in the decree of December 14, 2003 which provides the broad guidelines for medical waste is still very far from reality. In certain hospitals, the HCW is still sometimes collected with bare hands or directly forwarded to the discharges and/or burned in situ or in open-air incinerators. In general there is no maintenance on these equipments which are very often out of order. Furthermore, these equipments are poorly managed and are highly polluting.

This paper provides data for estimating health care waste production and suggesting the proper waste management system for the different services and clinical pathology laboratories of the hospital of Batna city. Most of the services do not use a particular management system. Then, we will try to see accidents due to improper handling of infectious waste. It is important to mention that in this study, as infectious waste was

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considered any waste material that came in contact with blood and other potentially infectious fluids of the body.

2. Understanding the meaning of Health Care Waste

2.1. Definition of Health care waste

Health care waste (HCW) is defined as the total waste stream from a health care facility that includes both potential infectious waste and non-infectious waste materials. According to the World Health Organization, infectious waste is the waste type suspected to contain pathogens (bacteria, viruses, parasites or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts [1]. The non-infectious waste is comparable to domestic waste, this type of waste does not pose special handling problem or hazard to human health or to the environment. It comes mostly from the administrative and housekeeping functions of health care establishments and may also include waste generated during maintenance of health care premises. General waste should be dealt with by the municipal waste disposal system.

Thus, HCW includes all the waste that is generated or produced as a result of any of the following activities [3]:

- Diagnosis, treatment or minimization of human beings or animals;
- Research pertaining to the above activities;
- Production or testing of biological; and
- Waste originating from minor or scattered sources.

2.2. Risks associated with the poor management of health-care waste

Poor management of health care waste can cause serious disease to health-care personnel, to waste workers, patients and to the general public. The greatest risks posed by infectious waste are accidental needle stick injuries, which can cause hepatitis B and hepatitis C and HIV infection. There are however numerous other diseases which could be transmitted by contact with infectious health care wastes. Finally, the dumping of HCW in uncontrolled areas can have a direct environmental effect by contaminating soils and underground waters. During incineration, if no proper filtering is done, air can also be polluted causing illnesses to the nearby populations. This has to be taken into consideration when choosing a treatment or a disposal method by carrying out a rapid environmental impact assessment [4].

3. Health Care Waste management in the hospital of Batna city

3.1. Hospital of Batna city and the production of Health Care of Waste (HCW)

The CHU (Centre Hospitalo-Universitaire) of Batna is the oldest hospital of the city. It was in the service of the colonial army, until the independence. A new hospital, "Touhami Benils", opened in 1979, became CHU in 1986. The hospital of Batna city includes the following infrastructures:

- 635 beds
- 15 services of hospitalization;
- 05 surgical units;
- 03 laboratories.

For a period of two months, we went through all services. We recorded the amount of waste generated by each service. We observed the collection and sorting of the HCW. And we recorded the amount of waste on the data sheets. The total number of beds in the hospital of Batna city was 635, and the quantity of medical waste generated by this hospital was about 3750 kg /day. The results indicated that the rate for infectious waste was 1.18 kg/bed/day and total HCW were 5.9 kg/bed/day. It was found that the infectious health care wastes quantities were higher in the service of Haemodialysis (e.g. dialysis equipment such as tubing and filters, disposable towels, gowns, aprons and gloves) and then Haematology service and Endocrinology service (Fig.1).

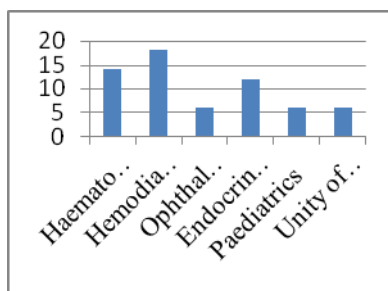


Fig. 1: Highly services production of solid infectious health care wastes from the hospital of Batna city

3.2. Source separation, collection and transportation

The wastes are segregated according to their characteristics, mainly into the following categories: sharps, infectious wastes, pathological wastes and pharmaceutical wastes. Although a system of color coding or labeling of waste containers/bags has been adopted, not all services strictly follow the national regulations to practice the color coding system. The HCW are segregated into:

1. Infectious wastes, pharmaceutical wastes and chemical waste (red bag: Photo 1);
2. Sharps (yellow containers: Photo 2);
3. Domestic waste (black bag: Photo 3).

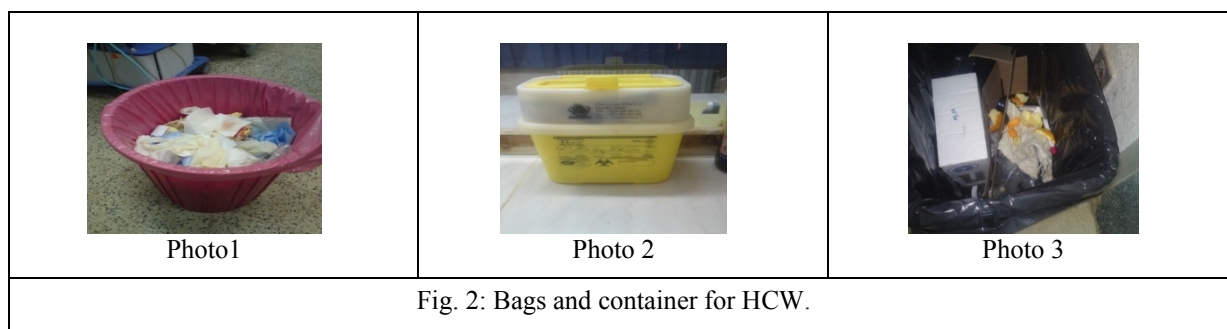


Fig. 2: Bags and container for HCW.

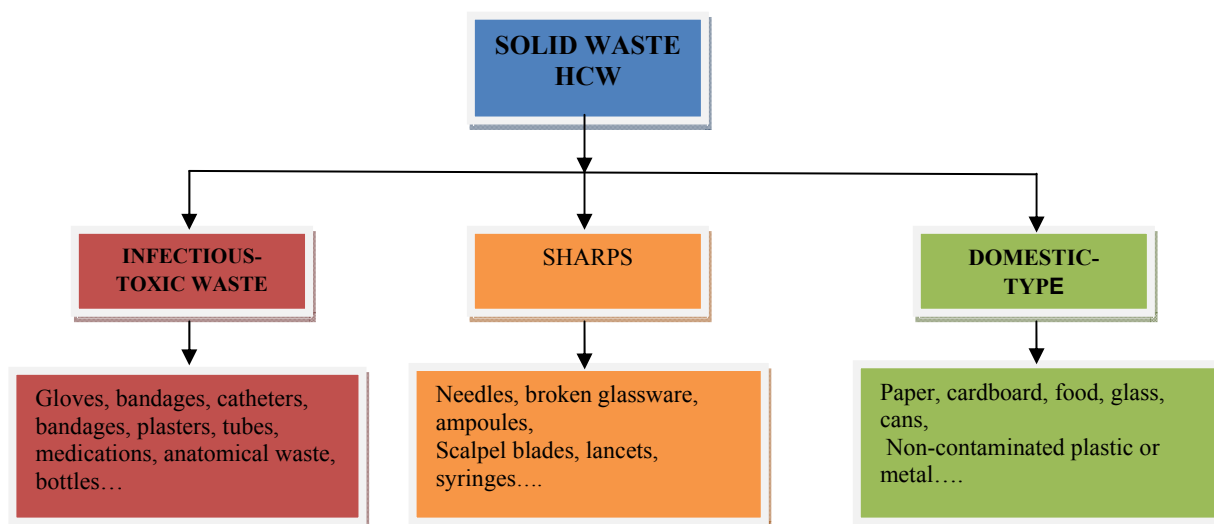


Fig. 3: Classification of solid Health care waste from the hospital of Batna city.

Wastes are collected daily and transported to the designated central storage site. Transportation of waste within the establishment utilizes wheeled trolleys that are dedicated solely for the purpose (photo 4). Not all workers transporting the waste are equipped with appropriate personal protective equipment including heavy-duty gloves, coveralls, thick-soled boots and leg protectors (photo 5).

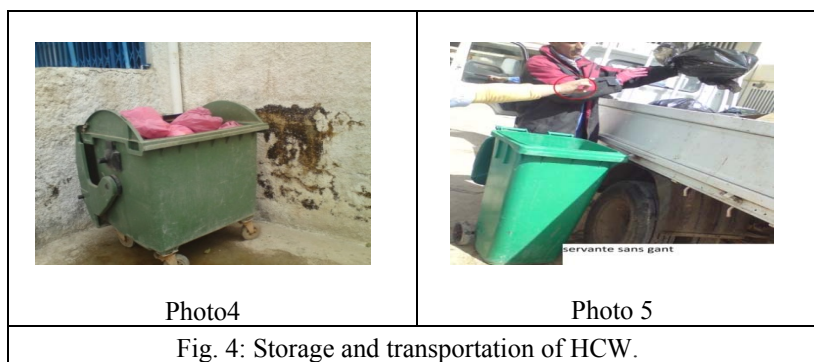


Fig. 4: Storage and transportation of HCW.

3.3. Treatment and incineration

The infectious waste was treated via incineration. The benefits of controlled incineration of infectious wastes include volume reduction and the removal of pathogenic risk, as long as the system operates correctly. The drawbacks to incineration include the large capital and operating costs for modern technologies, the need for skilled labour to operate and maintain the system, the potential lack of local access to materials for incinerator construction, the required supplies (e.g. fuels) and the potential for toxic emissions to the air where there is no emission control equipment. Open burning (uncontrolled incineration) should be avoided, because of risks to workers, not only from uncontrolled toxic gas emissions to the air, but as well from infectious wastes that are only partially burned. After incineration, the final waste is deposited in a site and they are taken by the vehicle of the municipality for the landfill. However, noninfectious waste was discarded directly in a sanitary landfill of the city of Batna.

4. Impacts of poor health care waste management

During the handling of wastes, injuries occur when syringe-needles or other sharps have not been collected in rigid puncture proof containers. This risk is even greater for people who do not benefit from protection measures, especially since it is recommended to develop the knowledge, attitudes and practices in behavior change in the management of infectious wastes. They have never received training or education regarding the management of HCW. This ignorance can lead to accidents. For 2010, the accidents recorded are represented in the following figure.

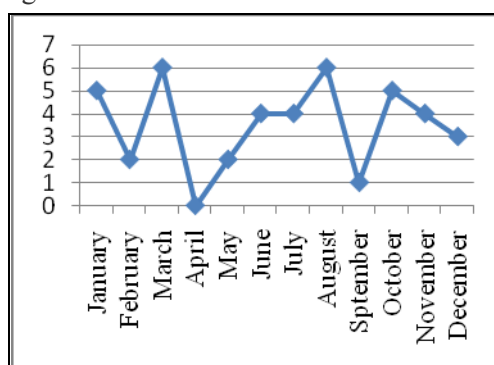
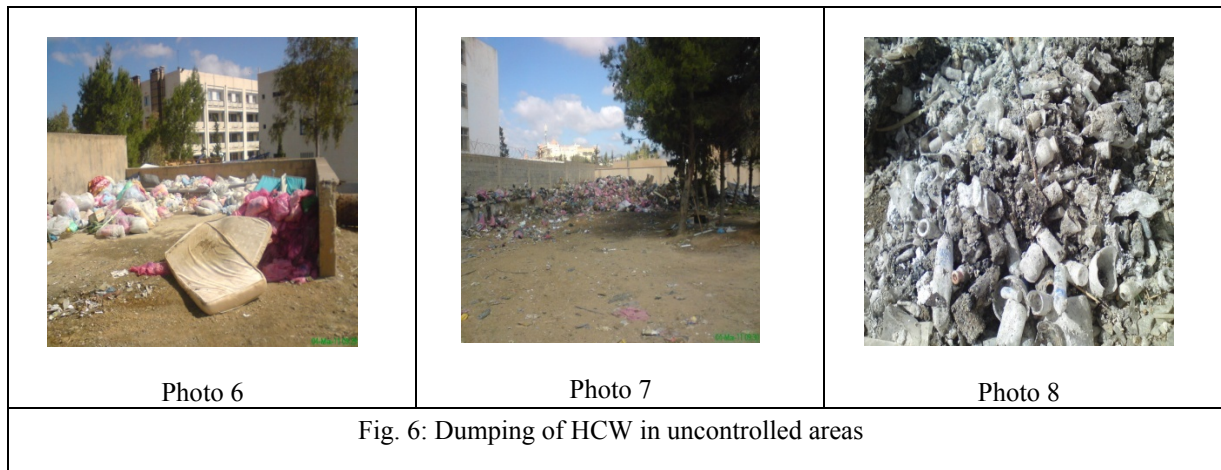


Fig. 5: Accidents recorded (2010).

The average is 3.5 accidents per month, which is a fairly high risk. These accidents cause hepatitis B, hepatitis C and tuberculosis. Those most affected are nurses and sanitary staff. They are being injured because the waste has not been packed safely. In that respect, *sharps are considered as one of the most dangerous category of waste*. Many injuries occur because syringe needles or other sharps have not been collected in safety boxes or because these have been mixed with domestics waste in black bags.

We have also seen the dumping of HCW in uncontrolled areas before being collected and transported by vehicle of the municipality to the landfill (photo 6, 7 and 8). This can have a direct environmental effect by

contaminating soils and underground waters. The storage area should have an impermeable, hard-standing floor with good drainage; it should be easy to clean and disinfect.



5. Conclusion

During the past few years, there has been an increase in the level of public concern about the management of healthcare wastes (HCW) on a worldwide basis. Healthcare activities lead to the production of wastes that may cause adverse health effects [5]. Despite the efforts for the management of wastes, the current system of healthcare waste management in the hospital of Batna city is under development and is in dire need of immediate attention and improvement. There is still a lack of specialized services for the collection and final disposal of health care wastes in the hospital of Batna. Thus, the wastes are not properly segregated, collected and disposed in all the services of the hospital, which may lead to a negative impact on public health and on the environment. Finally, the storage, transport and treatment of HCW will have to comply with current regulations and all personnel involved must be properly trained to avoid injuries and accidents [2]. This can reduce accidents due to a poor management of HCW.

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7. References

- [1] A. Pruss, E. Giroult, P. Rushbrook. Safe Management of Wastes from Healthcare Activities, WHO, Geneva. 1999.
- [2] A. Graikos, E. Voudrias, A. Papazachariou, N. Iosifidis, and M. Kalpakidou. Composition and production rate of medical waste from a small producer in Greece. *Waste Management* 30 (2010) 1683–1689.
- [3] L.F. Diaz, Health Care Waste Management Manual. Department of Health. Manila. Philippines. 2003.
- [4] WHO. Preparation of National Health-Care Waste, Management Plans in Sub-Saharan Countries. Guidance Manual. *Secretariat of the Basel Convention and World Health Organization*. 2005.
- [5] E. Shinee, E. Gombojav, A. Nishimura, N. Hamajima, K. Ito. Healthcare waste management in the capital city of Mongolia. *Waste Management* (2007) 683–1689.