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Research Article

Investigating the Status of Hospital Waste management of Dehdasht City in 2016

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ABSTRACT

Introduction and Purpose: Not controlling hospital waste and neglecting its proper collection, preservation, conveyance and disposal will have special problematic consequences. Moreover, lack of knowledge about hospital waste management endanger people's health and environment. Therefore it should be collected and discarded according to hospital residue management rule. The purpose of the current study is to investigate the status of hospital waste management of Dehdasht city in 2016.

Procedure: The research was carried out as a cross-sectional descriptive study in Dehdasht city hospital in 2016. In addition to determining the status of production, storage, collection, transportation and disposal of hospital waste, waste components, weighing garbage and produced waste per capital were specified during four seasons and during 7 consecutive days of each month. Data were collected through checklist, observation, interview and referring to the hospital (under study) in person. The collected data were analyzed and reported using SPSS software.

Results: The result showed that the total amount of produced hospital waste was 2125 kg in 2016; The portion of infectious waste was 1332 kg which accounted for 62% of the total hospital waste in 2016 and waste production per capital for each active bed was about 0.7 kg per day. The components of hospital waste weight percent include infections waste 63%, ordinary waste 30%, sharp waste 5%, chemical waste 2%. It should be mentioned that the maximum percent of waste was related to women's Department (18.76%), Ear, nose and throat (19.44%) and dialysis (24.24%).

Conclusion: The results indicated that infectious waste and its danger and also the way it is handled and disposed of should be considered more than before. Hospital waste management is not at the optimum level. Therefore the authorities should pay more attention to this issue. Some actions should be taken to reduce waste production and to separate infectious waste at the point of production; Additionally modern ways of making hospital waste harmless should be utilized. Therefore in order to reduce the environmental effect of hospital waste, modifications of some of the management methods are necessary.

Keywords: Hospital waste, Waste management, Hospital

INTRODUCTION:

Hospital is one of the important sanitary places that due to increasing growth of population have been developed significantly. Therefore it caused an increase in the number of patients and subsequently hospital waste in a way that regarding hospital waste it caused problems quantitatively and qualitatively and also made such a material content more and more dangerous.Waste is defined as solid, liquid and gas materials (except waste water) that directly and indirectly results from human activity and the producer considers it as a waste. According

to World Health Organization (WHO) definition about waste management law: All infectious waste from hospitals, healthcare centers, medical diagnostic laboratories and other similar centers are called hospital waste. According to world health organization, hospital waste should be refined like other special waste. However American environmental organization (USEPA) defined hospital waste as dangerous waste. Today it becomes obvious that some special kind of medical waste are among harmful and dangerous waste that are produced in the society (1).Based on the studies carried out on 630 kinds of chemical materials that are mainly used in hospitals, more than half of them were non-toxic and 300 types were toxic and dangerous which were as the main part of waste in hospital garbage (2).World Health Organization's study showed that neglecting correct waste collection and disposal can lead to32 environmental problems to which counteraction is impossible. Probable presence of pathogen in healthcare department shows its potential dangers (3). Being exposed to dangerous hospital waste like mutagenesis, carcinogenic substances and materials which cause anomalies lead to harm in breathing system, central nervous system and genital system. The above mentioned substances cause illnesses such as diarrhea, cholera, leptospirosis and typhoid. Human immune deficiency virus and hepatitis B can be transferred by mismanagement of dangerous hospital waste. According to the world health organization survey in 2002, 23 million people all over the world became infected each year because of contacting with hospital trashes; At the top of these illnesses are hepatitis B, C and aids. correct management of these substances play an important role in controlling environmental pollution and the occurrence of hospital infections because epimilogical studies have shown that due to contact with used needle tip, the probability of infecting with hepatitis B, C and HIV virus is 10%, 1.8% and 0.1% respectively. Neglecting correct collection , preservation, conveyance and disposal of infectious waste can cause special problems through the country that their reflection will be a serious threat to health and environment (water, soil and air pollution).mismanagement of hospital waste may cause incorrect ways of their disposal such as combustion and non-sanitary landfill which can have irreparable complications for the environment, public, hospital staff and municipal workers. One of the above mentioned methods is combustion of hospital wastes in which toxic and dangerous gases will be produced and enter the atmosphere like hydrochloric acid, fluoric acid, carbon dioxide, carbon monoxide, Nitrogen oxides, dioxins, smoke and unpleasant smell that blur the respiratory air. If dangerous medical wastes dispose with homemade wastes, it will cause massive hazards for municipal workers, public and environment (7).

There are serious concerns about treatment of diseases caused by inappropriate ways of disposing produced wastes in sanitary and therapeutic places in developing countries like Iran (8). Thus much of the research works in England and USA are devoted to general management of health and therapeutic department wastes (3). Furthermore, it is proven that ordering and separating wastes significantly decrease the production of uncontrolled greenhouse gases, reduce the amount of ash and its toxicity. Based on economical, social and cultural status of patients and general conditions of the area in which hospitals are placed, the amount of produced wastes and also hospital wastes management may vary (9, 10). Hence the issue of collection, purification and disposal of hospital wastes are of import from three points of view; assurance about the services to be sanitary and about people not to be infected by hospital infections, maintaining the health of those who works in these centers and prevention of environmental hazards caused by insanitary collection, purification and disposal of contaminated materials in hospital wastes (2). According to directives of country waste management organization, medical waste management should start with providers of health services like hospitals and then extends to smaller centers with less produced waste and finally applies in other places. In order to completely and precisely implement waste management program in such centers- that have

the following stages: controlling and adjusting produced waste, separating, packing, tagging and transporting out of the produced area and operation of making them safe and final disposal- there should be a training waste management program for all the staff including highly qualified doctors, service staff and janitor. These management components are interconnected and if there is a defect in one of these sections, it will cause disorder and irregularities in overall management of hospital waste. Therefore this research is intended to study hospital waste management based on obligatory elements in this management system to provide an overall perspective of its current status.

Considering this issue that non-principled management and disposal of hospital waste are serious threats for the health of patients, workers, people and environment and since there have been no scientific and objective research on such a material in Dehdasht city, the current study aimed at determining the current status of hospital waste management in Imam Khomeini hospital in Dehdasht city in 132016.

MATERIALS AND METHODS:

The nature of this research is a type of cross-sectional descriptive and observational study in which there is no intervention and data have been gathered and presented on a regular basis by the use of a checklist at one point in time. This study was carried out in Imam Khomeini state hospital of Dehdasht city affiliated to university of medical sciences of Kohgiluyeh and Boyer Ahmad province. Its type of activity is also therapeutic.In addition to determining the status of production, storage, collection, transportation and disposal of hospital waste, waste components, waste weighing and produced waste per capital were specified during four seasons and seven days per month. Data were collected through checklist, observation, interview and referring to the hospital (under study) in person. The collected data were analyzed and reported using SPSS software. Studying medical waste was done as the following. meanwhile before starting, necessary tips were explained to members and all needed safety equipments and appliances were prepared.

First of all yellow bags (for collecting infectious wastes) and black bags (for gathering non-infectious wastes) were prepared and delivered to different parts of the hospital under study and then special labels were provided and given to different parts of the hospital. Labels contain these characteristics: section name, waste type, date of collection and shift work. Then yellow boxes with red lids which has the label of 'dangerous waste' were prepared and delivered to the above mentioned sections. These boxes also contained labels of delivery and collection date. In the next section 3 shifts of morning, noon and night were considered by service forces. Waste from various parts of the hospital were collected and transferred to temporary storage area. Various categories of wastes like homemade, infectious, sharp and chemical wastes were weighed separately by the use of a scale with 0.01 gram sensitivity.

RESULTS:

The result of the current study depicted that total amount of produced solid wastes in the hospital under study was 2125 kg on average in 2016. Maximum portion was affiliated to infectious wastes which accounted for about 63% of the whole produced wastes in the hospital (table1).The portion of hospital waste in different seasons (spring, summer, fall, and winter) have shown in the following table 2. Waste production for each person was 0.7 kg per capital.

Table 1: Relative and absolute frequency distribution of different kinds of hospital wastes in the hospital of Dehdasht city

Waste type	Normal	Infectious	Sharp	Chemical
Weight kg	639	1332	99.5	37
Percent	30%	63%	5%	2%

Table 2: Percentage of Infectious wastes production in different seasons of year

Seasons of year	Infectious wastes percent
Spring	12.98%
Summer	13.78%
Fall	15.73%
Winter	20.13%

Table 3: Average distribution of produced hospital waste weight (kg/Capitall)

Waste	Spring	Summer
Normal	2.69	3.04
Infectious	6.13	6.52
Sharp	0.36	0.4
Chemical	0.47	0.75

Table 4: Comparison of different sections for the production of infectious wastes in percentage terms

Section name	Percent of the production of infectious wastes in different parts
ICU	1.35%
CCU	1.31%
Laboratory	0.75%
Dialysis	24.24%
Emergency	7.2%
Women	18.76%
Maternity	3.5%
Internal	6.45%
Surgery	1.8%
Children	7%
Surgery room	2%
Ent	19.44%
Ct scan	0.5%
Infants	3.75%
Kitchen	1.35%

The information obtained from the hospital under study by the use of a designed checklist containing 50 questions was as follows. In order to separate, store, collect and dispose wastes, wheelbarrows were used in the above mentioned hospital. Waste collection was done in the morning, noon and, late night of each work shift. Waste collection in the production area was as follows: infectious wastes in yellow bags, pseudo homemade wastes in black bags and sharp infectious wastes in safety yellow bags. Those who collected safety boxes didn't use glove, mask, boot or special uniform (they didn't use safety devices). The kind of dishes used in this hospital were propylene and buckets were pedaling. Dishes and buckets were washed with detergents and warm water each week (disinfectant materials were not used).

Waste bags contained special labels but they weren't completely completed. Temporary storage location was designed within the hospital and existing wastes were transferred to this place by wheelbarrows per day. Meanwhile the temporary storage location didn't have a properly improved situation (washable floor, air conditioning system and, drainage). There were a few flies in the wastes temporary storage area. Infectious wastes were burned. Safety boxes were crushed in the waste disposal machine and then loaded along with normal wastes by the hospital inappropriate tractor and exited the hospital per week. There was no training for the personnel about hospital waste management.

DISCUSSION AND RESULTS:

World Health Organization assumed that 10 to 25 percent (on average) of hospital produced wastes are infectious and sharp objects accounted for 1 to 15 percent of the total hospital wastes in developing countries. Infectious wastes in the hospital under study was 63% which is considered high (16). Infectious waste in the overall healthcare centers of developing countries is approximately 63% and between 0.01 to 0.65 kg for each bed per day (17).Based on an study carried out in Brazil, It was assumed that average amount of total

hospital waste is 3.24 and infectious wastes 0.57 kg in each day and night (24 hours) (18). Other researches carried out in Iran shows that produced hospital waste in Tehran is 3.4, Isfahan 3, Kermanshah 2.3 to 3.6 and Orumieh0.95 kg for each bed per capital (19 to 21); This is while produced waste in Dehdasht city is .7 kg for each person per capital which is less than the above numbers. According to a study done by Jung and his assistants in Korea, produced hospital waste was reported 0.14 to 0.49 kg for each bed per day (22) which is not in accordance with the result of the current study. It is reported that the amount and percent of infectious waste is more than criteria. It may be due to inappropriate separation of wastes by staff and services and nonconformity of other hospital staff and visitors or insufficient monitoring of waste separation and mixing with other wastes.

In comparison to an investigation carried out in Yasouj (2), In Dehdasht city waste production in winter and fall is much more than spring andsummer.

As table 4 shows a comparison among different parts in terms of infectious waste production, Dialysis, ENT and women part had maximum production which need more monitoring and supervision and also special training must be given to the personnel, patient and patient's companion. Regarding hospital waste management, there was no program (base on 6 obligated elements of medical waste management) for biological and medicinal waste management, management of wastes produced from surgery operation, autopsy and pathology. According to the 6 obligated elements of medical waste management, health tips including entering, packing, collecting and transporting should be observed though none of them were observed in the hospital under study because of lack of awareness and training about wastes which should be transferred out of the hospital regarding hospital waste management. Wastes were transferred out of the hospital by an improper carriage (tractor) which is dangerous for societies health due to hazards of dispersion of contamination of dangerous infectious wastes.

CONCLUSION:

The results indicated that infectious waste and its danger and also the way it is handled and disposed of should be considered more than before. Hospital waste management is not at the optimum level. Therefore the authorities should pay more attention to this issue. Some actions should be taken to reduce waste production and to separate infectious waste at the point of production; Additionally modern ways of making hospital waste harmless should be utilized. Therefore in order to reduce the environmental effect of hospital waste, modifications of some of the management methods are necessary.

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