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Research Article

Investigating Waste Management in Public Hospitals of Kohgiluyeh and Boyer-Ahmad Province

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ABSTRACT

Background and purpose: lack of attention to the management and control of hospital wastes in various stages of production, storage, collection, transportation and final disposal already has created many problems; so that subsequently, the environment and human health put at serious risk.Improper management of hospital wastes could be risks for workers, patients and their environment.The research and observational cross-sectional study in 2016 in public hospitals in Kohgiluyeh and Boyer-Ahmad is done.The aim of this study was to investigate the management of waste in public hospitals ofKohgiluyeh and Boyer-Ahmad province.

Materials and Methods: In this cross-sectional study is observational, the study population consisted of all public hospitals in Kohgiluyeh and Boyer-Ahmad formed.Data were collected by Czech complete list approved by the Ministry of Health, and also visit the hospitals, interviews with managers and public health professionals working in hospitals, took over 2016.

Results: The study showed that the total number of beds in the public hospital four a total of four hospitals, 887 beds that the amount of waste produced 2684 kg per day. In hospitals, a total of 2217 people were busy serving of these, 3.10% of them were active in waste management.Most infectious hospital waste per capita to Gachsaran hospital, and the highest per capita domestic and sharp overnight hospital waste is also related to Imam Khomeini hospital.The average per capita waste generation per bed is equal to 3.02 kg. All hospitals performed to separate waste according to the instructions.All units also carried out disinfecting waste and are simply waste with special equipment were transferred to municipal landfills.

Conclusion: The results obtained from this study, in order to reduce pollution in the hospitals, the medical waste management activities should focus on local produce and perform in the hospital.The results are a warning to the relevant authorities to cooperate and assistance and the costs not so much, to resolve this problem immediately take action.

Keywords: hospital waste, public hospitals, waste management, Kohgiluyeh and Boyer-Ahmad

INTRODUCTION

Hospitals, including healthcare centers which in recent years due to high population growth and development of cities have been remarkable. These changes increase the number of visitors and diversity of service facilities in hospitals and wastes produced at these centers has increased, so that today an increase in disposable tools and new treatment methods and a variety of large differences in the quality and quantity of wastes

produced is sent in Hospitals (Amoee and Omrani, 2003).

Hospitals and medical centers are the most important centers of health care waste production; therefore, more emphasis is given on hospital waste (Proid and Townsend, 2009).Hospital waste is one of the health problems caused by hazardous agents and pathogens of particular sensitivity (EPA Iran, 2003).Proper management of these materials plays an important role in the control of environmental pollution and the incidence of nosocomial infections because epidemiological studies have shown. The needles used in contact with someone likely become infected with HIV and hepatitis C and B (Omrani, 2005). According to estimates, about 630 kinds of chemicals and drugs in hospitals 300 are toxic used.In countries around 4.85% of hospital, waste without performing any operation disinfecting buried in landfills. Of these 63.3% burned and released into the environment are stacked together to form 2.18%.Only about 29.67 wastes produced in hospitals, mainly in areas like household waste are recycled.None of the above methods approved environmental and health consequences due to the international scientific community is not environmentally friendly.Therefore, it seems that there are serious shortcomings in this areashould be resolved as soon as possible to remove them (Hasanlu, 2013).

The sources of hazardous wastes can be hospitals, clinics, physicians' offices, clinics, medical research centers, pharmacies and nursing home named.Waste Solid waste generated at these locations, say health care (Khoram and Fadaee, 2007).Based on research conducted by 40 to 50 percent risk of hospital waste and could be infecting others with HIV and hepatitis (Mousavi, 2004, Afshar and Aghaee, 2004). Scientific peer review has shown that the majority of infections caused because of carelessness and negligence in maintenance, transport and waste Physics More is (Afshar and Aghaee, 2004).Hospital waste pollution of water, soil and weather conditions are favorable for the growth of vermin and Micro creates perilous regression and because of the stench, there is also other potential health risk (RayeganShirazi et al., 2008).

Hospital waste management, including waste minimization and recycling, sterilization using steam (autoclave method), sterilization using microwaves, sterilized using heat, sterilized using gamma rays, disinfection using chemicals, incineration, neutralization, landfill and sewage disposal network is (Chobnoglos and Krisf, 2002). Tips that are correlated with unsanitary hospitals, lack of attention to proper disposal of hospital waste and releasing them in the environment and neglect of which can lead to disaster. It should be acknowledged that many of hygiene and safety in hospitals from production to disposal in hospitals as well as collect and bury the municipalities affected by numerous shortcomings and anomalies. Construction and equipment facilities available tissue status and human resources services each hospital a decisive role in relation to the waste collection system (HabibZadeh et al., 2006). Unfortunately, the number of hospitals, garbage collection by hand to pay the practice has dangerous factors, especially waste containing contaminated needle and other sharp objects and inform the workers of its existence has not numerous events are leading to hospitals. It seems that the number of movements of hazardous waste in hospitals there is less risk of them will be less.

On the other hand, using the appropriate and necessary separation of landfill waste sectors, it make sure the lid such that the garbage bags and the superior quality of the risky and mark it on the bag indicating the dustbin as well as the colors are different bags is essential. This makes the polluter sensitivity, the risks resulting from contact with hazardous waste, in addition to personnel involved with obvious and often workers lack gloves, and safety devices are in hospitals (Mahmudieah, 2004). Various researches have been conducted on waste management in hospitals.Zaree et al (2013) study examine the status of waste management in hospitals in Boushehr province concluded total number of beds in 11 hospitals (except oil Hospital and military hospitals for which data was obtained) at a rate of 2074 kg per day and

865 beds are solid waste and per capita production of 3.2 kg per bed per day. Also in terms of waste management, separation of infectious and hazardous wastes from ordinary wastes hospital, burning of infectious waste incinerator in the center out of the city and preferably in a municipal solid waste landfill and the landfill engineering and ordinary waste and incinerator ash and other waste in relatively good condition. Dehghani et al (2010) in a study titled Evaluation of medical waste management in public hospitals in Arak concluded that hospitals in waste separation are poor.

However, in terms of gathering and transportation, storage, maintenance, and final disposal of wastes were satisfactory.

Bazrafshan and KurdMostafa Poor (2009) in a study determine the quality, quantity of hospital wastes in Sistan, and Baluchestanprovince concluded that the amount of hospital wastes produced not only in hospitals is different. But also in other cities of Iran and other countries is somewhat different and this difference is primarily due to factors such as waste management, the type of services provided by the hospital, the number of active beds, cultural and economic status of the community and so on. Aghaee and Afshar (2008) in a study as management of hospital wastes in hospitals Mahshahrpetrochemical industry concluded that separation and sterilization in the hospital doing well, but do not perform landfill. Integrated management of hospital waste disposal sanitation and engineering.Improper maintenance and sewage in places often visited hospitals whirlpool is just increase the presence of insects and rodents and vectors and other as well as geographical conditions (where) some of these places are deserted and inappropriate use of pesticides and disinfectants, helped in the proliferation of these creatures.The incineration of hospital waste, hospital waste elimination device they use. Dehdasht city hospital has multiple parts, a major role in the production of hospital waste, which if properly managed and the principles on which waste is done irreparable risks to employees, the community and the environmentDue to this, the study of the management of hospital wastes is one of the requirements of the health system. Therefore, this study aimed to assess the state of separation, collection and transport, storage and maintenance and final disposal of solid waste in government hospitals Kohgiluyeh and Boyer-Ahmad proper strategy will be optimal management of hospital waste.

METHOD

This study is a cross - sectional and observational, which in 2016 in four public hospitals in Kohgiluyeh and Boyer-Ahmad, whose numbers are 4 hospitals have been carried out. Data was collected through observation, interviews, visiting hospitals and checklist was completed. Tehran University of Medical Sciences in the School of Public Health of the checklist has been developed.The checklist of questions such as: the number of wards and hospital beds and the number of people who work in the collection and transportation of waste and so on. Another question on the checklist of state separation is collection and transportation, storage and maintenance and final disposal of hospital waste. In each hospital operations according to the checklist of questions through interviews with managers and employees of Waste and field observations were responding.Finally, based on the observance of standards (based on the directive of the Ministry of Health, treatment and Medical Education) are in hospitals and according to the answers given to questions about the management of hospital wastes has been concluded. Data were collected after permission from the Department of Health, was the head of the health department. The government hospitals covered by the Medical University of Kohgiluyeh and Boyer-Ahmad and notice of the Ministry of Health in the field of hospital waste separation at source had received, incumbents monitor, and disposal of hospital waste associated willingness to cooperate with researchers enrolled and excluded otherwise. All public hospitals declared its willingness to cooperate. In order to uphold the principles of research ethics, research before the interview and questionnaire checklist, the purpose of the study to the relevant authorities explained and stated that health

professionals in hospitals for lack of desire, Mukhtar will be to stop cooperating with the researcher. the total waste per hospital, per capita waste generation in kg per day dividing the daily waste production per capita number of beds per hospital, per capita waste production per bed. The daily waste separation and re-weighing, calculating the weight of quasi-domestic waste, infectious, tip and was sharp.

RESULTS

Profile of hospitals: a summary of information about the four teaching - medical hospitals Kohgiluyeh Boyer Ahmad, who was using checklist in Table 1 below.

Table 1 Summary of Information Hospitals - Health study in Kohgiluyeh and Boyer Ahmad in 2016

Hospital Name	Type of Activity	Number of wards	Total number of employees	The number of staff working in waste management	Number of beds
Imam Sajjad	Educational – Health	18	700	80	260
Shahid Beheshti	Educational – Health	17	600	60	265
Imam Khomeini	Therapy	17	567	40	220
Shahid Rajaee Gachsaran	Therapy	17	350	35	142
Total	-	69	2217	215	887

Results The table above shows that in hospitals with 887 beds was serving a total of 2217 employees, of which, 3.10% of them were active in waste management.

Table 2 The daily per capita rate of total output, according to the hospitals of hospital waste

Hospital Name	The total wastes (Kg/d)	Infectious waste (Kg / d)	Sharp waste (Kg/d)	Household-like waste (Kg / d)	Per capita waste production (Kg / d)	per capita Infectious waste (Kg / d)	per capita Sharp waste (Kg/d)	per capita Household-like waste (Kg / d)
Imam Sajjad	770	220	20	530	0/86	0/84	0/07	2/03
ShahidBeheshti	481	135	11	335	0/54	0/50	0/04	1/26
Imam Khomeini	770	170	50	550	0/86	0/77	0/22	2/5
ShahidRajaee Gachsaran	663	390	13	265	0/74	2/74	0/09	1/86
Total	2684 (Kg/d)	915 (Kg /d)	94 (Kg/d)	1680 (Kg /d)	3/02 (Kg /d)	1/3 (Kg /d)	0/10 (Kg/d)	1/89 (Kg /d)

In addition, according to data from the results table above, in hospitals, total waste produced by hospitals is approximately 2411 kg per day. The highest amount of total public hospital wastes produced (like home) related to Imam Sajjad (530 kg per day), most infectious waste ShahidRajaee Hospital of Gachsaran (390 kg per day) and most sharp relating to Imam Khomeini hospital waste (50 kg per day). Most infectious hospital waste per capita of ShahidRajaee Hospital Gachsaran, and the highest per capita domestic overnight hospital waste and sharp is also related to Imam Khomeini hospital. The average per capita waste generation per bed is 3.02 kg (Table 2).

DISCUSSION

Per capita waste

The results showed that per capita production of hospital waste and infectious waste 3.02 kg per bed per day, 1.03, home-like 1.89, 0.10 sharp kg per bed per day. Similar to developed countries (5.1 kg.), and most of the developing country (2.1 kg) is (Abedi, 2002). The results Taskona et al (2008) in Greece indicate that the average rate of medical wastes the equivalent of 9.1 kg per bed per day. A study in Brazil showed that per capita waste production per bed per day 3.245 (da Silva et al., 2010), India (2) 5.0 (Patil and Shekdar, 2012) and in Jordan, 0.5 to 2.2 (Abdullah et al., 2008) have been reported. In Iran, the Tehran research indicates the amount of waste per capita 2.71 kg. And Babylon 2.01 kg (RayeganShirazi, 2008) in a developing country and Iran has been less than expected, but this amount in Yazd 7.42 kg (Baghianimoghadam, 2006), Shiraz 3.43 kg (Hatem, 2006) and Bandar Mahshahr 3.23 kg (Afshar and Aghaee, 2008). It was more than expected in Iran, possibly because of lack of

staff and patients and relatives of patients are unresponsive.

Amounts of infectious waste, home like and sharp respectively 34, 63 and 3 percent of total waste production. The total amount of hazardous wastes (total infectious and sharp) is equal to 37 per cent. However, studies in the rest of the world in about 10 to 25 percent of the total hospital waste and infectious waste and dangerous forms (Taghipoor and Mosaferi, 2009).

Matthews and Schalk study (2008) on hospital waste management in Brazil revealed more than 50 percent of waste the waste is non-infectious. Meanwhile, the results of studies conducted in the cities of Khoy, and Tehran respectively 46 and 47.9 percent indicates the type of infection (FadaeeKhorami, 2008; Danbelli et al., 2006).The results Habibzade et al (2007) on waste management at hospitals Bukan,Mahabad and Saghez showed that 61 percent of public hospital waste, 23 percent of infected and 16% of waste is sharp. The results TaghiPooret al (2009) in Tabriz hospitals showed that 29.44 percent of infectious waste, 70.11 percent and 0.45 percent of the general type is the kind of sharp.

As you can see the values of hazardous wastes in this study is higher than the results of other studies that reason, governing the management of hospital waste, especially hazardous waste sorting of waste to the public.

The percentage of stocks included in public waste and infectious waste management, an important point that from the standpoint of reducing the amount of waste that must be considered in the purchase and consumption of goods and items containing plastics and textiles in such a way to act that produced less waste.In connection with the general waste had the highest percentage of weight for plastics, food waste, textiles, paper and cardboard, metals, glass and other materials is which can be managed by proper training principles and values of the reduced staff.Ingredients hospital waste collection and recycling of wastes have a direct impact on operations and to increase health awareness can be achieved in recycling of origin.

Waste separation

According to observational data, in all hospitals of waste separation was done according to the instructions. Plastic containers used for storing waste equipped with garbage bags were resistant and Tralee with wheel of sectors collected andwas transferred to temporary storage in the hospital.Separation of waste produced at the beginning of each episode is done. Infectious waste in yellow bags and waste-like household black bags and sharp waste and won the yellow box infectious and noninfectious stiffness in stiff blue box was collected.Before transferring the waste from the temporary position, garbage bag tags contain information on specific waste types and it produced and installed. The separation took place in accordance with the instruction of the Ministry of Health.

Collecting

Plastic containers used to hold waste was equipped with garbage bags were resistant.Tanks for hazardous waste (infectious) and normal (non-infectious) are isolated in hospital and in all relevant component, separate bucket with the appropriate color for the collection of hazardous and ordinary.Waste bins and vehicles for daily cleaning and disinfection. Sections walking garbage collected by Tralee and were transferred to temporary storage in the hospital.In all facilities used to collect and transport waste was pretty good.

Temporary storage

Temporary storage location was also relatively good condition. It equipped with biological treatment systems, hot water systems, sanitary leachate disposal system, cooling systems, adequate protection against the sun, lighting and ventilation was adequate.It is also possible to wash and disinfect the floor and there was a possibility of evacuation and proper drainage and its strong and impermeable floor and for a variety of medical waste was segregated. In hospitals, the quality of temporary storage sites and storage of waste is undesirable.The results Askarian et al (2004) showthat only 26.7% of temporary places of hospital waste have been of good quality.

Status of waste transport

Waste transport infectious waste by a special machine with a special mark took place. Transportation of cars, trucks covered for hospital waste, which has been pressing system and waste were transported to the municipal landfill site. All centers were studied for disinfecting system. All hospitals have a system for disinfecting waste and waste elimination by autoclave and were safe according to Mohseni et al (2001), in hospitals of the province, the transportation of the waste in temporary sites; in 45% of hospitals and 55 percent also been using carts. Studies in China and Brazil show that was 93.3 and 85 percent of hospitals are equipped with temporary status (Zhang et al, 2009; Dasilva et al., 2010). The results Askarian et al (2004) show 80 percent of hospitals in the province are equipped to place temporary storage. All hospitals have waste management are responsible for the control daily and continuous monitoring of the production process to the disposal of hospital waste is collected and transportation and daily information to manage hospital waste management reports. As well as personnel, training in the field of waste management in all hospitals hospital training periods beginning and in-service training for personnel issues along with the rest done. Hospital staff somewhat in relation to methods of transport and disposal of medical wastes was trained. The results Tsakona et al (2008) show 80% of workers involved in their hospitals waste collection activities have been trained.

CONCLUSION:

Given that the problems in the management of hospital waste has always been one of the principal concern, development and improvement of existing waste management is essential hospital. And certainly with the results and achievements of scientific research that will be done in the form of specialized and more accurate and the results of such research as a source of information readily available regarding the production, maintenance, collection and transportation of hospital waste disposal. It can be a big step to improve the situation and reduce 50% of waste produced, at least in the first 2 years of harvest. Given the cost of safe disposal of infectious waste associated with infectious waste production reduction strategy can be very useful and economical.Ifthe resolution is desirable that a high percentage of waste in ordinary hospital (like home) are non-infectious and log the amount of waste for safe disposal of infectious waste decreased construction or reduce the cost and reduce the depreciation of machinery.Regular monitoring equipment used in the storage, collection and transport of medical waste and the use of biological risk for infectious waste logo and monitor the effectiveness it must be seriously considered and repair and replacement of these devices continuously pursued. It seems the situation in proportion the level of monitoring and follow-up of the executive management of hospital waste and involved are being justified with the review and analysis of the status quo. It pay particular attention to proposals such as reducing waste, hospital committees, waste management training courses for target groups, intersectional cooperation, especially the Ministry of Health, Treatment and Medical Education, Environmental Protection Agency and municipalities, Czech compiling a list of internal audit and completed its regular and ongoing monitoring of infectious ordinary waste separation at source can be sharp products. In addition to upgrading, the existing situation provides a good platform to improve hospital waste management. The limitations of this study can be due to inherent problems affecting waste particularly difficult gather information weight and the level of service because of low cooperation and information worth knowing its rubbish and the heavy workload of the officers would monitor the collection and disposal of hospital waste and the fear of disclosure of information concerning the events cited.

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