Hospital Waste Management In Order To Reduce Environmental Hazard


Abstract— Hospitals in broad spectrum produces waste materials which during health care activities as compared to other waste product are potentially harmful in causing infection and injury. Collection and disposal of hospital and other health care centers waste products requires specific locations due to their danger to human health, animals, plants and environment. Materials and method in this research work is descriptive and analytic and are obtained from valid documents and resources. In general we can mention that managing hospital waste materials plays a vital role in preventing its negative impacts over environment.

Keywords— environment, hospital, hospital waste products, offal products

I. INTRODUCTION
Hospitals are medical institutions and are formed by using recognition, treatment, hygienic, educational and research methods. Their sole purpose is the treatment of inpatient and outpatient and provides facility and security for its staff and patients [1].

In every hospital broad spectrum of waste materials are produced. Waste produced by offices and kitchens are same as those of residual waste on the other hand waste material produced via operation theaters are completely contaminated and are considered to be dangerous. Residual wastes are produced in almost every hospital. Components such as paper, kitchen waste etc. is present among hospital waste materials. These waste products if not mixed up with infected and contaminated materials can be normally collected, transferred and disposed of. Except these waste hospitals also produce dangerous and infectious waste materials which are known as “Special hospital waste”[1].

Collection, transport of residual, industrial and hospital waste is one of the challenges our country is facing. Hospital waste management is of great importance. Government’s attention toward health care, growth increase in rural areas, different incidents and disasters, usage of disposable equipment’s in hospitals, Proliferation of drug use are the main cause of increase service operation in hospitals which also results in more waste production [2].

These special waste materials possess a threat to human health and environment as they are both infectious and can cause severe injury [3]. Survey shows that around 75-90 percent of hospital waste materials are same as compared to our daily residual wastes and can be handle and disposed of as they possess no threat while the remaining 10-25 percent are contaminated and dangerous therefore necessary precautions must be take while handling them [4].

Worldwide studies show that the laws of handling infectious waste, their production capacity and their maintenance methods are different in different countries. According to international statistics in average hospitals daily 1/5-1 kilogram waste per patient is produced [4]. These values are different in various countries such as 1/1-12 kg in high income countries and up to 0/5-3 kg in Low income Countries [5].

II. EMPAHSISES THE NEED FOR HOSPITAL WASTE COLLECTION
Collection and disposal of hospital waste are of great importance as they require specific location because of their danger to human health, animals, Plants and environment. Hospital waste has not only the danger of spreading Pathogenicity but also may wound contaminate staff and workers.

In an Epidemiological study conducted by Kurri and colleagues in three years over injuries cause to workers through needles and other hospital waste. Their work method were Questionnaire based and analyzed parameters shows Comorbidity hepatitis c. The results obtained from these three
years shows that 248 workers were harmed out of which 43/1 percent were nurses, 19 percent cleaners, 15/7 interns, 11/7 percent residents and 6 percent were technicians. Out of these 12/5 percent were affected during waste collection, 10/5 percent were affected during needle disposal and 77/5 percent were affected due to other reasons while collecting dangerous hospital waste [6].

In another research conducted by Abdu leman Amoy 1375, the criteria of collection, handling, transferring and disposing of hospital waste in province of Khuzestan via Questionnaire was performed. The result of this research shows that more than 22 percent of hospital wastes are contaminated and most of it (12/78 percent) along with other waste materials is transported out of hospital and unfortunately in 2/56 percent of hospital these hazardous waster are handled by hand [7].

On the following basis four factors are considered to be of importance regarding waste collection and disposal from hospitals [2],[8]:
1) Ensure health services and prevent hospital infections
2) Ensure health and safety of waste collecting workers
3) Prevent environmental hazards caused via collection, transport and disposal of wastes
4) Preservation of public health from health hazards such as collection, transport, and unsafe disposal of hospital wastes.

III. CLASSIFICATION OF HOSPITALS HAZARDOUS WASTE S
The world health organization in its last segmentations calcifies hospital waste into ten main groups:
1) Infectious waste materials (comprises of all doubtful waste material utilized during surgery or being in contact with human blood or body fluid during treatment)
2) such as anatomic or pathologic wastes (tissues or body part, blood or plasma)
3) medicine waste
4) chemical waste,
5)heavy metal waste
6) pressure vessels
7) sharp material waste (needle and scalpels etc.)
8) highly infectious waste (microbial culture)
9) cytotoxic and genes toxic waste (Chemotherapeutic drugs and radiotherapy)
10) and radioactive wastes (diagnostic imaging therapy) [9].

IV. HOSPITAL WASTE MANAGEMENT
IN 1992 United Nations defined a management group for collecting, transport and disposal for hospital waste and each group was set responsible for its particular task [10]. World health organization in year 1996 presented a form for analyzing waste disposal system in hospitals of under developing countries, which was corrected and presented to all countries for implementation including Iran [10].

Recently hospital waste management program is defined as a set of coherent and systematic rules for categorizing, packing and labeling, collecting, transport, recycling and disposing of solid waste materials on the basis of health principles, economy, Aesthetic and environment friendly package[11].

This is one of the best presented schemes for collection hazardous waste materials and to differentiate between normal and infectious wastes by keeping them into double layer propylene bags of different colors[11],[12], using hand carts [11], system shootings [10] and pneumatic tubes for their collection in closed environment [11]. Then Using waste burning furnaces [11], sterilizing infectious waste by the process of steam sterilization [13], crushing them before transport and finally disposal of wastes [14].

Furthermore workers must be given proper training for waste handling especially infectious waste [15] and also providing them with safety kits including boot, gloves masts non penetrable or thick suits and finally none recycling of hospital waste are key features of this scheme [10].

V. INFECTIOUS WASTE MANAGEMENT
A Part of hospital waste is infectious. The main purpose of handling such waste is to reduce its disease spread to minimal. Organization and centers responsible after analyzing waste material having pathogens more than the normal level which may cause the spread of infectious disease, came to action. Control and prevention center have considered five hospital waste diseases as infectious which are as follows: microbiologic waste, pathologic waste, infected animal carcasses, blood and sharp objects.

Importance of categorization, maintenance, and infectious waste elimination are so important that today even the world’s developed countries have implied tough rules and regulations for medical and health care institutions. Studies conducted via Almunif in 2003 and Tudor in 2005 mentioned the importance of infectious hospital waste and their disposal [16], [17].

One of the main important principles of infectious waste management is separation of them for normal waste materials which also prevent spread of diseases [18]. Another vital recommendation in waste management is their recycling process must occur before transporting them out of hospital [13]. Here recycling means to perform any action which reduces risk of disease spread [15].

VI. THE TIME AND LOCATION OF HOSPITAL WASTE COLLECTION
From the view of location and due to the presence of dangerous and infections materials in waste and Maintenance in temporary places their distance from the wards and other sites of hospital must be far away [19]. Therefore the more they are away from hospital sections the less is the danger of disease spread [20]. Temporary waste storage sites must have these features as Permeability, Stability against atmospheric
agents, Rodents, Soil penetration resistance latex and Cleaning and Disinfection [21].

For design and construction of hospitals and other health care institutions Architectural drawings and construction plans must be discussed with ministry of health and environment in order to provide appropriate location for waste management and also construction of particular transport route in and out of every ward [22].

The average waste collection time shows that how long the waste remain inside wards [23]. The best way of managing hospital waste is to remove waste from wards as soon as possible and transport them to their destination [7]. Due to risks that hospital wastes have they must be treated as special waste products and should not be kept in temporary storage places for more than 24 hours [14].

Hospitals the produce radioactive waste materials are comprised of special equipment’s such as Ventilation systems, air sampling, radioactive detecting system, fire detection and control and door lock and fire proof system. Also radioactive wastes must be collected in Lead containers and their disposal sites must be differing from other waste disposal sites [22].

VII. RESULT AND RECOMMENDATION

With repect to the recent waste disposal program throughout the country need of a comprehensive plan is vital. Rules should be in place for waste material separation of hazardous waste (infectious, chemical, pathologic and radioactive wastes) and waste should be categorized on color combination of garbage bags.

If it’s not possible to recycle the waste inside hospitals before transporting it outside and keeping in mind that not every hospital has the budget to buy an Incinerators it’s not necessary and we also don’t recommend it. Therefore it’s more suitable establishing an Incinerator with high capacity in the city outskirts to support most hospitals and health care centers.

City municipality is responsible for management of theses waste Incinerator sites along with supervision of environmental health offices of each city in order to provide better and environment safe waste disposal methods and Guidelines in order to decrease the amount of waste produced via these centers. Therefore following are suggested:

1) Regular monitoring and maintenance of equipment’s for transport of waste material as they are of vital importance.
2) Waste collection in every unit via black plastic bags or plastic containers and after discharging they must be washed and cleaned immediately.
3) Determining the weight of the waste produced in a hospital, number of staff and required equipment’s for waste collection can be predicted and better management results can be achieved.
4) All hospital waste on the basis of three categories of, infectious wastes, sharp equipment’s and needles and residual wastes are separately collected in different containers.
5) Sharp tip wastes should dispose using special crushing devices and along with infectious waste send to Incinerator.
6) Standard and efficient incinerator should be bought and installed in every hospital in such a way that there should be no smoke after burning waste. All waste material must be crushed an burned or disposed.
7) All waste management must undergo special test and vaccination for hepatitis B to insure their health and safety.
8) We must emphasize on waste categorization. Hazardous wastes (infectious, chemical, pathologic and radioactive) must be categorized by color codes. Such as infectious and radiotherapy waste in red bags, poisonous wastes in purple color bags, Autoclave wastes in blue color bags, all other hospital waste in yellow color bags and residuals waste must be put into black color bags. Furthermore all hospital staff and personals must be educated about waste color scheme.

VIII. REFERENCES