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AN OVERVİEW OF THE MEDİCAL WASTE DİSPOSAL OF TURKEY

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ABSTRACT

Among the general wastes, medical wastes originating from health institutions have the status of special wastes. Since there are infected, pharmaceutical, pathological, various chemical and radioactive wastes as well as pointed and cutting tools in the waste of health institutions, they must be collected and treated separately from general wastes. Medical waste poses a serious environmental risk if it is not collected, transported and disposed of properly. In this study, it shared information and statistics related to medical waste control in Turkey.

1. INTRODUCTION

Medical wastes include all wastes that may occur in all hospitals, family practice center, laboratories, veterinary clinics, and households where medical equipment is used. In general, 75-90% of medical wastes originating from the daily use of the personnel in the institutions are wastes that are not risk of domestic waste. About 25-10% of the medical waste is considered as hazardous waste that can threaten the health of living. According to the research conducted by the World Health Organization in developed countries, it is possible to say that 80% of the medical wastes were in the risk-free group, 15% were infection-containing, 3% were chemical waste, 1% were cutting-piercing instruments and 1% was special wastes.
Medical waste regulations were published for the first time in Turkey in 1993. These regulations were amended in 2005 in line with the European Union Environmental Directives. Since then, alternative medical waste treatment technologies have been implemented in Turkey [1-4]. According to the Regulation on Control of Medical Wastes No: 29959, which entered into force on 25.01.2017, medical waste refers to infectious waste, pathological waste and penetrating waste from health institutions. Medical wastes specified in this regulation are as in table 1.

Table 1. Medical wastes specified in Reg. 25.01.2017/29959 [5]

Contaminated glass and similar objects
Waste generated after quarantine
Gloves, fabrics, etc. used during surgery. materials
Human pathological waste, placenta, body parts, etc. all objects in contact with them
Scalpels used in medical interventions,
Microbiological wastes from laboratories
Objects contaminated with blood
Ventilation filters containing bacteria and viruses
Injector needles and needle cutters
Lam-coverslip, Waste water and equipment wastes generated after dialysis
Guinea pigs used in biological experiments

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The World Health Organization classified hazardous medical wastes in nine parts. These classes are [4]:

- Infectious Waste: Known or likely to carry infectious agents; blood and blood products, especially all kinds of body fluids, human tissues, etc. classified as infectious waste.
- Pathological Waste: Tissue, organs, body parts, human fetus and animal carcass, blood and body wastes composed of liquids are called pathological waste.
- Cutter-Drilling Waste: Syringe, syringe and all other subcutaneous interference needles, scalpel, blades, serum set needles, surgical needles, biopsy needles, broken glass, lamellae, broken glass tube and petri dishes such as stinging, puncture, abrasions and injuries that may cause injuries.
- Pharmaceutical Waste: Drugs, vaccines, sera, and other pharmaceutical products that have expired, are packaged and contaminated. Used gloves, hoses, bottles and cans containing pharmaceutical residues are defined as pharmaceutical wastes.
- Genotoxic Waste: Drugs that cause abortion in living things or used in the treatment of cancer are genotoxic waste. Body wastes of patients treated with drugs containing certain chemicals and radioactive material are also included in this type.
- Chemical Waste: Solid, liquid or gaseous waste containing chemical substances used in medical diagnosis, treatment or experimental research which may have harmful effects on human health and environment. Wastes that contain chemicals such as aminoacids, sugars and certain organic-inorganic salts are non-hazardous chemicals.
- Wastes Containing Heavy Metals: Waste containing high amounts of heavy metals is a subclass of hazardous chemical waste and is generally highly toxic.
- Pressurized Containers: Gas is used in many types and components in medical facilities during medical activities. An example of this is the nitrogen gas used during narcosis. Such gases are stored in pressurized cartridges and aerosol cans. However, certain types of aerosol cans must be destroyed.
- Radioactive Waste: Waste containing solid, liquid and gaseous materials contaminated with radionuclides is defined as radioactive waste.

2. A BRIEF STATISTICS [4]-[7]

Turkey Statistical Institute has published the medical waste statistics based on the data of a survey administered every two years in the Medical Waste Control Regulation within the scope of medical institutions that produce large amounts of waste. After 2017, Medical Waste Statistics were produced by using the administrative records of the Ministry of Environment and Urbanization of health institutions within the same scope.
The amount of medical waste obtained from 1527 health institutions in 2016 was 81024 tons. The amount of waste that was sterilized and disposed of in landfills is 68452 tons.
The amount of waste disposed at incineration plants was 12566 tons. The amount of buried, exposed waste is 6 tons. The amount of medical waste obtained from 1525 health institutions in 2017 was 85987 tons. The amount of waste that was sterilized and disposed of in landfills is 75730 tons. The amount of waste disposed at incineration plants was 10637 tons. The Ministry of Environment and Urbanization reported that 38,000 tons of medical waste were disposed of in the first 4 months of 2018. As of the end of March 2018, 58 sterilization facilities with a total capacity of 202 thousand 982 tons per year and 3 incineration plants with a capacity of 142 thousand 680 tons per year ensure the management of medical waste in 81 provinces.

3. DISPOSAL OF MEDICAL WASTES

Separation, collection of medical wastes transport, dispatch to disposal facility and what to do in this process was published in 2017 under the name of Medical Waste Control Regulation-29959.
The responsibility for the collection of medical wastes at source, transport and temporary storage within the health institution belongs to the health institutions.
The responsibilities of transporting or transporting, sterilizing or disposing of medical waste from temporary warehouses and containers to medical waste processing facility, establishing / establishing, operating / operating medical waste processing facilities for this purpose are metropolitan municipalities, authorities and authorities in other places.
Medical wastes are collected separately from domestic and recyclable wastes in the formation processes. The purpose of the separate collection of these wastes is to select the appropriate disposal method for the type of waste. Special packaging is applied in different countries with various color coding according to waste types.
Wastes generated in health institutions are collected in three different color bags which can be easily distinguished from each other. Domestic wastes are collected in black bags and glass wastes such as medicine and serum bottles are collected in blue bags. Wastes generated in health institutions are collected in three different color bags which can be easily distinguished from each other. Domestic wastes are collected in black bags and glass wastes such as medicine and serum bottles are collected in blue bags. Medical wastes are pathological and non-pathological, infected, chemical and pharmaceutical wastes from the units, and all kinds of human tissues and organs, urine containers, blood or placenta contaminated wastes, bacterial cultures, bacterium, emergency services wastes, filters, bloody glands and cotton swabs and

other dressings and surgical wastes, medicine boxes, faeces and contaminated articles, carcasses of experimental animals used for research purposes, wastes of quarantine patients are collected in red bags. Needle-cutting waste such as needles are placed in a yellow infected waste bucket and put in a red bag after the mouth is closed. Red bags are made of 100 micron thick (double layer), 60cm (width) x 85cm (length), leak proof, moisture proof, resistant to tear and explosion under normal conditions and medium density polyethylene. "International Clinical Waste Emblem" and "Medical Waste ibar are written on it.

Medical waste bags are collected and transported by trained personnel for the loading, unloading, cleaning and disinfection of wheels, lids, stainless metal, plastic or similar materials, which do not cause any damage to the bags during loading and unloading, and which are reserved for this purpose only. The vehicles used to transport medical wastes in the unit will be colored orange, with the "International Biohazard" emblem on them "Attention! Medical Waste ".

Medical waste bags are loaded into waste transport vehicles with their mouths tightly connected and uncompressed, avoiding hand or body contact during collection and transport. Waste bags are never carried by hand. Waste chimneys and moving lanes are not used during transport. Medical wastes and household wastes are not loaded and transported in the same vehicle. Waste transport vehicles are cleaned and disinfected regularly every day. In the event that a bag explodes or spills inside the vehicles, the waste is safely discharged and the transport vehicle is disinfected immediately.

Medical wastes should be disposed of by selecting the most appropriate method according to the type of waste without harming the environment and human health. Medical wastes are, incineration, sterilization, chemical disinfection, microwave and plasma methods. Incineration process is to make the wastes harmless by burning at high temperatures in special furnaces in facilities licensed by the Ministry of Environment and Forestry.

Broken thermometers, used batteries, radiological waste, bulbs containing heavy metals and pressure vessels are not burned. In cases where the Ministry of Environment and Forestry considers it necessary and within the permission of the Ministry, taking necessary precautions and providing the provisions of the Regulation on Control of Hazardous Wastes in flue gas emissions can be burned in cement plants. Sterilization is a method of eliminating all kinds of microbial life, including bacterial spores, by physical, chemical, mechanical methods or by radiation, or by reducing the level of these microorganisms by 99.9999%. The microwave method is the application of microwave under hot steam after the shredding of the waste. Microwave technology cannot be used for liquid blood and hazardous chemicals. Disinfection is the process of killing pathogens using chemicals. This disposal method is more suitable for the treatment of liquid waste such as urine, blood, faeces or hospital sewers. Thermal plasma is the process of reducing the infection content in the waste by using heat. It is a process used for liquid medical waste. Cultures and agars, pathological and liquid animal wastes.[7, 8].

4. CONCLUSIONS

With the rapid development, the need for health sector in our country gradually increasing.. Thus, the formation of health institutions accelerates. Among the wastes, medical wastes originating from hospitals have special waste status. Since hospital wastes include infected, pharmaceutical, pathological, various chemical and radioactive wastes, as well as pointed and cutting tools, they must be collected and treated separately from general wastes. Storage or disposal of hospital wastes without any treatment or accumulation in a random area causes environmental problems.The emergence of new health institutions or the expansion of existing ones has led to an increase in the amount of medical waste and diversity of waste. Disposal of medical wastes becomes a major problem for some reasons, such as increasing consumption of consumables, increasing the potential hazards while destroying infected wastes. Although there is a regulation on medical wastes, hospital wastes will continue to be an environmental problem in some regions in our country if there is not enough importance in the subject and if there is not a conscious planning and action style about the collection, storage, transportation and disposal of hospital wastes.

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REFERENCES

[1] Ege, H.,Adana İli tıbbi atık yönetimi; sorunlar ve çözüm önerileri (MSc.), Çukurova Üniversitesi, Fen Bilimleri Enstitüsü, Adana, Türkiye, 2009.

[2] Bayır, Ç., Ülkemizde tıbbi atık yönetimi, bertaraf edilmesi ve mevcut durumun incelenmesi (MSc). Muğla Üniversitesi, Fen Bilimleri Enstitüsü, Muğla, Türkiye, 2011.

[3] Üstün, H., , Tıbbi atık bertaraf yöntemleri ve karşılaştırılması Giresun İli örnek çalışması (MSc.), Gebze Yüksek Teknoloji Enstitüsü, Mühendislik ve Fen Bilimleri Enstitüsü, Gebze, Turkey, 2012.

[4] Durmuşcan, Ö., Türkiye'de tıbbi atık sorunları ve çözüm önerileri (MSc). Çukurova Üniversitesi Fen Bilimleri Enstitüsü, Adana, Türkiye, 2019.

[5] TAKY, 2017, Resmi Gazete, 29959 Sayılı, 25.01.2017 Tarihli, Tıbbi Atıkların Kontrolü Yönetmeliği.

[6] https://www.aa.com.tr/tr/turkiye/4-ayda-34-bin-ton-tibbi-atik-bertaraf-edildi/1143067
[7] ÇOB, Mayıs 2018 Tarihli, Güvenli Tıbbi Atık Yönetimi, Çevre ve Orman Bakanlığı, Çevre Yönetimi Genel Müdürlüğü, Atık Yönetimi Daire Başkanlığı, Güvenli Tıbbi Atık Yönetimi Kılavuzu, Ankara, 76s.
[8] http://cevreonline.com/tibbi-atiklar/

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