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The solutions and recommendations for logistics problems in the collection of medical waste in China

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Abstract

Medical waste is one of the major hazardous wastes and carries a large number of pathogenic bacteria, so they could pose a big threat to the environment and human health if not being recycled and disposed properly, especially in developing countries. China has obtained great achievements about the management of medical waste in the past ten years. The studies mainly focus on the policy and regulations, processing technology, and the classification and packaging, etc. The collection process is somehow ignored in which the cost proportion and risk are high. Every year, there are some unnecessary casualties and property loss during the collection process in China. This paper pays much attention to this process and regards it as a reverse logistics activity. We analyze the collection network including the structure and flow of medical waste which recycled by the third party disposal company in China. Furthermore, the solutions are proposed to solve the existing logistics problem. Finally, the suggestions about regulations and monitoring methods during the collection process are given.

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Keywords: Medical waste; Collection process; Structure design ; Network optimization

1. Current status of medical waste recycling and management in China

1.1. Definition, classification, and regulations of medical waste

It is not late for China to realize the harmfulness of medical waste. Early in the 1958, He Yi-ming et al.^[1] pointed out the importance of medical waste in their article. They believe that medical waste is different from general

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rubbish, and it is very dangerous on the prevalence of some diseases. Therefore, medical waste must be collected and disposed timely and properly. But it costs a long period of time for scholars to define the medical waste [2-6]. Until the breakout of SARS in 2003, China began to pay attention to the management of medical waste seriously. In the June of 2003, China published Regulations on the Administration of Medical Wastes (Order No.380 of China State Council, 2003). In this bulletin, medical waste refers to the toxic or indirect toxic, infectious and other hazardous wastes generated from the activities of medical and health institutions in the medical, health care, prevention, and other related medical treatment [7]. Till then, China has a consistent and accurate definition of medical waste.

Medical waste is classified into five categories. They are infectious waste, pathologic waste, injury waste, medicine waste, and chemical waste respectively. However, in the actual recycling activities, medical waste is usually classified by its components. As shown in Fig. 1, the main components of medical waste are waste glass, scrap metal, plastic and rubber, and other medical waste including paper, pathological and drugs, the proportion of which separately are 12%, 3%, 25%, and 60%.

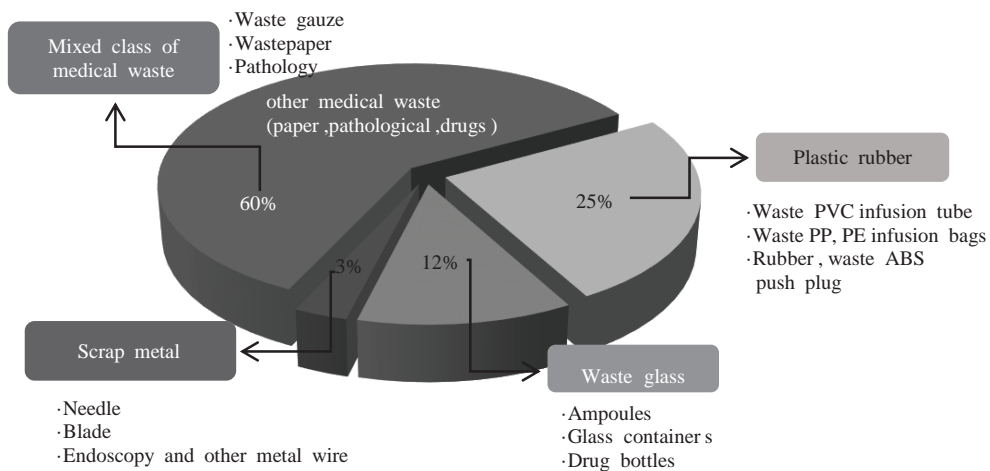


Fig. 1 Components of medical waste in China

As for regulations and standards, China State Council enacted Regulations on the Administration of Medical Wastes. General provisions are included in this Regulation, which embodies managing principles of medical waste, such as centralized disposal, strengthened supervision, whole process control, and etc. The publication of the Regulation changed the empty status of medical waste management in China, ensuring related government departments' supervision on medical waste in accordance with law of the People's Republic of China. Since then, other departments legislated some other supporting regulations and technical standards in succession, like Measures on Permits for use of Hazardous Wastes, Administrative Punishment Measure for Medical Waste Management, Technical Standard for Medical Waste Incinerator, etc.(more details are listed in Table 1 and Table 2), providing legal basis for strengthening management on medical waste.

Because of the late beginning of urban environmental sanitation planning in China, the focus of the planning work is medical waste disposal all the time. As a result, the studies on collection of medical waste accordingly lag behind. From the comparison of the below two tables, we can see that the regulations almost focus on disposal technologies. Little attention is paid to the collection process.

In addition, besides the national regulations, some big cities release their own regional regulations in accordance with their realities. Examples are as follows: Measures for medical wastes management of medical and health institutions in Tianjin, Regulations on the Management of Medical Wastes in Guangdong, and Regulations of Medical Wastes Management in Beijing, and etc.

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