

The Safe and Effective Management by Municipal Workers of Infectious Waste Materials Disposed of by Home Health and Medical Care Services

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Abstract : The management of waste materials disposed of by home health and medical care services (HHMC wastes) in Japan is now receiving greater attention from governmental workers dealing with general-household waste materials. In general, waste materials are collected in a mixed form, and then are transported and disposed of along with municipal solid wastes. At some places, municipal workers are suffering needle-prick accidents. There is no denying the fact that infections associated with HHMC waste materials do sometimes occur. HHMC waste materials with sharp-edges, such as injection needles, should be directly collected and transported to medical institutions by either patients or their families. The collection and transportation by patients and their families can thus prevent municipal workers from experiencing needle-prick accidents. One of the most important strategies for medical institutions is the education of patients and their families. Improved rules for the management and handling of HHMC waste materials are therefore essential for the safe and effective management of municipal workers.

Key words : Municipal workers, Medical institution, Infectious waste materials, Home health and medical care service

Introduction

The establishment of home health and medical care services is a basic requirement of the general population in recent years. Both medical devices and instruments are used while treating patients at home, thereby producing a variety of waste materials.

Waste management is carried out in Japan in accordance with the Waste Disposal and Public Cleansing Law (the Waste Disposal Law). Waste materials are classified as industrial and general-household (municipal wastes). Industrial waste materials generated as a result of industrial activities and general-household waste materials, referred to as waste materials other than industrial waste. Infectious waste materials disposed from hospitals and clinics (medical institutions) are in-

cluded in industrial wastes and are categorized into one type of hazardous waste materials.¹⁾ The waste generated from the treatment of patients suffering from infectious diseases may spread infection either through direct contact or indirectly through the environment. The management of these infectious waste materials is regulated under the Law.²⁾ On the other hand, waste materials, disposed from home health and medical care services (HHMC wastes) in the home are still included in general-household waste materials. The infectious waste disposed from these services is one type of HHMC waste materials and it is, therefore, included in general-household waste materials. However, the management of such infectious waste materials disposed of by private homes is not regulated.

The purpose of this study was to research HHMC waste materials in order to describe the pre-

sent situation of HHMC waste materials in medical institutions and municipal governments ; and also to determine safe and effective management strategies for municipal workers dealing with such waste materials.

Material and Methods

This study describes the present HHMC waste management practice in Japan. In order to evaluate the management practice of HHMC waste materials disposed of by home health and medical care services, we selected 3 medical institutions from each city in a prefectural government and 74 municipal governments in cities having public health centers. This mail survey was performed in cooperation with the Japan Medical Association and municipal government offices dealing with the management of general-household wastes. We mailed a questionnaire including information on the disposal of HHMC waste materials to 141 medical institutions and 74 municipal governments. Regarding the method of the respondent's answers, all answers were circled and multiple answers were allowed for each question.

Results

The overall response rates were 68.1% for medical institutions and 86.5% for municipal governments. We contacted 96 medical institutions consisting of 20 hospitals (average ; 133.5 beds) and 74 clinics (average ; 3.8 beds) (2 facilities were unknown).

Table 1 shows the recovery rates of HHMC waste

materials disposed from homes. 87.5% of medical institutions reported that their patients transported used needles to medical institutions. In addition, 98.6% of medical institutions collected self-injection needles use by their patients. However, none of the municipal governments collected needles. With respect to non-sharp objects, like continuous ambulatory peritoneal dialysis (CAPD) bags and disposal diapers, more than 60% of the municipal governments collected and disposed of them as general-household waste materials.

Table 2 shows the troublesome problems that medical institutions have in managing HHMC waste materials. 75.0% of medical institutions reported the expenses of such management. Except for problems regarding financial resources, the education for persons concerned, and information on management practices at home, and the development of collection routes were seen as obstacles to the effective collection of such materials. The refusal of municipal governments to collect and transport such materials was only reported by 13.1% of the respondents.

Table 3 shows the HHMC waste materials which municipal governments collect and transport at present. Only 5 (7.8%) municipal governments collected and transported all infectious wastes including needles disposed of by private homes. 56.3% of the municipal governments collected and transported all non-infectious wastes. 25.0% of them did not collect all wastes related to home health and medical care services at home.

Table 4 shows the number of accidents when municipal workers handle wastes disposed of from home. 33.9% of municipal governments reported

Table 1. Recovery rates (%) of home health and medical care waste materials

	Collection of medical institutions	Collection of municipal governments	Others/ Unknown
Needles	87.5	0	12.5
Syringes	75.0	0	25.0
CAPD Bags	20.0	80.0	0
Tubes/Catheters	47.9	14.6	37.5
Cotton battings/Gauzes	33.3	47.9	18.8
Disposal diaper	2.1	62.5	35.4

96 medical institutions answered this question.

CAPD ; continuous ambulatory peritoneal dialysis

The number of medical institutions having patients using CAPD bags was 10.

The number of medical institutions having patients using self-injection needles was 71 and recover rate was 98.6%.

Others include home-visit nursing stations, pharmacies, and manufacturers.

Table 2. Main obstacles in the appropriate management of home health and medical care waste materials (n=84)

	Number of answers	%
Cost of management comes expensive	63	75.0
Education for patients and their families is difficult	37	44.0
Collection route is not established	27	32.1
Handling, treatment and disposal methods in home are not established	45	53.6
Information on infectious wastes disposed from home is lacking	26	31.0
Municipal governments refuse to collect such waste materials	11	13.1
Nothing is troubled	25	29.8
Others	19	22.6

84 medical institutions answered this question.

12 medical institutions did not describe anything and thus are not included in this table.

Multiple answers are allowed.

Table 3. Collection and transportation of home health and medical care waste materials by municipal governments

	Number of cities	%
All infectious waste materials	5	7.8
Infectious wastes except needles	4	6.3
All non-infectious waste materials	36	56.3
Non-infectious wastes except needles	2	3.1
Combustibles waste materials	3	4.7
Disarrangement	1	1.5
Nothing	16	25.0
Total	64	100.0

64 municipal governments answered this question.

Table 4. Accidents by collection and transportation of home health and medical care waste materials (n=59)

	Number of cases	%
Yes	20	33.9
No	34	57.6
Others	5	8.5

59 municipal governments answered this question.

5 municipal governments did not describe anything and thus are not included in this table.

19/20 municipal governments report needle-prick accidents.

accidents, while 95.0% of 20 municipal governments experienced needle-prick accidents.

Table 5 shows the correct method for collecting and transporting HHMC waste materials ought to be. As a result, there was clearly a difference in the viewpoints of medical institutions and municipal governments. Except for the cooperative harmony of the persons concerned, medical institutions described that medical institutions and municipal governments should manage HHMC waste materials. However, almost all municipal governments had the opinion that medical-related facilities should manage HHMC waste materials, while

the opinion that municipal governments should collect and transport them was only voiced by 9.5%.

Discussion

The World Health Organization,³⁾ U.S. Environmental Protection Agency,^{4) 5)} U.S. Centers for Disease Control and Prevention,⁶⁾ and Germany^{7) 8)} have already established strict guidelines for the management of infectious waste materials from medical institutions. In addition, Finland has guidelines on the management of wastes from health care facilities.⁹⁾ In Japan, infectious

Table 5. Appropriate systems for collection and transportation of home health and medical care waste materials (%)

	Medical institutions (n=94)	Municipal governments (n=63)
Municipal governments	68.5	9.5
Medical institutions	48.9	87.3
Pharmacies	6.5	44.4
Home-visit nursing stations	15.2	30.2
Manufacturers	20.7	46.0
Cooperation of persons concerned	56.5	46.0
Others	0	4.8

94 medical institutions and 63 municipal governments answered this question.

Multiple answers (2 or 3) are allowed.

Facilities concerned are municipal government, medical institutions, pharmacies, home-visit nursing stations, and manufacturers.

4 medical institutions did not describe anything and thus are not included in this table.

1 municipal government did not describe anything and thus was not included in the table.

wastes are defined as the waste materials generated in medical institutions as a result of medical care or research which contain pathogens that have the potential to transmit infectious diseases. Infectious waste materials disposed from medical institutions are regulated. These infectious waste materials are not recyclable.¹⁰⁾ On the other hand, infectious waste materials disposed from home are including in HHMC waste materials, therefore, municipal governments tend to collect and transport them as general-household wastes.

Municipal workers are anxious about needle-prick accidents when collecting or transporting wastes. In this study 33.9% of municipal governments have experienced accidents and almost all municipal governments have experienced needle-prick accidents. Needle-prick accidents have also been reported by 30.9% of 68 municipal governments in the metropolitan area.¹¹⁾ Infectious wastes, especially sharp objects, need to be handled with great care to prevent the spread of pathogens and to protect waste workers in addition to being segregated from other waste materials. The management of HHMC waste materials is, however, not regulated by the Ministry of Environment.

Medical institutions directly educate patients and their families to carry self-injection needles for insulin therapy back to medical institutions. Approximately 90% of medical institutions have already established such a system.¹²⁾ Not only sharp objects, such as injection needles, but also those that become sharp objects when broken

should be carried back to medical institutions. In our study it became apparent that medical institutions did not rely on municipal governments for the collection and transportation of needles and syringes.

It is preferable to separate wastes with sharp objects from other HHMC wastes to prevent injury. Sharp objects need to be put in a container with a lid so as not to injure the persons concerned. The containers for disposal of sharp objects are collected and transported separately from general-household waste materials, because an injury from this type of waste must be avoided. Such segregation is based on the classification of HHMC waste materials requiring special care and attention when handled inside the home. As a result, medical institutions should instruct patients and their families not to discard sharp objects along with other wastes. Strict adherence to such guidelines by medical institutions and their patients can thus protect municipal workers from getting infections.

Municipal governments have to collect general-household wastes from homes and transport them to incineration or recycling plants under the Waste Disposal Law. There is, however, no reason why municipal workers should have to manage all general-household wastes when it may put them at a risk of infection. Therefore, we suggest that municipal workers need not collect and transport sharp objects. However, non-sharp objects, like CAPD bags and disposable diapers, are normally expected to be collected and transported. The po-

tential for causing infection varies greatly depending on the sharpness and quality of wastes. Patients and their families must separate non-sharp HHMC wastes from general wastes and dispose of them packed in plastic or vinyl bags.

It has been suggested that the quantity of non-sharp HHMC wastes will increase in the future. It is important that municipal governments collect non-sharp objects and transport them to garbage furnaces. The responsibility of collecting and transporting HHMC wastes between medical institutions and municipal government must be more clearly established. A number of difficulties are being faced at many levels regarding the implementation of safe and effective management methods for HHMC waste materials in practice. However, the cooperation of all persons concerned, including workers in medical institutions, municipal governments and the Ministry of Environment is needed in order to establish improved rules for the collection and transportation of HHMC waste materials.

Conclusions

Due to the increase in the quantity and diversified quality of waste materials disposed from home health and medical care services, the management of such materials has become increasingly important in order to protect municipal workers from infection. Strict guidelines for the disposal of HHMC wastes by patients and their families must be established and enforced. We suggest that medical institutions should manage sharp objects, like injection needles, while municipal governments should manage other HHMC waste materials. In addition, the Ministry of Environment should establish broad regulations to systematize the implementation of such a program.

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