

# Knowledge and Awareness of Clinical Waste Management among Medical Practitioners in Hospital Batu Pahat, Johor

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**Abstract**—The study is a descriptive study administered using questionnaires conducted to identify the level of knowledge and awareness among medical practitioners towards clinical waste management in hospital. Data were analyzed using statistical analysis tools such as Mann-Whitney Test and Chi-square Test. Study found that the level of knowledge and awareness among respondents are high. However, there were some weaknesses identified. Half of the respondents (50%) had experienced sharp injuries. Inadequate training and low knowledge in some respondents were identified that lead to improper disposing of clinical waste in general waste bins and vice versa. Statistical analysis showed that there is significant difference between the incidence of needle stick injury with receiving training ( $p$ -value<0.005). Respondents that do not receive information were not aware on the correct procedures of disposing clinical waste. Proper training is crucial as to increase and maintain high knowledge and awareness of clinical waste management in hospitals.

**Index Terms**—Knowledge, awareness, clinical waste, medical practitioners, hospital.

## I. INTRODUCTION

Hospital waste is a potential reservoir of pathogenic micro-organisms that requires appropriate, safe and reliable handling [1]. All persons exposed to hazardous hospital waste are potentially at risk including all those who handle the waste at any stage [2]. The Department of Environment Malaysia stated that mixture of general waste into clinical waste stream and vice versa is common in hospitals where this problem is an added cost to the concession company, the owner of health care facility as well as the government [3]. The combination of dangerous wastes with general waste in the hospitals is due to the lack of comprehensive staff training and to a lesser extent due to the lack of facilities [4]. Loose clinical waste in yellow wheeled bins or improper sealing of the yellow bags is quite common from private health care facilities. This will create higher risk on needle stick injury and biological hazard among health care workers even though the percentage of the loose waste is very small [1].

The World Health Organisation (WHO) recognizes that in

many countries including developed countries, improper management and disposal of medical waste continue to pose a significant threat to the enjoyment of human rights, including the right to life, physical and mental health, safety and healthy working environment as well as the rights to an adequate standard of living [5].

The areas that need improvement in the point of clinical waste management in the hospital include awareness for proper clinical waste management and training for personnel involved in the clinical waste management [6]. Proper training encourages awareness and knowledge of proper handling and disposal of clinical waste in hospitals [4]. Lack of proper training in the hospitals poses serious risks to personnel as far as the hazards of hospital waste is concerned [4]. According to the WHO, lack of awareness about the health hazards related to healthcare waste, inadequate training in proper waste management, absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the topic are the most common problems connected with healthcare waste [7]. The study aims to identify the level of knowledge and awareness of medical practitioners regarding clinical waste management in Hospital Batu Pahat.

## II. RESEARCH METHODOLOGY

The survey study was administered using questionnaires. Respondents of the study were selected randomly from medical practitioners in Hospital Batu Pahat. They include nurses, medical laboratory technologist and those who were involved in clinical waste disposal. Pilot survey was undertaken prior to the actual survey where the questionnaires were first piloted to fifteen staffs in the hospital. One hundred twenty questionnaires were distributed as to identify the level of knowledge and awareness on clinical waste management among medical practitioners. Distributions of questionnaires were assigned to the Matrons which are the nurse's head in the hospital. The Matrons were more aware on to whom the questionnaires should be distributed as only medical practitioners involved in the clinical waste should be the study samples. Descriptive statistics were used to explain the demographic characteristics of the respondents. Frequencies and percentages were also used in order to represent the information regarding knowledge and awareness of the respondents. Statistical analysis using Mann-Whitney Test and Chi-Square Test were applied in the study.

Researcher had some constraints, with respect to the information received, in that some relevant information was not provided by respondents. It is hoped that further studies would be conducted at more hospitals as to reflect better the

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level of knowledge and awareness among medical practitioners in term of clinical waste management in the hospitals. Full cooperation could not be achieved during the study as feedback received by the hospital personnel showed that the questionnaires were too long and need longer time to be answered.

TABLE I: RESPONDENT’S KNOWLEDGE AND AWARENESS REGARDING CLINICAL WASTE MANAGEMENT

Awareness and Knowledge Questions	Description	Frequency (N)	Percentage (%)
Do you know about clinical waste management process in the hospital	Yes	93	93
	No	7	7
	Total	100	100
Do you think clinical waste management in the hospital is following the correct procedure	Yes	81	81
	No	19	19
	Total	100	100
Can clinical waste cause risks and health hazards to your health when infected	Yes	99	99
	No	1	1
	Total	100	100
Can clinical waste cause risks and adverse health effects to the environment when not handling properly	Yes	99	99
	No	1	1
	Total	100	100
How many categories of clinical waste in hospital	1	4	4
	2	22	22
	3	40	40
	4	3	3
	5	5	5
	6	6	6
	More than 10	3	3
	Do Not Know	17	17
	Total	100	100
Do you know the correct method of handling clinical waste based on the categories	Yes	78	78
	No	22	22
	Total	100	100
Are bags and containers for clinical waste marked with the international symbol	Yes	92	92
	No	8	8
	Total	100	100
Are clinical waste containers or bag holder been put in all locations where particular categories of waste may be generated	Yes	81	81
	No	19	19
	Total	100	100
Do you segregate general waste from clinical waste	Yes	99	99
	No	1	1
	Total	100	100
Do you know about the color coding for waste generation	Yes	91	91
	No	9	9
	Total	100	100
What is the color of the clinical waste bin	Black	6	6
	Yellow	92	92
	Blue	2	2

	Total	100	100
What is the amount of infectious waste that should be thrown in the container	Less than 3/4 full	77	77
	More than 3/4 full	5	5
	1/2 full	3	3
	Do Not Know	15	15
	Total	100	100
Do you use personal protective equipment in handling clinical waste	Yes	87	87
	No	5	5
	Total	100	100
Do needle stick and sharp injuries need to be reported	Yes	95	95
	No	5	5
	Total	100	100
Do you know if the hospital has a set of transport schedule for infectious waste within the organization	Yes	93	93
	No	7	7
	Total	100	100
Are clinical waste collected daily (or as frequently as required) and transported to the designated central storage site?	Yes	95	95
	No	5	5
	Total	100	100
Do you know if the hospital uses a wheelie bin or trolley for internal transport	Yes	94	94
	No	6	6
	Total	100	100
Do you know if the hospital must have standard storage room for keeping hospital infectious waste	Yes	92	92
	No	8	8
	Total	100	100
Do you know if the hospital storage room has good lighting and ventilation	Yes	74	74
	No	26	26
	Total	100	100
Do you know if the storage time for infectious waste is 24-48 hours	Yes	66	66
	No	34	34
	Total	100	100
Do you know if the hospital has an incinerator for treatment and disposal of infectious waste	Yes	28	28
	No	72	72
	Total	100	100
Do you know who is responsible to manage clinical wastes in the hospital	Yes	83	83
	No	17	17
	Total	100	100
Do you know where is the location of the storage area of clinical wastes in the hospital	Yes	78	78
	No	22	22
	Total	100	100

### III. RESULTS AND DISCUSSION

#### A. Demographic Characteristics

According to the age group of the respondents, most of the respondents aged between 21-30 years old (53%). There are 19% of the respondents aged between 31-40 years old, 12% aged between 41-50 years old and 16% aged between 51 years and above. Female respondents (81%) are higher than male respondents (19%). Majority of the respondents are Malay

(94%). Based on the level of education, most of the respondents were Diploma holder (72%) while others having Higher Certificate Examination (SPM) (18%) and Degree (10%). Majority of the respondents in Hospital Batu Pahat are nurses that worked in Support Service 1 category. According to the duration of services, most of the respondents worked in the hospital at least 10 years (40%), while others were 1 to 3 years (21%), 5 to 10 years (17%), 1 year below (13%), and 3 to 5 years (9%). Using cross tabulation, it was found that 28 of the respondents aged 41 years old and above had worked in the hospital for at least 10 years. Where else, respondents in age group of 21 to 30 years old had worked in the hospital in less than 5 years.

#### B. Awareness and Knowledge on Clinical Waste Management

Table I shows the results of knowledge and awareness questions among medical practitioners towards clinical waste management. There were high number of respondents that gave positive answers that reflect their high level of knowledge and awareness on clinical waste management in the hospital. However, study found there were low knowledge and awareness in some questions given. Only 5% of the respondents answered correctly on the categories of clinical waste where there are actually five categories of clinical waste according to the DOE. There were 22% of the respondents did not know the correct method of handling clinical waste based on the categories.

There were 8% of the respondents did not know that the correct color coding for clinical waste containers are yellow. Results found that 50% of the respondents noticed needle stick and sharps were thrown in other containers that it's specific containers. There were 16% of the respondents had experienced needle stick or sharp injury. Analytical analysis using chi-square test confirmed that there is significance difference ( $p$ -value  $< 0.005$ ) between the knowledge of correct color of clinical waste bins and the respondents noticed needle stick and sharps in other containers that its specific containers. It was indicated that respondents that have low knowledge on the correct color of clinical waste bins would makes mistakes in disposing clinical waste. It was found that 37% of the respondents did not receive any training in clinical waste handling management in the hospital. Chi-square test showed that there is significance difference between the incidence of needle stick or sharp injury with receiving training in clinical waste handling and management among respondents ( $p$ -value  $< 0.005$ ). This means that respondents that do not received training on proper technique of disposing sharps in the clinical waste management were capable of getting needle stick or sharp injury.

Analysis using Mann-Whitney Test found that there is significant difference ( $p$ -value  $< 0.005$ ) between gender and the awareness of clinical waste management process. Female respondents have higher level of awareness than male respondents. There is significant difference ( $p$ -value  $< 0.005$ ) between gender and the knowledge of storage time for infectious is waste that is 24-48 hours. However, there is no significant difference between age groups of respondents and the knowledge and awareness of clinical waste management.

There is also no significant difference between level of education of respondents and the knowledge and awareness of clinical waste management. Job categories have no relationship with the knowledge and awareness towards the medical practitioners.

#### IV. CONCLUSION

The findings suggested that the awareness and knowledge of staff are important to ensure that clinical waste management is practiced properly. Under the Environmental Quality (Scheduled Wastes) Regulations 2005, it is now compulsory for the hospitals to ensure that all their employees attend training programmes. The hospitals should institute regular training and education to doctors, nurses, laborers and also waste handlers of the concession companies. Proper training is necessary as to develop high awareness and knowledge regarding clinical waste management and the health, safety and environmental issues. For newly hired staffs, in-house specialised training which provides a knowledge base on the process of clinical waste management and its associated risks could be conducted. Personnel in the hospitals should be trained to handle clinical waste in a proper manner and to attend user training courses organised by the concession companies. It is important for all workers in the hospitals to know and understand about the potential risks of the clinical waste. Environmental health and waste management experts must be included in the infection control team in the hospitals. Auditing on clinical waste management in the hospitals should be conducted regularly as to ensure that clinical waste management is being practiced properly by all hospital staffs. Moreover, continual education of both hospital and concession companies should be provided as to reduce the incidence of sharps injuries that have become the main concern of clinical waste management injuries worldwide. Continual education and monitoring by the supervisors should be conducted as to ensure the compliance of the use of personal protective equipments and other save working procedures.

#### ACKNOWLEDGMENT

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#### REFERENCES

- [1] WHO, "Fact Sheet: Wastes from Health-care Activities," New Delhi, 2007.
- [2] MOH, "Sharps Injury Surveillance Manual," Putrajaya: Occupational Health Unit, Disease Control Division, 2007.
- [3] DOE, "Guidelines on the Handling and Management of Clinical Wastes in Malaysia," Putrajaya: Ministry of Natural Resources and Environment, 2009.
- [4] M. Askarian, M. Vakili, and G. Kabir, "Results of a Hospital Waste Survey in Private Hospitals in Fars Province, Iran," *Waste Management*, vol. 24, issue 4, pp. 347-352, 2004.
- [5] C. Georgescu, "Report of the Special Rapporteur on the Adverse Effects of the Movement and Dumping of Toxic and Dangerous Products and Wastes on the Enjoyment of Human Rights," United Nations, 2011.
- [6] P. Agamuthu, *Solid Waste: Principles and Management*, Kuala Lumpur: Perpustakaan Negara Malaysia, 2001.
- [7] WHO, "Fact Sheet: Health-care Waste Management," New Delhi, 2011.



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