MEDICAL SOLID WASTE MANAGEMENT KNOWLEDGE AMONG HEALTHCARE WORKERS AT DUC GIANG GENERAL HOSPITAL IN 2022

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ABSTRACT

The aim of study was: (1) Describe the knowledge on medical solid waste management of healthcare staffs and (2) Determine association factors of knowledge on medical solid waste management at Duc Giang General Hospital in 2022. The research was a cross-sectional descriptive study, conducted on 121 healthcare workers. The results showed that: 26,4% of healthcare workers have good knowledge of medical solid waste management; assessing each session: basic knowledge: 52,1%, medical solid waste classification: 16,5%, recognition of bags and waste storage tools: 49,6%, waste warning awareness: 76%, form, quality of packaging and waste storage tools: 45,5%, waste collection:42,1%, personal protection 42,1%. Untrained health workers had an 8,41 times higher rate of poor knowledge than trained health workers (95%CI 1,08-65,68). Conclusion: Medical solid waste management knowledge among healthcare workers is low and training is a factor related to knowledge in waste management among healthcare workers.

Keywords: *healthcare workers, medical solid waste management, knowledge*

I. INTRODUCTION

Medical waste is waste generated from the operation of medical facilities [6]. Medical waste consists of liquid, gaseous and solid forms. Medical solid waste may contain hazardous components such as: sharp objects; bacteria, viruses, fungi, parasites that cause disease; radioactive substances and may contain pressured gases that are potentially toxic, explosive and flammable. Persons at risk to health due to medical waste include: healthcare workers, medical waste management staff, patients, patients' family members.

Many studies showed that the level of the knowledge among hospital staffs in management of medical solid waste is low. Research results Tran Quynh Anh et al. (2020) showed that proportion of health workers with: good knowledge of classification of medical solid waste was 62,2% of healthcare workers, classification principles of medical solid waste was 79,5% of healthcare workers, waste storage equipment was 88,5%, color code with storage equipment was 69,9% [9]. Hoang Cao Sam et al.

Knowledge of healthcare workers on medical solid waste management is an important factor in ensuring the safety of human health, economic efficiency and preventing the risk of environmental pollution. Therefore, we conducted the study: *"Medical solid waste management knowledge among healthcare workers at Duc Giang General Hospital in 2022"*.

II. RESEARCH SUBJECTS AND METHODS

2.1. Subjects of study: healthcare workers including clinical and administrative staffs involved in the generation of medical waste.

2.2. Time and place of study:

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- Time: March 5th to 28th, 2022
- Location: Duc Giang General Hospital

2.3. Research design: an cross-sectional descriptive research, using quantitative research methods.

2.4. Sample size:Use the sample size formula:

$$n = Z^2_{(1-\alpha/2)} \frac{p(1-p)}{d^2}$$

In details:

-n: The minimum number of health workers required for the study

-$Z_{(1-\alpha/2)}$: The level of statistical significance, with α= 0.05, the coefficient Z1-α/2=1,96

-p: The presumption rate of health care workers achieving good knowledge p=50%=0.5

-d: Expected error, selected d=0,1

Substituting the data into the formula n = 96, sample size was 121 health care workers.

2.5. Tools for evaluation:

The set of questions on knowledge on healthcare waste management is based on Circular 20/2021/TT-BYT [6], and a number of regulations on infection control [4], [5], [7], including:

- Basic knowledge of medical solid waste
- Knowledge of medical solid waste delineation for 6 types of solid medical solid waste.
- Knowledge about the color of bags, containers for 8 types of medical solid waste.
- Knowledge of medical solid waste alerts with 4 warnings.
- Knowledge of quality, form of bags, storage tools of medical solid waste.
- Collection guidelines for 6 types of medical solid waste.
- Knowledge of personal protection for 18 procedures and surgeries.

The trial questionnaire was tested and verified by Cronbach's alpha test to determine reliability before conducting the study.

2.6. Evaluation criteria used in the study: The participant's overall knowledge was categorized using a cut-off point. A knowledge domain was considered good if the score was between 70 and 100% and not good if the score was <70%. The strength of association was assessed by using odds ratio (OR).

2.7. Data processing: Data was processed by SPSS 20 software

III. RESEARCH RESULTS

3.1. Knowledge on solid medical waste management

Table 1. Knowledge on medical solid waste management

Evaluation criteria	Amount (n=121)	Proportion (%)
Basic knowledge of medical solid waste	63	52,1
Knowledge of medical solid waste classification	20	16,5
Knowledge about the color of bags, medical solid waste containers.	60	49,6
Knowledge of medical solid waste warning signs.	92	76,0
Knowledge of quality, form of bags, storage tools of medical solid waste.	55	45,5
Knowledge of solid waste collection	51	42,1
Knowledge of personal protection equipment (PPE)	34	28,1
All contents	32	26,4

The results showed that healthcare workers had the highest knowledge of recognizing medical solid waste alerts with 76% achieving "good", while the lowest in medical solid waste assignment knowledge was knowledge of classification 6 types of solid medical solid waste, at 16,5%. Overall, the healthcare workers with good knowledge on medical solid waste management is 26,4%.

3.2. Some factors related to medical solid waste management knowledge of healthcare workers

Table 2. Some factors related to medical solid waste management knowledge in healthcare workers

Characteristics		Not good		Good		p	OR (95%CI)
		n	%	n	%		
Gender	Male	21	84,0	4	16,0	>0.05	2,16 (0,68-6,87)
	Female	68	70,8	28	29,2		
Age	<30	20	76,9	6	23,1	>0.05	1,26 (0,45-3,48)
	≥30	69	72,6	26	27,4		
Profession	Doctors and nurses	64	71,1	26	28,9	>0.05	0,59 (0,22-1,61)
	Different	25	80,6	6	19,4		
Education	University or post-university	51	78,5	14	21,5	>0.05	1,73 (0,76-3,90)
	Lower University	38	67,9	18	32,1		
Year of experience	≤5 years	28	77,8	8	22,2	>0.05	1,38 (0,55-3,44)
	>5 years	61	71,8	24	28,2		
Sector	Clinic staffs	63	78,8	17	21,3	>0.05	2,14 (0,93-4,91)
	Others	26	63,4	15	36,6		
Trained on medical solid waste management	*Not yet*	*19*	95,0	*1*	5,0	**<0.05**	**8,41 (1,08-65,68)**
	Already	70	69,3	31	30,7		

The proportion of staffs with "not good" knowledge in untrained healthcare workers group tend to be 8,41 times higher than trained healthcare workers

IV. DISCUSSION

The overall assessment showed that the percentage of healthcare workers achieving good knowledge in medical solid waste management was 26,4%. This figure is critically low, especially at Duc Giang hospital. This situation can lead to risk of hospital infection, infection control issues.

With regarding to detailed sections, the staffs with good knowledge ranged from 16,5% to 76%. In details: the lowest was in medical solid waste classification; the highest was in awareness of medical solid waste warning. Proportion of staffs with: good knowledge of basic knowledge on medical solid waste (58,1%); color of bags and storage tools of medical solid waste (49,6%) , form and quality of medical solid waste storage tools (45,5%), medical solid waste collection (42,1%), personal protection (28,1%). These figures are significantly lower than the result in the research of Tran Quynh Anh et al. (2020). In details, medical solid waste management was classified into 3

sections: the principle of classification; requirements for waste storage equipment reach the color code with storage equipment. And the proportion of healthcare worker with good knowledge in the result of Tran Quynh Anh were 88,5%; 79,5%,; 69,9%, respectively [9]. Our study results are lower than the one of Hoang Cao Sam et al. (2015), the proportion of objects having correct knowledge of carrying out the classification reached 90,4%; the percentage of staffs with the right knowledge of position of collection bin is 93,8%; 97,2% of healthcare worker with right knowledge of where waste is stored. The percentage of medical staffs practicing correct classification of each type of waste: infectious waste is 86,6%; recycling waste is 86,9%; sharp waste is 90,4% [1].

The analysis results showed that healthcare staffs trained on medical solid waste was statistically significantly associated with knowledge in medical solid waste management (p<0.05). Untrained healthcare workers has 8,41 times higher potential of not obtaining sufficient knowledge on medical solid waste management than trained healthcare workers (95%CI 1,08-65,68). This result shows that the role of training is important in improving the management knowledge of medical solid waste for healthcare staffs. This is coincident with the research results of Mugabi et al. (2018) in which 66,9% of healthcare workers were trained in medical solid waste management, 90.5% required training to improve knowledge in medical solid waste management [6].

Other studies have shown that the association between knowledge in medical solid waste management and factor. In the research of Hoang Cao Sam et al. (2015) has a strong association between knowledge and practice on medical solid waste classification (OR=36,3 (95%CI: 8,9- 16,1), p<0,05) [1]. According to Phung Xuan Son et al. 's research (2017), the restriction on waste management is closely related to the training process of health workers [8]. Hosny et al. (2018) study results show that multivariate analysis shows that factors such as qualifications and experience influence on knowledge in medical solid waste management in medical staffs (p<0,05) [2].

V. CONCLUSIONS AND RECOMMENDATIONS

The cross-sectional descriptive study on 121 healthcare workers showed that healthcare workers with knowledge of medical solid waste management were 26,4%. The study also found that untrained health workers had the knowledge of solid waste management 8.41 times lower rate than trained health care workers.

Based on the research results, it is necessary to conduct training knowledge on medical solid waste management for healthcare staffs.

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