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Alaa Noori Sarkees
Duhok University, College of Nursing, Head of Nursing department & Director of postgraduate Unit

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Abstract

Background and objectives: Recently, healthcare waste management has elicited as important issues among healthcare organizations. These wastes are generated due to healthcare activities that can produce potential of disease transmission and injuries to individual, community and environment. Management of healthcare waste means using techniques that inhibit the spread of diseases. That's why the study aimed to assess the nurses' level of knowledge about health care waste management. Methods: A study was conducted at all five governmental hospitals and thirteen main primary health care centers in Duhok City. A non-probability "purposive" sample of 129 nurses were recruited from all nurses who work in such hospitals' day shift and main Primary Health Care Centers of Duhok City based on their agreement to be subjects in the present study. An assessment tool included two parts. The first one is concerned with assessment of Nurses' demographic characteristics and the second one was concerned with assessment of their knowledge toward healthcare waste management. Data were analyzed through the application of descriptive and inferential statistical data analysis. Finally, cut off point is used to determine the nurses' level of knowledge related to such management. Results: The findings indicated that more than two thirds of nurses show high level of knowledge (69%) (Mean 2.67, SD ±0.503) toward management of healthcare waste. Conclusions: The present study concluded that the highest number of nurses of present study showed high level of knowledge about how to manage the health care waste that produced due to providing of such health care.

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Background and objectives: *Recently, healthcare waste management has elicited as important issues among healthcare organizations. These wastes are generated due to healthcare activities that can produce potential of disease transmission and injuries to individual, community and environment. Management of healthcare waste means using techniques that inhibit the spread of diseases. That's why the study aimed to assess the nurses' level of knowledge about health care waste management.*

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Conclusions: *The present study concluded that the highest number of nurses of present study showed high level of knowledge about how to manage the health care waste that produced due to providing of such health care.*

Key words: ***Nurses' Knowledge, Health Care, Waste Management.***

INTRODUCTION

Health care waste (HCW) as defined by Govt. of India (1998 cited in Chakraborty *et al.,* 2014) as "Any waste generated during the process of diagnosis and treatment or immunization of human beings or animals or in research activities contributing to the biological production or testing".

Waste management means special attention and proper ways of segregating, collecting, storing, handling, and discarding of hazardous and non-hazardous waste that generated due to the process of providing health care, in order to prevent disease outbreaks to community through contaminated waste.

Moving toward the goal of reducing the health-related problems, eliminates the potential risks and treat patients, the waste inevitably will be created as a result of health care services, which itself can poses hazardous to health. The waste produced in the context of health care activities carry a higher susceptibility to infection and injury more than any other kind of waste (Sinha *et al.,* 2016).

Poor management of waste-related healthcare poses threat to individuals and environment. Due to of that exposed healthcare workers, patients, waste pickers and handlers, and the general population to health risks that emerge from infectious waste (particularly sharps), chemicals, and other particular healthcare waste (Johannessen *et al.,* 2001).

According to Aleguz and Kokasai (2008), the World Health Organization (WHO) reported that the average of hazardous waste produced through health care in high-income countries is 0.5 kg per day per hospital bed. Despite this fact, low-income countries produce only 0.2 kg per day per hospital bed. In most cases, non-hazardous health waste is not separated from hazardous waste, which leads to the production of a high quantity of hazardous waste.

Umar and Yaro (2009) stated that the poor health care waste management practices pose a significant danger to the public, patients and health professionals and contribute to environmental deterioration.

Article prepared by Mane *et al.,* (2016) mentioned if health care waste is dumped in sites that are uncontrolled will be where it can be easily accessible by public. As well as rag pickers and children are particularly at risk to be in contact with infectious waste. In addition to that improper disposal and management of these HCW will contribute to environment pollution such as air pollution due to uncontrolled incineration, water pollution due to dumping in drains, tanks and along the riverbed, and soil pollution due to unscientific land dumping.

Johannessen *et al.,* (2001) confirmed that all staff of health care facility, including nurses and their assistants must be aware of the basic management plan of health care facility for HCW and their role in such plan. Furthermore, it is important to go with developing a plan for waste management in general and particularly HCW for the health care facility to be integrated into the daily activities. It is important that the nurse and assistant nurse to have knowledge of how to deal with waste of health care process that have a significant impact on the life and the environment because it contains hazardous materials, for example, sharp materials, biological, chemicals and toxic substances in addition to normal waste, that should manage properly to prevent it's negative effects on health of individuals and environment.

1.1. Aim of the Study:

The study aims to identify the nurses' level of knowledge related to the management of healthcare waste in the health care institutions of Duhok City.

1.2. Objectives of the Study:

1.2.1. To assess the nurses' level of knowledge about health care waste management.

1.2.2. To determine the relationship between the nurses' level of knowledge about healthcare waste management and their demographic characteristics as age, gender, level of education, years of employment and participant in work shop and training related to healthcare waste.

SUBJECTS AND METHODS

A descriptive study (healthcare facility based survey) was conducted from December, 2014 through February 2016, through the using an assessment approach in order to assess the Nurses' knowledge toward Healthcare Waste Management. This study had been conducted at all five governmental hospitals and thirteen main primary health care centers in Duhok City (table 4). Current study was approved by the scientific committee of faculty of medical sciences/ University of Duhok and then obtaining the official approval from the General Directorate of Health in Duhok Province. A non-probability "purposive" sample of 129 nurses were recruited from all nurses who work in such hospitals' day shift and main PHC Centers of Duhok City. Those nurses were involved according to their agreement to be subjects in present study in order to assess their level of knowledge toward healthcare waste management. An assessment tool (Questionnaire) was built and included two parts. The first one was concerned with assessment of nurses' demographic characteristics as place of working, age of the nurse, nurses' gender, nurses' level of education, nurses' years of employment, workshop and training related to health care waste, while the second one was a questionnaire based method concerned with assessment of their knowledge about healthcare waste management. This tool was used to collect data through adopted direct interview technique. Gathered data were analyzed through the application of descriptive statistical data analysis (frequency and percentage) and inferential data analysis (Pearson Correlation Coefficient). Furthermore, level of nurses' knowledge regarding healthcare waste management were computed through the application of score cut of point as (Low level 33-54), (Moderate level 55-76), and (High level 77-99). These analyses were applied through the using of SPSS program version 20.

RESULTS

Table 1 presents the distribution of nurses according to their demographic characteristics as the large numbers of nurses are among the age 27-33 years 47, 36.4% (Mean 32.74, SD ± 7.91), and regarding to their level of education 53, 41.1% of them (Mean 1.89, SD ± 0.763) were institute graduates. Also, approximately half of them 65, 50.4% (Mean 9.964, SD ± 8.1797) show <1-9 years of employment. While more than two thirds of those nurses work in hospitals 89, 69.0% (Mean 1.69, SD ±0.464) and were females 84, 65.1% (Mean 1.65, SD ±0.478). Finally, maximum number of them 110, 85.3% (Mean 1.15, SD± 0.356) did not attend any workshop and training course related to health care waste management).

As presented by table 2 more than two thirds of nurses show high level of knowledge 89, 69.0% (Mean 2.67, SD ±0.503) regarding management of healthcare waste.

Table 3 reveals a highly significant negative relationship between nurses' knowledge towards healthcare waste management and their place of working, moreover and at the same time this table shows highly significant positive relationship between such knowledge with nurses' years of age, both these correlation are at the level 0.01of significance, while no significant

relationship had been noted between this knowledge and nurses' residual demographic characteristics.

DISCUSSION

With regard to the gender of nurses, the largest share in the study was for females, where they formed more than two-thirds of the study sample. This is due to the reluctance of the male sex to practice nursing and to go to other specialties because of poor job satisfaction in the nursing profession. Also, the sample of the present study was nurses who work in the day shift, and most of the employees are from the women's staff, since male staff prefers evening or night shift. Regarding the academic achievement of the nurses, as shown in the current study, nearly two-fifths of the study sample was graduates of technical diploma program in nursing. In addition, the largest number of nurses working in health facilities is graduates of nursing institutes. Moreover, the study showed that the years of employment of more than half of the nurses participating in the study ranged from less than one to nine years. Taking into consideration the involvement of nurses in workshops and training courses on healthcare waste management, the study found that most of the nurses who agreed to be included in the study sample were not included or participated in workshops or training courses related to the management of waste resulting from the healthcare process. A recent study conducted at four governmental hospitals in Duhok City, which describes job and demographic characteristics of nurses who work in such hospitals. As this research clarified, that females comprise the highest percentage of nurses 59.3% among the study sample. Also, that a high percentage of them 53.4% had certificate less than diploma, and 32% of research sample had worked less than three years of employment (Musa, 2012). Previous study findings indicated that more than half of nurses were included in such study 52.9% were 40 years old and more. Moreover, 65.7% of them were male, and 47.2% stated that are graduates of nursing institute, while 52.9% of study sample have one to five years of employment (AL-Hraishawi and Naji, 2015). The nurses' mean of ages who were the subjects in the study held at hospitals of Ain Shams University in Cairo was 31.2 and all of them were females. Moreover, 67.5% of those nurses stated had received training course on management of health care waste (Hakim *et al*., 2014). Regarding to nurses' level of knowledge towards health care waste management; in fact, the result that emerged by current study presents that most of nurses had high level of knowledge related to management of the waste resulting from the process of providing health care. A hospital based study research, done by Shivalli and Sanklapur (2014) at tertiary care teaching hospital of Mangalore city in India, shows near to half of the nurses 47% who recruited had excellent knowledge related to the ways of management healthcare waste. Concerning to research study has been done by Tenglikar and his colleagues on nursing homes staff (Doctors, Nurses and Housing staff) in Gulbarga city which deals with assessing the Knowledge Attitude and Practices regarding health care waste management. In fact, this study shows most of nurses working in this homes had high score about general knowledge related management of healthcare waste (Tenglikar *et al.,* 2012). Other research papers at medical college hospital in Trivandrum assessed the knowledges, attitudes, and practices of healthcare workers about management of biomedical waste products, show the level of knowledge according to professional categories that the highest proportion of nursing staff had average knowledge score regarding how to manage healthcare waste (Ranu *et al.,* 2016). Concerning the relationship between nurses' knowledge toward management of health care waste

with their demographic characteristics, the present study found the nurses who work in primary health care centers are more concerned with management of waste generated from health care process than nurses who work in hospitals because of the size and nature of the health care services and the number of nurses related to the number of patients, in addition, the quality of healthcare that provided compared to the primary health care centers. Besides, the current study indicated that the nurses acquired knowledge related to management of healthcare waste through their life span and growing of age in their work. However, and related to knowledge of nurses regarding management of health care waste with the remaining nurses variables that included in present study as gender, level of education, years of employment and attending workshop and training courses related to management of health care waste, the study indicated no significant relationship between them. Studies carried out by AL-Hraishawi and Naji (2015); Yar (2010) revealed the significant relationship between nurses' knowledge with growing old, this result shows compatibility with current study-related result regarding nurses' knowledge and their growing age. Shivalli and Sanklapur (2014) presented similarity in their study conducted on nurses who work in Mangalore city teaching hospital in India with results of current study regarding the relationship of nurses' knowledge on healthcare waste management with their gender and years of employment, while in the same time present dissimilarity with the results related to such knowledge with nurses' age and place of work. In a recent study at Ain Shams University Hospitals, Cairo, which studied the variables that could affect the scores of knowledge, attitude, practice related to management of healthcare waste, the study found that having ever received training on waste management, were not significantly correlated with the nurses' scores about knowledge regarding management healthcare waste. On the other hand, the same study shows disagreement with current study findings due to years of work experience, it was the significant variable among nurses with their knowledge score concerning healthcare waste management; most of nurses who had worked two or more years indicated high knowledge scores (68.7%) more than those worked less than two years (47.3%) (Hakim *et al*., 2014). Study findings suggest that nurses' knowledge towards healthcare waste management might be increased due to increment of their age and years of experience. Moreover, the authors applied One Way ANOVA to find out the significant difference between nurses' knowledge of healthcare waste management and their different categories of educational level. A significant difference was observed between different nurses' educational levels and their knowledge regarding health care waste management (Karthik and Dharmappa, 2013).

CONCLUSION AND RECOMMENDATIONS

The highest number of nurses of present study showed high level of knowledge toward how to manage the health care waste that produced due to providing of such health care. The nurses of current study who work in primary health care centers were more concerned with management of health care waste than that work in hospitals, and they acquired their knowledge regarding to ways of healthcare waste management through their life span and growing of age in their work. The recommendations that emerged due to the findings of present study are as follow:- the study suggests that the knowledge of the nursing staff about management of healthcare waste is crucial to ensure that such waste are managed properly. So, the healthcare institutions should establish periodic workshops, training and education programs for nurses aimed to develop high knowledge related to management of healthcare waste.

Tables

Table 1: Distribution of Nurses by their demographic characteristics

Nurses' demographic		F	%	Mean	S.D
Place of working	Primary Health Care Center Hospital Total	40 89 129	31 69 100	1.69	0.464
Age	20-26 27-33 34-40 41-47 48-55 Total	32 47 28 16 6 129	24.8 36.4 21.7 12.4 4.7 100	32.74	7.91
Gender	Male Female Total	45 84 129	34.9 65.1 100	1.65	0.478
Level of education	Intermediate school of nursing Technical diploma College Total	45 53 31 129	34.9 41.1 24.0 100	1.89	0.763
Years of employment	<1-9 10-19 20-29 30-over Total	65 34 28 2 129	50.3 26.4 21.7 1.6 100	9.964	8.1797
Workshop and training	No Yes Total	110 19 129	85.3 14.7 100.0	1.15	0.356

(F= Frequency. %= Percent. SD= Standard Division)

Table 2: Distribution of nurses by their level of knowledge toward health care waste management

Nurses' level of knowledge	F	%	Mean	S.D
Low Moderate High Total	2 38 89 129	1.6 29.4 69.0 100.0	2.67	0.503

(F= Frequency. %= Percent. SD= Standard Division)

Table 3: Relationship between knowledge of nurses toward health care waste management and their demographic characteristics

		Place of working	Age of the Nurses	Nurses' gender	Nurses' level of education	Nurses' years of employment	Workshop and training related to health care waste management
Level of Nurses' knowledge toward health care waste management	Pearson Correlation	-.436**	.290**	-.054-	-.134-	.151	.052
	Sig. (2-tailed)	.000	.001	.546	.131	.088	.560

**Correlation is significant at the 0.01 level (2-tailed).

Table 4: Name of Hospitals and main Primary Health Care Centers in Duhok City

Hospitals	Primary Health Care Centers
1. Azadi Teaching Hospital 2. Heve Pediatric Hospital 3. Burn Hospital 4. Emergency Hospital 5. Maternity and Gynecology Hospital	Mateen PHC Duhok PHC Sarhaldan PHC Barzan PHC Shahedan PHC Khabat PHC Malta PHC Qazi Mohammed PHC 16 Aab PHC . Bahdenan PHC . 11 Adar PHC . Zanko PHC . Shandokha PHC

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