# **Original Research Article**

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# Knowledge and attitude of nurse professionals towards medical waste management at Hamad Medical Corporation in Qatar: a cross-sectional study

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# **ABSTRACT**

**Background:** The improper management of wastes generated in health care facilities can severely affect the health of caregivers, patients and members of the community. Medical waste management can be achieved with the cooperation of all workers and patients; however, nursing personnel play a significant role in the whole process. Therefore, this study was done to evaluate the knowledge of nursing professionals regarding waste management in Hamad Medical Corporation (HMC) hospitals in Doha and to assess their attitude towards medical waste management.

**Methods:** Descriptive cross-sectional study conducted at 4 governmental hospitals in Doha city; Hamad General Hospital (HGH), Women's Hospital (WH), Rumiallalh Hospital (RH) and Al-Amal hospital among 420 nurses.

**Results:** The response rate among nurses were 82.3%, most of them are female and non-Qatari. On analyzing data on knowledge about waste management procedures, it was found that the most widely reported procedures was segregation (89.9%) and incineration (84.9%). Almost all nurses (99.4%) believed that training and education regarding medical waste is required for all staff, also 98.8% of the studied nurses agreed that attending medical waste management program is beneficial.

**Conclusions:** Knowledge of most studied nurses regarding medical waste management was found to be high and had positive attitude.

Keywords: Knowledge, Nurses, Qatar, Waste management

# INTRODUCTION

Improper management of health care facilities wastes are lethal and can have health impacts on the community, the personnel working in health-care facilities, and on the environment. The term health-care waste includes all the waste generated within health-care facilities, research centres and laboratories related to medical procedures. In

addition, it includes the same types of waste originating from minor and scattered sources, including waste produced in the course of health care undertaken in the home (e.g. home dialysis, self-administration of insulin, recuperative care).<sup>2</sup> According to World Health Organization (WHO) around 85% of hospital wastes are non-hazardous, the remaining 15% is considered hazardous material that may be infectious, chemical or radioactive.<sup>3</sup> The different types of waste are sorted and

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known as follows; infectious waste: waste contaminated with blood and other bodily fluids from laboratory work or from patients with infections, pathological waste: human tissues, organs or fluids, body parts and contaminated animal carcasses, sharps waste: syringes, needles, disposable scalpels and blades and non-hazardous or general waste: waste that doesn't pose any biological, chemical, radioactive or physical hazard.<sup>4</sup>

Unsafe injections were responsible for as many as 33,800 new HIV infections, 1.7 million hepatitis B infections and 315,000 hepatitis C infections. Patient has risks of 30%, 1.8%, and 0.3% respectively of becoming infected with HBV, HCV and HIV.<sup>4</sup> The International Labour Organization (ILO) estimated up to 2.78 million people die from occupation-related disease and injuries and 374 million experiences nonfatal injuries.<sup>5</sup> The most common problems connected with medical waste include absence of proper waste management, lack of awareness about the health hazards from medical wastes, insufficient financial and human resources and poor control of waste disposal.<sup>3</sup>

In the state of Qatar, medical waste management is done by different sectors including the Ministry of Municipality and Environment, Ministry of Public Health and infection control department at Hamad Medical Corporation (HMC). The three sectors corporate in establishing legislations, policies and supervising the process of medical waste management and disposal.

Nurses are at higher risk of exposure to the medical waste hazards. They spend maximum time with patients in the ward than any other member of the health team, increasing their exposure to the risk of hazards. They are also responsible for preventing risk of waste to the other members of health team and community at large perspective.<sup>6</sup>

On the other hand, awareness among heath care workers regarding medical waste management has not been studied.

This study aims to evaluate the knowledge of nursing professionals regarding waste management in Hamad Medical Corporation (HMC) hospitals in Doha and to assess their attitude towards medical waste management.

# **METHODS**

This study was a descriptive cross-sectional study.

# Study setting

The study was conducted at 4 governmental hospitals in Doha city; Hamad General Hospital (HGH), Women's Hospital (WH), Rumiallalh Hospital (RH) and Al-Amal hospital from 2009 to 2010. The four hospitals are working under HMC, providing secondary and tertiary health services to most of the population in Qatar. It is the premier non-profit main health care provider in Doha.

### Study population

The study was conducted among nursing staff working at HGH, WH, RH and Al-Amal hospital.

They were recruited and distributed according to their qualification and experiences. Fitness of nurses for work is assured through preplacement medical examination. Orientation program is carried out within the first week of employment including: type of work, procedures and responsibility and general precautions. On the other hand, at the time of the study, there was no specific training regarding management of medical waste. Estimated number of nurses working within the HMC is 5316 distributed in different working area at five main hospitals. Exclusion criteria included nurse working at administration and health information system and those at leave during the data collection.

### Sampling technique

The investigator selected the sample randomly using proportionate stratified random sampling method where four hospitals within Doha city were included in the study. A list of all nurses within those hospitals was obtained by the investigator from the human resources section of HMC. Using this list, the investigator applied the sampling method.

The proportion of nurses within each hospital was calculated from the total number of nurses. Nurse selection within the facility followed the simple random sampling method. The investigator used a computergenerated random number which was obtained for each subject in the sample. Specific serial numbers with no repetition was given for each participant.

# Sample size

Sample size was 420 nurses using 95% confidence level and 5% absolute precision, effect size of 50% and 20% added for non-response.

A modified validated questionnaire comprised of demographic data including age, sex, nationality, educational level, place of work, working area, departments and working experiences, in addition to the knowledge of waste management which assessed the understanding of waste management techniques and methods of waste disposal in the hospital. The last section of the questionnaire assessed their attitude.

# Statistical analyses

Statistical Package of Social Science (SPSS), version 16 for windows was used. Descriptive and analytic statistic was used as appropriate.

### **RESULTS**

A response rate was 82.3%. The distribution of nurses in the different facilities where (49%) from HGH, and 6.2% from Al-Amal hospital were recruited.

Approximately, half of the participating nurses (49.9%) were working at inpatient hospital wards followed by 17.7% at intensive care units while operating theatre included 4.3% of them. mostly female and non-Qatari (Table 1).

Table 1: Frequency distribution of the demographic characteristics of the study population (n=345).

Variable	Frequency		
	N	%	
Age group (in years)			
≤30	77	22.3	
31-35	85	24.6	
36-40	87	25.2	
>40	96	27.8	
Sex			
Male	30	8.7	
Female	315	91.3	
Nationality			
Qatari	7	2.0	
Non-Qatari	338	98.0	
Educational level			
Secondary	39	11.3	
High nursing institute	109	31.6	
University and post graduate	197	57.1	
Place of work			
HGH	169	49.0	
WH	78	22.6	
RH	76	22.0	
Al-Amal hospital	22	6.4	
Experience in years			
1-10 years	148	42.9	
11-20 years	149	43.2	
21 year and above	48	13.9	
Working settings			
Outpatient clinic	29	8.4	
Intensive care unit	61	17.7	
Inpatient hospital ward	172	49.9	
Emergency unit	35	10.1	
Operating theatre	15	4.3	
Others	33	9.6	

The frequency distribution of knowledge of nurses about possible medical hazards in the workplace is shown in Figure 1.

Infection and sharps almost revealed analogous percentage and represent the major medical hazards reported by nurses (95.4% and 95.1%) followed by chemical hazards (60.3%).

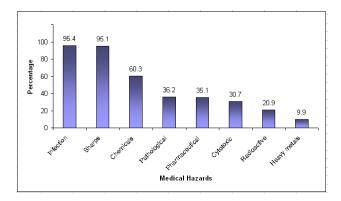


Figure 1: Knowledge of nurses about possible medical hazards in the work place (n=345).

In Figure 2, almost all nurses (96.8%) stated that hepatitis is a possible condition associated with exposure to medical waste and (84.9%) reported that HIV is among the conditions that can be contracted at their working settings followed by 79.4% for injures.

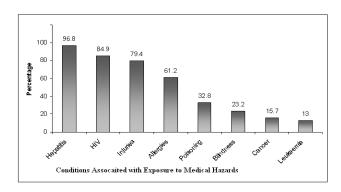


Figure 2: Knowledge of nurses about the possible conditions associated with exposure to medical hazards (n=345).

Gloves, masks and gowns were reported by almost all of the nurses (99.7%, 98.6% and 91% respectively) to be a part of personal protective measures which can be used at work place in order to reduce the hazards resulting from exposure to medical waste.

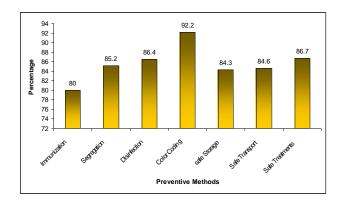


Figure 3: Knowledge of nurses about the possible preventive methods that can be used to reduce the medical waste hazards (n=345).

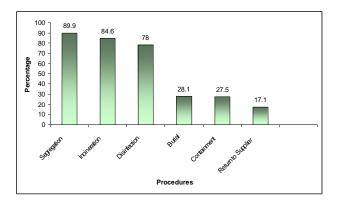


Figure 4: Nurses knowledge about procedures available for medical waste management in the corporation (n=345).

Figure 3 shows the different preventive methods used to reduce the medical waste hazards, color coding of

medical waste achieved the highest percentage with 92.2% of nurses reporting it.

In Figure 4, on analyzing data on knowledge about procedures available for waste management, it was found that the most widely reported procedures were segregation (89.9%) and incineration (84.9%) while return to supplier procedure attained only 17.1%.

The distribution for sources of information regarding medical waste showed the training courses as the highest frequency among participating nurses (98.3%) followed by internet source (84.3%) and obtaining information regarding medical waste from colleagues attained the lowest frequency with 67.8% of nurses reporting it.

The frequency distribution of the studied sample according to their knowledge about medical waste management plan and legislations was shown in Table 2.

Table 2: Frequency distribution of the studied sample according to their knowledge about medical waste management plan and legislations (n=345).

Knowledge	Yes		No	
	Frequency	%	Frequency	%
Awareness of any national legislation applicable to the medical waste management.	257	74.5	88	25.5
Awareness of having a waste management plan at the health care setting.	336	97.4	9	2.6
Awareness that waste management responsibilities are included in the job descriptions.	312	90.4	33	9.6
Awareness that the hospital provides regular education on medical waste management for employees.	388	98	7	2.00

Table 3: Frequency distribution for attitude of the studied nurses regarding medical waste management (n=345).

Attitude	Agree		Disagree	
	Frequency	%	Frequency	%
Safe management of medical waste is not an issue at all.	23	6.7	322	93.3
Safe management of medical waste is the responsibility of government.	130	37.7	215	62.3
Medical waste management is team work/no single class of people is responsible for safe management.	312	90.4	33	9.6
Safe management efforts by hospital increases financial burden on management	110	31.9	235	68.1
Safe management of medical waste is an extra burden on work	40	11.6	305	88.4
The development of medical waste management's system is an essential issue.	37	94.8	18	5.2
Training and education regarding medical waste is required for all staff.	343	99.4	2	0.6
Attending medical waste management program is beneficial.	341	98.8	4	1.2

The majority of nurses (97.4%) were aware that their healthcare setting is having a waste management plan. Waste management responsibilities were known to be included in the job description by 90.4% of the studied nurses.

Data on nurses training and education showed that most of nurses (98%) were aware that their hospitals provide regular education on waste management for the employee.

Almost all nurses (99.4%) believed that training and education regarding medical waste is required for all staff, also 98.8% of the studied nurses agreed that attending medical waste management program is beneficial (Table 3).

Only 0.6% of nurses disagree that training and education regarding medical waste is required for all staff. None of the participants had neutral response for attitude regarding medical waste management.

### DISCUSSION

The percentage of female nurses were found to be high (91.3%) compared to male nurses (8.7%), women are commonly the predominant gender in many health care settings. In Oman, males represent proximity of 4% of the registered nurse population which is consistent with the demographic nurse population in the current study.<sup>7</sup>

More than half of the study participants (57.1%) attained a university and postgraduate degree and 11.3% of nurses had secondary school level education which represent the policy of employment at HMC.<sup>8</sup>

Regarding the possible medical hazards at work place, infection and sharps almost revealed analogous percentage and represented the major medical hazards reported by nurses (95.4%, and 95.1%, respectively) followed by chemical hazards (60.3%). Only 9.9% of nurses stated that heavy metals are among the possible medical hazards that they may encounter at their working place. In contrast to study done in Bangladesh among nurses where more than half of the respondents did not know any of the general waste. In the answer of knowledge about infectious waste 6.4% gave all right answers. Knowledge about pharmaceutical waste and biomedical was correct in only 8% and 7.2% respectively.

The fact that infection and sharps were recorded by almost all nurses may be explained by that those hazards are common, and it's usually regarded as general information that most of nurses have come across previously. Nurses are familiar with syringes and needles and with accident that happens as a result of sharp injuries. Other cause included that the effect of infection; sharps are direct and rapid to develop while the effect of other hazards may take time to develop and appear, so it was rendered by nurses to lesser extent.

Regarding the possible conditions associated with exposure to medical hazards, almost all nurses (96.8%) stated that hepatitis is a possible condition associated with exposure to medical waste. Most of the studied nurses (84.9%) reported that HIV is among the conditions that can be contracted at their working settings followed by 79.4% for injures. In comparable to study done in Rwanda among health care workers to assess the knowledge about different health problems due to

exposure to medical hazard, 53%, 61% and 54% of healthcare attendants knew that HIV, hepatitis B and hepatitis C can be transmitted.<sup>11</sup>

High awareness regarding hepatitis and HIV among the studied nurses maybe directly attributed to the role of continuous training, education of staff at HMC and the effect of media.

Concerning the possible preventive methods that can be used to reduce medical waste hazards, among the different preventive methods the nurses were asked to define them, color coding resulted in the highest percentage with 92.2% of nurses reporting it. The other six components of preventive methods had produced almost same frequencies including: immunization, segregation, disinfection, safe storage, safe transport and safe treatment (ranging from 80% to 86.7%). Almost all preventive methods available to reduce the medical waste hazards were highly perceived by the nurses. This result was consistent with study in Egypt among stuff nurse where the knowledge overall regarding waste segregation, coding, storage and transportation were satisfactory with score 80%.<sup>12</sup>

Regarding the knowledge of nurses about medical waste management plan and legislations, the majority of nurses (97.4%) were aware that their healthcare setting is having a waste management plan and 74.5% of nurses are aware of national legislations applicable to medical waste. Waste management responsibilities were known to be included in the job description by 90.4% of the studied nurses. In divergent to study in Bangladesh where there was no good infrastructure for waste management (95.2%) stated there was no logistic supply, and 40% of respondents complains of insufficient training for waste management.<sup>13</sup>

This high awareness is accomplished through different ways including memos, announcements and the HMC website which announces all training programs and workshops and sends emails to each employee.

# Attitude of nurses toward management of medical waste

Almost all nurses (99.4%) believed that training and education regarding medical waste is required for all staff. Another 98.8% of the studied nurses agreed that attending medical waste management programs is beneficial. This is in a part due to that they regard the training courses are the main source of information regarding medical waste for nurses.

In study to assess the attitude among health care workers in Egypt, the percentage of nurses agreeing that safe disposal is of ultimate importance for preventing infection transmission was high (82.1%) Moreover, the percentage of nurses agreeing that using personal protective equipment decreases the risk of contracting infection was (43.0%). Their willingness to cooperate with hospital

waste management team (81.5%) and the proportion of nurse staff agreeing that waste disposal is a team responsibility were low only (29.8%). The percentage of nurses agreeing that safe waste disposal should be a priority among hospitals were only (35.8%).<sup>14</sup>

In the current study, a percentage of 88.4% of nurses believed that safe management of medical waste is not an extra burden on work. This can be clarified by that waste management is a part of everyday work of nurses and it's included as an element of total patient care.

### **CONCLUSION**

Knowledge of most studied nurses regarding medical waste management was found to be high and had positive attitude. Intensifying the in-service training on medical waste management, monitoring the policy implementation of medical waste management and reviewing the components of medical waste training program at HMC.

Excessive production of waste and unavoidable exposure should be further evaluated by quantification of medical waste at each hospital setting and identifying appropriate control strategies tackling these barriers.

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