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Knowledge and Attitude of Hospital Personnel Regarding Medical Waste Management

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ABSTRACT

Aims Considering the importance of medical waste recognition by health centers staffs and its role on maintenance and improvement of social and environmental health, this study aimed to evaluate the knowledge, attitude and practices of hospital staffs regarding to medical waste management.
Instrument & Methods The current descriptive, analytical and cross-sectional research was carried out on the staffs of the Ayatollah Rohani Hospital of Babol City, Iran, in 2013. 130 employees were selected by stratified sampling method. A researcher-made questionnaire (accessible as an attachment) containing 4 parts of demographic information, knowledge (15 questions), attitude (6 questions) and practices (6 questions) was used for data gathering. The data was analyzed by SPSS 17 software using Kruskal Wallis and Mann-Whitney tests.
Findings The participants mean scores of knowledge, attitude, and practice were 10.7±1.6 (out of 15), 5.5±0.8 (out of 6), and 4.5±1.5 (out of 6), respectively. 12% (16 people) of the participants had low, 72% (93 people) of the participants had medium, and 16% (21 people) of them had high knowledge toward hospital waste management. 16% (21 people) of the participants had medium and 84% (109 people) of them had high attitude toward hospital waste management. 4% (5 people), 46% (60 people) and 50% (65 people) of the participants had low, medium and high practice, respectively.
Conclusion The level of knowledge, attitude and practice of the Ayatollah Rohani Hospital of Babol City, Iran, regarding hospital waste management is acceptable.

Keywords Knowledge; Attitude; Medical Staff, Hospital; Medical Wastes Disposal; Hospital

CITATION LINKS

[1] Medical waste management in the south of ... [2] Characteristics of healthcare ... [3] Healthcare waste management in the capital city of ... [4] Results of a hospital waste survey in private hospitals in ... [5] Rules and management of bio-medical waste at Vivekananda polyclinic: A case ... [6] Clinical solid waste management practices and its impact on human health and ... [7] Healthcare waste management practices and risk perceptions: findings from hospitals in the ... [8] A review of legal framework applicable for the management of healthcare waste and current management practices in ... [9] Study of biomedical waste management practices in a private hospital and evaluation of the benefits after implementing remedial measures for ... [10] Biomedical waste in laboratory medicine: Audit and ... [11] Hospital waste management in the teaching hospitals of ... [12] Standards of clinic waste management in hospitals--a second ... [13] A descriptive study on evaluation of bio-medical waste management in a tertiary care public hospital of ... [14] Biomedical solid waste management in an Indian hospital: A case ... [15] Report: medical students for monitoring biomedical waste ... [16] Hospital waste management status in Iran: A case study in the teaching hospitals of ... [17] Hospital waste management in El-Beheira ... [18] Assessment of medical wastes management practice: A case study of the northern part of ... [19] Hospital waste management system--a case study of a south Indian ... [20] Survey of medical waste characterization and management in ... [21] Characterization of medical waste from hospitals in ... [22] Knowledge and awareness regarding biomedical waste management in ... [23] Knowledge, attitude and practices of health-care personnel towards waste disposal management at Ain Shams university ... [24] The awareness of Yazd city hospital personnel's about the management of hospital wastes in ... [25] Assessment of the knowledge, attitude and practices regarding biomedical waste management amongst the medical and paramedical staff in tertiary health care ... [26] Knowledge assessment of hospital staff regarding biomedical waste management in ... [27] Knowledge, attitude and practices regarding biomedical waste management among healthcare personnel in Lucknow, India [28] Knowledge, attitude, and practices about biomedical waste management among healthcare personnel: A ...

Introduction

Provision, maintenance, and promotion of people's health in society are considered as serious responsibilities of the health system [1, 2]. Regarding the maintenance and improvement of the health condition the societies, the management and disposal of medical wastes are of high importance [3-5]. Health centers must dispose their wastes, e.g. infectious, chemical, medicinal, cytotoxic, pathologic, and radiologic materials, in a way that people and environment be exposed to the least possible threat [6-8]. Generally, hospital wastes are divided into two groups; household solid wastes and hazardous or hospital wastes [9, 10]. Hazardous wastes need *ad hoc* management due to their hazardous characteristics such as toxicity, pathogenicity, flammability, corrosion and, etc. [10-12]. Hospital hazardous wastes include various pathogenic factors which considered as important source of diseases, thus, their disposal must be managed in a way that the health of patients, personnel (doctors, paramedics, nurses and non-medical workers such as cleaners) and the visitors of hospital not be threatened [3, 13, 14].

Due to the lack of a full understanding of dangers regarding medical wastes and its relation with waste management methods, it is of high necessity to execute the comprehensive plan of waste management in hospitals in all stages of waste production, separation, transportation and disposal in order to maintain and improve public and environmental health [15-17]. Lack of control and negligence in proper management of hospital wastes not only will threaten social and environmental health but also will lead to enormous costs [15].

The first important factor is separation of infectious and non-infectious wastes [18-20]. Unfortunately, due to the fact that separation of waste fractions at source has not been institutionalized and that the health-care staff and managers are ignorant to the importance of it, production of medical wastes in hospitals and health-care centers has risen noticeably [21]. Hence, hospital wastes, especially infective and hazardous, must be controlled under persistent and well-informed management [22, 23].

Regarding that fact, which is fundamental to proper management of medical waste and improving knowledge of health-care centers staff, the aim of this study was to evaluate the knowledge, attitude and practices of hospital staffs regarding to medical waste management.

Instrument & Methods

This descriptive, analytical and cross-sectional research was carried out on the staffs of the greatest educational hospital of Babol City, Iran (Ayatollah Rohani Hospital), in 2013. 130 employees including doctors (10), interns (10), nurses (50), laboratory sciences technicians (15), operation room and anesthesia technicians (15) and service workers (30) from different wards of the hospital were selected by stratified sampling method.

A researcher-made questionnaire (accessible as an attachment) containing 4 parts of general information, knowledge (15 questions), attitude (6 questions) and practices (6 questions) was used for data gathering. Its face and content validity were confirmed by relevant experts while the reliability of the questionnaire was determined by Kappa Test-Retest. The kappa was determined 0.72, 0.71 and 0.73, for knowledge, attitude and practice, respectively. Each proper answer resulted in 1 point whereas wrong answers had zero point. The degree of knowledge was divided into 3 levels; low (1 to 8), medium (9 to 12) and high (more than 12). The degrees of attitude and practice were also considered as low (0-2), medium (3-4) and high (5-6).

The data was analyzed by SPSS 17 software. Mann-Whitney test was used to compare mean ranks of two independent groups, and Kruskal Wallis test was used to compare more than two groups.

Findings

The average work experience of participants was 4.4±3.6 years and age average was 31.09±6.11 years (23 to 53 years old). 65% (85 people) of participants were females. 7.7% of participants had PhD degree, 14.6% had associate's degree, 52.3% had Bachelor degree, 9.2% were undergraduate students, 13.1% had high school diploma, and only 3.1% had the degree below high school diploma.

12% (16 people) of the participants had low, 72% (93 people) of the participants had medium, and 16% (21 people) of them had high knowledge toward hospital waste management. 90% of the participants were not aware that hospitals are the chief responsible of managing the disposal of medical waste. 82% of them knew that waste separation at source is the most important stage of managing medical wastes which leads to disposal costs reduction. About 81.5% of the questioned personnel were aware of the fact that amputated body parts are considered as infective and hazardous waste. Furthermore, the point that gauze bandages are of hazardous waste was very well known to about 97% of those took part in the study. 84% of participants regarded infectious and isolation ward waste as hazardous one. 97% of them were familiar with infectious waste separation color coding while 49% did not know that covering infected needles with cap (recap) would decrease the potential of viral diseases such as hepatitis B and AIDS. 17% of the staff filled out the questionnaire was informed that autoclaving is the only way approved by ministry of health to dispose of hazardous medical waste. Approximately, 88% of them did know how to dispose the amputated body parts and organs properly. 47% of the participants considered hospitals, as the producer of medical waste, responsible for collecting and disposing of medical waste (Table 1).

16% (21 people) of the participants had medium and 84% (109 people) of them had high attitude toward hospital waste management. About 85% of them were aware of the necessity of the execution of medical waste management and all of them regarded it crucial to separate hazardous medical waste at source. More than 67% of the participants believed that supervising the medical waste management at hospital would suffice. 100% of them considered safety precautions in all stages of waste disposal management important. Around 96% of the staff considered hospital waste management training courses to be effective in reduction of injuries caused by sharp tools (Figure 1).

4% (5 people), 46% (60 people) and 50% (65 people) of the participants had low, medium and high practice, respectively. Only 40% of them used individual safety gear while working. Around 78% of the samples threw away the syringes in the safety box without covering the needles with caps. Approximately, 95% of the participants had gotten hepatitis B vaccine. Sharp tools had caused injuries to 33% of them during work experiences. 22% of them had not taken part in any waste disposal management training courses (Figure 1).

Figure 1) Relative (numbers in parentheses) and absolute frequencies of the knowledge, attitude and practice levels of the participants

Parameter	Low	Medium	High
Knowledge			
Doctors	0	9 (90)	1 (1)
Nurses	4 (8)	34 (68)	12 (24)
Laboratory staffs	1 (6.6)	13 (86.6)	1 (6.6)
Operation room staffs	1 (6.6)	13 (86.6)	1 (6.6)
Service workers	6 (20)	18 (60)	6 (20)
Interns	4 (40)	6 (60)	0
Total	16 (12)	93 (72)	21 (16)
Attitude			
Doctors	0	9 (30)	7 (70)
Nurses	0	8 (16)	42 (84)
Laboratory staff	0	0	15 (100)
Operation room staff	0	5 (33.3)	10 (66.6)
Service workers	0	5 (16.6)	25 (83.3)
Interns	0	0	10 (100)
Total	0	21 (16)	109 (84)
Practice			
Doctors	0	10 (100)	0
Nurses	2 (4)	22 (44)	26 (52)
Laboratory staff	0	9 (60)	6 (40)
Operation room staff	0	6 (40)	9 (60)
Service workers	3 (10)	9 (30)	18 (60)
Interns	4 (40)	6 (60)	0
Total	5 (4)	60 (46)	65 (50)

The participants mean scores of knowledge, attitude, and practice were 10.7±1.6 (out of 15), 5.5±0.8 (out of 6), and 4.5±1.5 (out of 6), respectively. There was no significant correlation between knowledge and age, attitude and age and attitude and working experiences as well. In contrast, there was a significant correlation between knowledge and practice amongst males and females ($p=0.03$) while that was not true in the case of attitude ($p=0.558$). There also was a statistically significant correlation between the samples education level and knowledge ($p=0.036$) and practice ($p=0.0001$) as well as between their job and attitude ($p=0.045$) and practice ($p=0.01$). On the contrary, the correlations between job and knowledge ($p=0.309$) and education level and attitude ($p=0.269$) were not statistically significant.

Discussion

The hospital staffs were following the medical waste management rules. Infective waste separation as well as waste color coding was executed in all wards. Sample's knowledge was 10.7±1.6 (out of 15) while this amount was 14 (out of 29) in Mokhtari *et al*. [24].

Positive attitude toward medical waste management was possessed by 84% of the participants and 50% of them showed high practice regarding this issue. On the other hand, the results of Sachan *et al.* in India suggested that 100% of the doctors and only 60% of the nurses held desirable attitude regarding hospital waste management [25]. 9.2% (12 people) of the participants had knowledge about executive management and the chief responsible of hospital waste management to which 50% (5 people) of the doctors answered properly. Service workers had no knowledge about this issue while this amount was 38% (low) in Mokhtari *et al*. [24]. 93% of laboratory and operation room staffs were aware of the hospital waste disposal management stages whereas only 67% of the service workers had proper knowledge about it. According to Vishal *et al.*, the doctors and the service workers had the lowest and highest knowledge regarding this issue, respectively [26].

In accordance with the World Health Organization that considers the separation of health-care centers waste as the most effective action toward reduction of the problems relevant to waste management and suggested using yellow bags to separate infective waste [9], 82% of the participants of the current study believed that waste separation at source would be the most important stage of medical waste management that would reduce its disposal costs. 93% of laboratory staffs had clear understanding of that while the lowest amount belonged to the service workers (77%). The results of Vishal *et al.* [26] showed that the nurses and service workers had the highest (70%) and lowest (28%) knowledge regarding the importance of waste separation at source, respectively.

97% of the participants were aware of the infective waste color coding while this number was only 30% in Mokhtari *et al.* [24]. Almost 49% of them had no information regarding the fact that covering infected needles with recap would probably cause viral diseases while a study in Bangladesh in 2012 has shown that 96% of the participants were aware of this issue [27]. About 88% of those who took part in the study knew how to properly dispose of amputated body parts and organs. In this research, just 18% of the participants were informed that autoclaving is the only way of disposal of hazardous medical waste approved by ministry of health while 43% of the participants in Mokhtari *et al.* in Yazd were aware of that issue [24]. It should be noted that although the average of 18 to 64% of hospital waste is not properly disposed [28], 100% of the operation room staffs were aware that autoclaving is the only way of disposal of hazardous medical waste approved by ministry of health while only 30% of the service workers had knowledge about it.

Based on the results of this research, the participants had very low knowledge regarding executive management responsibility and proper disposal of medical waste management and just 47% of them recognized hospitals as responsible for that. World Health Organization has announced that each unit is responsible for disposal of their own waste [4, 16]. 73% of the operation room staffs were very well aware of that while the interns had no information about it. According to Mokhtari *et al.* [24], 20% of the participants regarded hospitals as the responsible agent to properly dispose of the waste produced in the hospitals (6%) and just 40% of them applied individual safety gear while working, which is not acceptable regarding its importance. About 78% of the participants threw out the needles to the safety box without covering them. 95% of the questioned staffs had injected the hepatitis B vaccine. According to the instruction issued, all personnel are required to have hepatitis B vaccine so the managers of hospitals should take steps toward fulfilling this aim.

Lack of training is one of the important factors inhibiting staffs from clear understanding of proper ways to manage hospital waste [4, 28], and according to the current research, 22% of the staffs had no training courses. Due to the importance of hazardous waste management, they are required to participate in such classes at least once a year. Around 33% of the participants stated that they had injuries

caused by sharp tools which is not comparable to the number (55.4%) resulted from Mathur *et al.* [28].

Knowledge of the doctors, nurses, operation room and laboratory staffs were higher compared to that of the interns and service workers. Both Vishal *et al.* [26] and Mathur *et al.* [28] presented that the lowest and highest knowledge regarding hospital wastes management belonged to the service workers and doctors, respectively. It was also noted that the knowledge of the participants with associate degree (74.6%) was higher than those having high school diploma or lower and also undergraduate students (25.4%). These are in agreement with the results of Vishal *et al.* [26]. In the study of Singh *et al.*, medical doctors (83.3%), paramedics (80%), medical students (66.7%) had knowledge about waste management plan in hospitals [27]. In study of Sachan *et al.*, 30% of the doctors and 20% nursing staffs have more than 70% knowledge about biomedical waste management [25]. 100% doctors and 60% nurses have a positive attitude toward biomedical waste management. In Vishal *et al.* [26], the knowledge of doctors about BMW management and handling rule was much better (92.1%) as compared to nurses (54.4%) and laboratory technicians (47.6%). In Hakim *et al.*, the service personnel had significantly more information than the doctors and nurses in field of BMW management; however, the knowledge of physicians and nurses in details was more than the service personnel. Also, these people in terms of attitude had more scores than other medical personnel [23].

Lack of officials and other medical and non-medical hospital staff cooperation was a limitation of this study. Continuous education for all hospital staffs, using incentive schemes to improve knowledge, attitude and practice of employees, monitoring the performance of all staff on management of medical waste by managers and other officials and activation of infection control and environmental health committees and following up the decisions of these committees are suggested.

Conclusion

The level of knowledge, attitude and practice of the Ayatollah Rohani Hospital of Babol City, Iran, regarding hospital waste management is acceptable.

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Attachment

General questions

1. What is the type of the hospital? a) Public b) Specialized c) University-Training d) Medical University
2. What is the type of hospital ownership? a) Public b) Private c) Social Security d) Other
3. How many medical wards are there in the hospital?
4. How many para-clinic departments are there in the hospital?
5. How many beds are there in the hospital?
6. How many active beds are there in the hospital?
7. Does hospital have any infectious ward?
8. How many infectious beds are there in the hospital?
9. How many people are there in the inpatient and outpatient of hospital?
10. How many personnel are there in the hospital?
11. How many service personnel involved in the management of hospital waste?
12. Is there an environmental health expert in the hospital?

Questions related to knowledge

1. Which are the main responsibility for management and disposal of hospital wastes?
a) Hospital director b) Hospital administrator c) Waste management expert d) Infection control expert
2. What is the process of the management of solid waste in the hospital?
a) Collection and storage, transfer, separation and disposal
b) Separation, transfer, disposal, collection and storage
c) Separation, collection and storage, transportation and disposal
d) Collection and storage, separation, disposal and transfer
3. Which of the following is not one of the characteristics of hazardous medical waste?
a) Toxicity b) Pathogenicity c) Alkalinity d) Fire-fighting
4. Which is the most important stage in the hazardous medical waste management?
a) Collection b) Transfer c) Disposal d) Separation at source
5. Do parts separated from the body are hazardous medical wastes?
6. Are dressing of patients hazardous medical wastes?
7. Are the wastes produced from infected and isolated places considered as hazardous?
8. Which is the special color code for infectious waste? a) Yellow b) White c) Blue d) Black
9. When the container of sharp objects should be replaced?
a) After filling 1/4 b) After filling 3/4 c) After filling 1/2 d) After full-filling
10. Which way is correct to transfer the final disposal of medical wastes?
a) By hands b) By truly c) By wheeled-container d) No different
11. Which diseases are caused by contact to the contaminated sharp objects?
a) AIDS, Hepatitis A b) Hepatitis A, Typhoid c) Hepatitis A, Hepatitis B d) HIV, Hepatitis B
12. Is the needle coverlid prevents people from being infected by dangerous diseases?
13. Which method of disposal of hazardous medical wastes is approved by the Ministry of Health?
a) Incinerator b) Buried in the ground c) Autoclave d) All 3 options
14. Which method for removal of organs and limbs of amputated patients is correct?
a) A separate transport to the cemetery and buried in his own way. b) Burning in incinerators
c) Along with other infectious and hazardous waste to be buried. d) Disinfecting the autoclave method
15. Which organ is responsible for the collection and disposal of hazardous medical wastes?
a) The municipality b) Hospital c) Health center d) Environment Agency

Questions related to attitude

1. I am aware of the need for solid waste management project in hospitals.
2. The separation of hazardous medical wastes in the hospitals is necessary.
3. I am an important role in the implementation of waste management.
4. The safety and personal protective agree at all stages of waste management.
5. Monitoring the implementation of solid waste management in the hospital is adequate.
6. Courses for the management of medical wastes in reducing injuries from sharp objects are effective.

Questions related to practice

1. Do you use personal protective equipment during work? a) Always b) Sometimes c) Rarely d) Never
2. Are the infectious solid wastes collected to color-coded containers for disposal?
a) Always b) Sometimes c) Rarely d) Never
3. Have the injected syringes thrown to safety box without cover?
a) Always b) Sometimes c) Rarely d) Never
4. Have you ever injected hepatitis B vaccine?
5. Does your workplace have suffered from damage caused by sharp objects (needle stick)?
6. Have you ever been in hospital waste management training classes?