



## **Awareness of workers in Health Centers regarding medical waste risk in Benghazi city, Libya**

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### **Abstract**

Medical waste is one of the major public health related problems and create serious hazard to people and the local environment. Concerns the world hazards wastes as associated with poor biomedical waste management that leads to environmental pollution and spread some diseases. The aim of the present study is to assess knowledge, attitude and practice of healthcare providers related to dealing with medical waste. This study was a cross sectional study, conducted in four polyclinics in Benghazi, Libya. The data was collected by using pre-constructed and pre- tested questionnaire, distributed and collected on October 2017 to January 2018. The result showed that there was imbalance dealing with medical waste and the health institutions under study, environment standard was missing, the suitable utilities and there is no clear guidelines for workers, nor any training on dealing with medical waste and infection control at the health facility which are the basic problems faced medical waste management in general health institutions.

**Key words:** Medical waste, Knowledge, healthcare employees, management

## Introduction

Providing treatment and preventive services within the primary health care centers leads to creation of medical waste, which in itself may be hazardous to health, and may be a source of infection for workers and those who are attending the health centers and the surrounding environment. Inadequate and inappropriate knowledge to deal with medical waste has serious health concerns.

Health-care waste is a special type of nature. The risk of infectious diseases and injuries due to exposure to medical waste is higher than other types of waste, and improper handling of health-care waste may cause health problems for workers. Therefore, health-care waste management is an important part of maintaining the surrounding environment health.

The World Health Organization (WHO) defines waste from health care as all waste (solid and liquid) generated by health care institutions, research institutions and laboratories, including home health care, resulting in some 75-90% waste from waste generated as waste. Similar to household waste, are produced entirely from the housekeeping and administrative offices, as well as waste from the maintenance department of health care institutions. The remaining 10-25% are hazardous health care waste, which can cause a range of health risks.<sup>(1)</sup>

Effective management of biomedical wastes is not only a legal necessity but also a social responsibility in developing countries. Waste is transported to the outskirts of the city and dumped indiscriminately in an unhealthy manner, in addition to the construction of health care centers without regard to waste treatment and management.

Waste management in health care has a variety of implications, as it affects not only the health of the health center facilities, but also the health care staff as doctors, nurses, and other workers, as with the hygiene and environment surrounding the health centers.

Adequate knowledge about health risks from waste, sound techniques, methods of handling and safety measures can go a long way toward safe disposal and protection of the community from the various harmful effects of hazardous wastes.

Medical institutions produce hazardous chemical and radioactive wastes. While some of these wastes are usually non-infectious, they require a proper method of disposal. Some waste is considered as a double risk, such as tissue samples. Disposal of these wastes is an environmental issue. Medical waste is classified as hazardous or infectious, which can lead to many infectious diseases.

The spread of medical waste inside and outside different health care institutions is indicative of the knowledge and awareness of the health care workers in these institutions about the dangers effects of these wastes on them, on society, and on the total environment of the place.

Medical waste resulting from various medical and health practices. Containing large quantities of hazardous substances with harmful effects to working individuals and their surroundings including patients themselves causing them diseases other than those pathogens entered to the facility with.<sup>(2)</sup>

Medical waste has very serious environmental impacts on the environment, especially on water quality. The wastewater from health facilities contains large amounts of chemicals that are discharge to the drainage networks. Heavy metals such as mercury and cadmium.<sup>(9)</sup>

The health facilities should set up a daily collection and sorting program, taking into consideration the use of different vessels for each type, to be collected in such a way as to protect the workers from the risk of these wastes, with the collection of waste at least twice daily in hospitals. When collecting medical waste bags and containers, keep them sealed and not more than three-quarters of their capacity.<sup>(9)</sup>

In general, the programs of safe disposal of medical waste in the Arab countries suffer from several problems, notably the following:

Focus on how to reduce the environmental potential risks of medical waste as much as possible, the focus on improving the level of service through the sound and effective management of medical wastes in this sector.

Some countries of the world have developed a waste disposal system that is able to ensure proper sorting at source and disposal or remediation in a proper manner. However, these facilities lack in other countries, so all types of waste are mixed together. In addition, there is also a weak infrastructure component and a lack of awareness of the risks between medical personnel and health personnel. Many developing countries face a problem in dealing, with disposal of medical waste in a safe manner, due to the non-enforcement of legislation on their treatment and disposal.<sup>(2)</sup>

Infectious waste was identified as "waste that it contains pathogens (bacteria, viruses, parasites or fungus) with sufficient concentration or quantity to cause the disease to be exposed to it". In addition, Pathological waste was identified as "waste consists of tissues,

organs, body parts, human and animal embryos, blood and body fluids, also called anatomical wastes.)<sup>(3)</sup>

In UK, medical waste are regulated in accordance with the Environmental Protection Act 1990 (Part II), Waste Management Licensing Regulations 1994, Hazardous Waste Regulations (England and Wales 2005), and Private Waste Systems in Scotland.<sup>(6)(7)</sup>

Study in, India, have examined the cognitive aspect of health care workers such as hospitals staff, nursing homes and care homes. It was found that 26% of physicians and 43% of employees are aware of the risks related to biomedical waste.<sup>(8)</sup>

### **3. Factors contributing to infection :<sup>(4,5)</sup>**

- The presence of the pathogen: those microbes causing a disease.
- Toxicity: The ability and strength of the microbe to cause damage.
- Dosage: They provide a certain number of the same pathogenic microorganism for disease events, and vary from one microbe to another.
- Entry method: With sufficient number of pathogenic microorganisms, there is a way to enter the body, which varies from one microbe to another.
- The host's susceptibility to infection: the resistance and immunity of the host to the microbe against the occurrence of the disease, and these also vary from one host to another.<sup>(5)</sup>

Libya has the Environment Law No. 7 regulating the management of medical waste in various health facilities, but unfortunately the healthcare provider not aware of the extend of the effects and the responsible authorities as well.<sup>(16)</sup>

The present study explore knowledge, attitudes and practices of primary health care workers regarding the safe handling of medical waste and the extent to which they impact on workers during their day-to-day work. Health and safety practice in the workplace and environmental awareness are both a responsibility and an interest for all.

## **Methods and material**

### **Type of study:**

A descriptive (cross-section) study about medical waste, regarding knowledge of healthcare provider in primary health care facilities was conducted in the city of Benghazi.

### **Study period:**

The study was conducted during the period from October 2017 to January 2018 in the city of Benghazi, (polyclinics, health centers which providing primary healthcare for local community).

### **Study Tools:**

A questionnaire was constructed considering previous studies related to medical waste used to collect the study data. The questionnaire included, Personal data of participants who agreed to participate in our study, this included information such as educational age, gender, work experience, than data on the knowledge of the participants about medical waste, as well as the extent of the impact of medical wastes on their health status, and the impact on the recipient of health service, and the environment surrounding the health facility. Data on the behavior of health workers towards the dealing with medical waste in the health facility, as will data about the practice of health personnel in their work with respect to medical waste.

### **Data Analysis:**

The collected data has been sorted and validated, for all the information contained in data collected, and then analysis and tabulated using social statistical package SPSS version 19, in the form of descriptive tables.

## **Results**

The current study included 97 participants from health care provider, working in primary health institutions including (polyclinics health centers) in Benghazi city, during the period from first of October 2017 to February 2018. The results showed that more than 3/4 of participants their age between 25-45 years, with educational level of university and equivalent as 85.7%, the rest less than that. The participants from the medical professions, the working experience in health profession between 5-25 years as 56.8%. Tab. (2).

Regarding the knowledge of health facility workers about medical waste, it was found that 68.1% report that medical waste includes the waste of medical tools and equipment. More than one-third 36.3% of the participants state that there is no infection control committee in the medical facilities, and more than half express that there is no

guidance available for health care provider about dealing with medical waste. As well as the absence of any training programs about medical waste management and infection control at the health facility. Tab. (3).

Risks of medical waste in health facilities, workers believe it is result, mainly from cotton, gauze, paper and plastic tools used in medical practice as 77%, and the risks of medical wastes results in contamination and spread of diseases agents, as well as discomfort resulting in reduce the work efficiency. However, the risks to patients coming from medical help in one way or another, the risk of medical waste on the facility's environment is overwhelming is considered to cause pollution of the environment, disease and infection among workers. Tab. (4).

It is so important for the health facility to take precautions necessary by the health institutions as seen by the study participants, to deal with such waste, slightly more than half of the respondents, 59%, believe that the mixing of medical waste with the none medical waste is dangerous because it becomes all contaminated, and source of risks. The health facilities tasks permanently should take the proper way of dealing with medical waste, the participants of the study thought that there is need to provide a regular monitoring, providing special containers as well as protective equipment to deal with medical waste, the result showed less attention was given. Tab. (5).

However, what should be provided for dealing with medical wastes in health institutions, the majority of study participants believe that providing a specialized company to deal with the medical waste 90.2%, providing special guidelines to deal with medical wastes to reduce risks, 87.0% while the rest think providing special container it will help in protecting worker from the risks. The most important medical risks of medical waste, thought is the spread of infectious diseases,89.3% , while the responsible for monitoring medical waste, is infectious control and quality control department which should be in each institute, 64.7%. Tab. (6).

**Table (2) the general characteristics of the participants in the study**

<b>Characteristics</b>	<b>No.</b>	<b>%</b>
<b>Age n=96</b>		
• >25	<b>8</b>	<b>8.3</b>
• 35 - 25	<b>40</b>	<b>41.7</b>
• 45 - 36	<b>34</b>	<b>35.4</b>
• 46 <	<b>14</b>	<b>14.6</b>
<b>Sex n=96</b>		
• Male	<b>20</b>	<b>20.8</b>
• Female	<b>76</b>	<b>79.2</b>
<b>Education Level n=91</b>		
• Less than University level	<b>13</b>	<b>14.3</b>
• University and higher	<b>78</b>	<b>85.7</b>
<b>Nationality n=87</b>		

• <b>Libyan</b>	<b>85</b>	<b>97.7</b>
• <b>Non-Libyan</b>	<b>2</b>	<b>2.3</b>
<b>Occupation n=89</b>		
• <b>Administrator</b>	<b>13</b>	<b>14.6</b>
• <b>Medical professions</b>	<b>76</b>	<b>85.4</b>
<b>Years of Experience n=95</b>		
• <b>Less than 5 years</b>	<b>27</b>	<b>28.4</b>
• <b>15:05</b>	<b>29</b>	<b>30.5</b>
• <b>25 - 16</b>	<b>25</b>	<b>26.3</b>
• <b>More than 25</b>	<b>14</b>	<b>14.7</b>

**Table (3) Knowledge of the health workers in health centers regarding Medical waste**

<b>knowledge of Employees</b>	<b>No.</b>	<b>%</b>
<b>Medical waste according to your opinion? n=72</b>		
• Injection, cotton and gauze	<b>23</b>	<b>31.9</b>
• What produced by medical instruments and equipment	<b>49</b>	<b>68.1</b>
<b>Infection Control Committee office in the facility? n=91</b>		
• Yes	<b>58</b>	<b>63.7</b>
• No	<b>33</b>	<b>36.3</b>
<b>Guide for dealing with medical waste? n=89</b>		
• Yes	<b>41</b>	<b>46.1</b>
• No	<b>48</b>	<b>53.9</b>
<b>Have you ever received training on medical waste and infection control? n=93</b>		
• Yes	<b>39</b>	<b>41.9</b>
• No	<b>54</b>	<b>58.1</b>

**Table (4) Some of the risks that workers in the healthcare facility believe may result from medical waste**

<b>Risks</b>	<b>No.</b>	<b>%</b>
<b>Do you think cotton, gauze, paper and plastic are medical waste n=87</b>		
• Yes	<b>67</b>	<b>77</b>
• No	<b>20</b>	<b>23</b>
<b>Risks of medical waste in health facility environment? n=81</b>		
• Contamination, spread disease and infection	<b>73</b>	<b>94.8</b>
• Discomfort and difficulty of performing the work well	<b>4</b>	<b>5.1</b>
<b>Risks of medical waste on patients in health facility? n=77</b>		
• A source of infection, when the place is contaminated	<b>72</b>	<b>93.5</b>
• Chronic diseases	<b>4</b>	<b>5.1</b>
• No risk.	<b>1</b>	<b>1.3</b>
<b>What are the risks of medical waste on health facility workers? n=74</b>		
• Transmission of diseases	<b>72</b>	<b>97.3</b>
• Not wearing protective cloth and equipment	<b>2</b>	<b>2.7</b>

**Table (5) Available facilities to deal with medical waste in healthcare centers**

<b>Facilities</b>	<b>No.</b>	<b>%</b>
<b>Mixing medical waste with regular waste considers all medical waste n=83</b>		
• Yes	49	59
• No	34	41
<b>What are the reasons for saying (Yes) n=63</b>		
• Becomes contaminated with mixing them up	55	87.3
• There is no similarity between waste residues	8	12.7
<b>Is there any monitoring of the medical waste disposal? n=66</b>		
• Yes	31	47
• No	35	53
<b>Use special containers to collect and transport medical waste in the facility? n=89</b>		
• Yes	54	60.7
• No	35	39.3
<b>Use personal protective equipment to transfer medical waste? n=80</b>		
• Yes	45	56.3
• No	35	43.7

**Table (6) Procedures and precautions to deal with medical waste in healthcare facility**

	<b>No.</b>	<b>%</b>
<b>Procedures and measures should reduce the risk of medical waste n=61</b>		
• Providing a specialized cleaning company and monitor workers during dealing with waste.	55	90.2
• Raising awareness, and training on handling medical waste	6	9.8
<b>Precautions to be taken to protect facility staff from medical waste risks n=77</b>		
• Follow instructions and rules, use special tools and conduct periodic checkup	67	87
• Put all useless medical devices separately to get rid of them	10	13
<b>What are the best ways to reduce or minimize the risk of medical waste? n=69</b>		
• A committee form to control infection in the facility	3	4.3
• A specialized company to collect, transport and disinfect waste	10	14.5
• Using protective clothing and equipment	32	46.4
• Training courses program on medical waste	24	34.8
<b>What are the most important medical risks result from medical waste? n=75</b>		
• Spread and transmission of diseases	67	89.3
• Non sterilization of medical equipment and devices	8	10.7
<b>What are the right ways to get rid of medical waste? n=63</b>		
• Collect and place them in places to get rid of them properly	42	66.7
• Burning medical waste properly (Using incinerators)	21	33.3
<b>Who's responsible for monitoring and the collection of medical waste n=51</b>		



• Infection control and quality management department	<b>33</b>	<b>64.7</b>
• Special hygiene and cleaning company	<b>8</b>	<b>15.7</b>
• Community Health Environment dept. And Environmental Protection Agency	<b>3</b>	<b>5.9</b>

## Discussion

One of the most important strengths of this study was the assessment of medical waste management that was an opportunity to provide information on the subject that is lacking in our country. Egyptian study dealing with the same objective, also an Indian study that includes the same qualities as knowledge of medical waste, research found that the knowledge and existence of rules for the management of biomedical waste is better among physicians, nurses and other medical care workers.

The present study showed that more than half of health workers their knowledge about medical waste, include all what produced by medical instruments, the workers have no guideline about the management of medical waste. There is no programs for workers to be exposed to training programs on medical waste management and infection control program.

Regarding the knowledge of workers about risks of medical waste in our studied health facilities, results showed that workers agree that there is a risk of medical waste when mixed with household waste, which causes pollution for the surrounding environment and play part of spread of infectious diseases.

Health care workers understudy agree that safe disposal is critical to preventing transmission of related risks, wearing personal protective equipment (PPE) with a guideline at the health facility reduces the risk of related infection, as stated by WHO and many other authors.

In terms of facilities available for dealing with medical waste at the primary health care institutions, it was absent while it is believed to help in reducing the risk of medical waste providing following the instructions for managing the disposal of medical waste. However, the establishment of infection control committee within health facilities, to emphasize the need to use healthy methods in dealing with medical waste, and monitoring is so important.

## Recommendations

Medical waste management in Primary health care facilities considered as new functions for these facilities may be additional tasks for the infection control division or as support services, so from the present study, we may recommend:- <sup>(5)</sup>

- Ensure the availability of materials for collecting, transporting and treatment units of medical waste continuously.
- Reporting incident related to handling of medical waste, and submitting to authority.
- Keeping records of full information on the risks and appropriate practices of health care institution related to medical waste.
- Ensure that written emergency procedures are available and very clear to all health care workers in an institution, all times so individuals are fully aware of the actions to be taken in an emergency situation.
- Conducting broader research studies to identify problems, precautions and improvements, and adequate human resources needed for the program to be more effective.

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