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Knowledge, Attitudes and Practices of Medical Waste Management among Healthcare Staff in Dental Clinics of Sana'a City, Yemen

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Abstract

Background: Sufficient knowledge, attitudes and practices toward medical waste management lead to minimizing risks of diseases transmitted from the wastes of hospitals and dental clinics to the community. **Objective:** The aim of this study was to assess knowledge, attitudes, and practices of medical waste management among healthcare staff in dental clinics of Sana'a city, Yemen. **Methods:** A descriptive cross-sectional study was conducted among 194 healthcare staff of dental clinics in Sana'a city, Yemen, in the duration of May to July 2018. The random sample method was used to select dental clinics and health care personnel in the selected clinics. IBM SPSS program version 21 was used for data analysis. **Results:** The overall adequate knowledge, positive attitudes, and practices of participants were (77.3%, 78.9% and 52%) respectively. Only 29.9% of them knew of the medical waste management legislation while 97.9% were knowledgeable about the role of medical waste in disease transmission. The majority of participants (96.4%) believed that safe management of health care waste is an issue at all while, only 24.2% were using the color-coding system for disposing of medical waste. **Conclusions:** The authors concluded that the levels of adequate knowledge and positive attitudes of healthcare staff of dental clinics in Sana'a city were good while the level of practice was low.

Keywords: Attitudes, Dental Clinics, Knowledge, Medical Waste Management, Practices, Yemen

1. Introduction

Healthcare waste refers to any or all the waste generated by health care institutions[1]. Health care establishments such as hospitals, clinics, and medical centers generate a sizable amount of waste[2]. Healthcare solid waste classified into two main categories: general (non-hazardous), and hazardous waste[3]. Only 10–25% of healthcare waste is hazardous, of which 5–10% is an infectious waste in nature, with the potential for creating a variety of health problems[4].

The World Health Organization (WHO) describes healthcare waste as discarded, untreated materials generated from healthcare activities, which have the potential for transmitting infectious agents to humans[5]. Medical waste is represented as any waste that is generated throughout diagnosis, treatment or immunization of humans or animals, and research activities relating to biology[6–8]. Waste that producing from dental healthcare service units was classified into hazardous waste, non-hazardous waste, biohazards waste, sharps, and pharmaceutical wastes[7,8].

In dental clinics, wastes that are contaminated with blood and saliva during diagnosis and treatment are potential sources of infection[9]. Also, wastes that are contaminated with chemicals such as mercury, impression materials, acrylic, and materials used for restorative, and liquid wastes such as X-ray (developer and fixer)

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wastes generated within the dental facilities, may cause an impact on the environment and human health if not handled properly[10].

According to the WHO reports, improper management and disposal of medical waste continue to pose a significant threat to the rights of an adequate standard of living[4], also, create threatening to medical staff, waste handlers, patients, and the environment[11]. The absence of correct waste management, lack of awareness regarding the health hazards from these harmful wastes, inadequate financial and human resources and poor waste disposal systems are the most important issues connected with health care waste[12]. In Yemen, due to the lack of legislative oversight in addition to the health sector's neglect of healthcare waste management, waste is still poorly managed[11].

Sufficient knowledge, attitudes, and practices toward medical waste lead minimizing the risk of transmission of the disease from the hospital and dental clinics to the community[8,12]. The present study conducted to assess knowledge, attitudes, and practices about medical waste management among healthcare workers in dental clinics of Sana'a city, Yemen.

2. Methods

A descriptive cross-sectional study was conducted among 194 healthcare staff of dental clinics in Sana'a city, Yemen, in the duration of May to July 2018. A list of all dental clinics in Sana'a city was got from the Ministry of Public Health and Population. The random sample method was used to select dental clinics and health care personnel in the selected clinics.

A semi-structured questionnaire was used for data collection. The questionnaire comprised four sections. The first section used to collect demographic data of the participants (age, gender, education level, experiences' years, occupation, clinic type). The second section used to assess the knowledge of healthcare staff about medical waste management (8 items). The third section used to assess the attitudes of healthcare staff about medical waste management (8 items). The fourth section used to assess

Table 1. Knowledge of the study participants regarding biomedical waste (n=194)

Knowledge regarding biomedical waste	Options							
	Yes		No		Do not know		Total	
	n	%	n	%	n	%	n	%
Do you have an idea of the medical waste management legislation?	58	29.9	106	54.6	30	15.5	194	100.0
Do you think that medical waste has a role in disease transmission?	190	97.9	3	1.6	1	0.5	194	100.0
Do you think it is important to know how to deal with medical waste, its risks, and legislation?	184	94.8	6	3.1	4	2.1	194	100.0
Do you think that medical waste should be segregated in the source of its emission?	155	79.9	20	10.3	19	9.8	194	100.0
Do you think that sterilization of medical waste should be done before disposal?	97	50.0	47	24.2	50	25.8	194	100.0
Do you think that medical waste should be transported by special transport vehicles?	150	77.3	23	11.9	21	10.8	194	100.0
Storage of waste within clinics should not exceed 24 hours.	172	88.7	10	5.1	12	6.2	194	100.0
Wastes that may be toxic, flammable, or contain contaminated objects are hazardous medical waste.	190	97.9	1	0.5	3	1.6	194	100.0
Average overall knowledge	**150**	**77.3**	**27**	**13.9**	**17**	**8.8**	**194**	**100.0**

Table 2. Attitudes of the study participants regarding biomedical waste (n=194)

Attitudes regarding biomedical waste	Options							
	Agree		Disagree		Do not know		Total	
	n	%	n	%	n	%	n	%
Safe management of health care waste is an issue at all.	187	96.4	3	1.6	4	2.1	194	100.0
Proper segregation and disposal of health care waste part of your responsibility.	165	85.1	14	7.2	15	7.7	194	100.0
Safe management efforts by the clinic decrease the financial burden on management.	102	52.6	54	27.8	38	19.6	194	100.0
Safe management of health care waste is not an extra burden on work.	135	69.6	42	21.6	17	8.8	194	100.0
Clinic management should organize separate classes or a continuing education program to upgrade existing knowledge about health care waste management.	185	95.4	3	1.5	6	3.1	194	100.0
An effluent from clinic activities must be sterilized and treated before discharge to the sewerage system.	94	48.5	37	19.0	63	32.5	194	100.0
Labeling the container before filling it with waste is an important step.	184	94.8	4	2.1	6	3.1	194	100.0
Will you like to attend voluntarily programs that enhance and upgrade your knowledge about waste management?	171	88.1	16	8.3	7	3.6	194	100.0
Average overall attitudes	**153**	**78.9**	**22**	**11.3**	**19**	**9.8**	**194**	**100.0**

the practices of healthcare staff about medical waste management (10 items).

The participants were informed of the study aim, and verbal consent was got before data collection. A pilot study was conducted to test the validity and reliability of the questionnaire. Feedback got from the pilot study was taken into consideration, and the participants in the pilot study were excluded. SPSS program version 21 (SPSS Inc., Chicago, USA) was used for data analysis. Descriptive statistics (frequency, percentage) was applied to interpret the results.

3. Results

Of 194 (100%) study participants, 58 (29.9%) were males and 136 (70.1%) were females, and most of the participants 151 (77.8%) were in the age group (<30 years) while only 36 (18.6%) were in the age group (30-40 years). Over three-fourths 149 (76.8%) had a bachelor's degree, and only 44 (22.7%) had completed a diploma degree. 102 (52.6%) of participants had less than 3 years' experience; 47 (24.2%) had 3-6 years and 45 (23.2%) had over 6 years' experience. More than half of the participants 102 (52.6%) were from private clinics and 92 (47.4%) were from government clinics.

Table 1 showed that the overall adequate knowledge of the participants was 77.3%. Only 29.9% of them knew of the medical waste management legislation while 97.9% had correct knowledge about the role of medical waste in disease transmission. The majority of the participants (94.8%) knew of the importance of knowledge for correcting the wrong dealing with medical waste and its risks while 79.9% knew that segregation of bio-medical waste has to be done at the source of its emission. Only 50% of the participants had appropriate knowledge about the importance of waste sterilization before disposal off, while 77.3% had appropriate knowledge about using special transport vehicles for medical waste

Table 3. Practices of the study participants regarding biomedical waste (n=194)

Practices regarding biomedical waste	Options							
	Yes		No		Do not know		Total	
	n	%	n	%	n	%	n	%
Disposal of biomedical waste done according to color-coding.	47	24.2	140	72.2	7	3.6	194	100.0
Proper disinfection of biomedical waste is carried out before final disposal.	24	12.4	143	73.7	27	13.9	194	100.0
Use of personal protective when dealing with medical waste.	185	95.4	6	3.1	3	1.5	194	100.0
Sharps are disposed of in puncture-proof containers.	151	77.8	39	20.1	4	2.1	194	100.0
Is the current practices of disposal of medical waste in the clinic correct and safe?	86	44.3	65	33.5	43	22.2	194	100.0
Have you used a vaccine against Hepatitis B?	135	69.6	55	28.3	4	2.1	194	100.0
Have you used a vaccine against tetanus?	61	31.4	111	57.3	22	11.3	194	100.0
History of needle-stick injury in the past.	139	71.7	54	27.8	1	0.5	194	100.0
Reporting of those needle-stick injuries to seniors.	15	10.8	122	87.8	2	1.4	139	100.0
Adequate treatment of those needle stick injuries.	122	87.8	7	5.0	10	7.2	139	100.0
Average overall practices	---	**52.0**	---	**41.0**	---	**7.0**	---	**100.0**

transportation. 88.7% had adequate knowledge about the storage period of waste within clinics.

Table 2 showed that the overall positive attitude of the participants was 78.9%. The majority of participants (96.4%) were believed that safe management of health care waste is an issue at all, and 85.1% believed that the proper segregation and disposal of medical waste is part of their responsibility. While 52.6% of participants were believed that the safe management efforts by the clinic decrease the financial burden on management and 69.6% believed that the safe management of health care waste is not an extra burden on the work. The majority of participants 95.4% were believed that their clinics' management should organize continuing education programs to upgrade existing knowledge about health care waste management, and only 48.5% believed that effluent from clinic activities must be sterilized and treated before discharge to the sewerage system. While 94.8% were believed that labeling the container before filling it with waste is an important step, and 88.1% agreed to attend voluntarily programs that enhance and upgrade their knowledge about waste management.

Table 3 showed that the overall appropriate practice of the participants was 52%. Only 24.2% of them were using a color-coding system for disposing of medical waste and 12.4% were using proper disinfection of medical waste before final disposal, while 95.4% used personal protective equipment during dealing with medical waste. Over two-thirds of participants (77.8%) were disposing of sharps in puncture-proof containers, while only 44.3% had correct and safe practices of medical waste disposal in their clinics. Only 69.6% of participants were vaccinated against Hepatitis B, and 31.4% were vaccinated against tetanus. The majority of participants 71.7% had a history of needle-stick injury, only 10.8% of them were reported the needle-stick injuries and 87.8% were treated adequately.

4. Discussion

Every health worker is expected to have proper knowledge, attitudes, and practices about medical waste management to decrease its risk of health and environment[13,15,16]. Hence, the present study conducted to assess knowledge,

attitudes, and practices of medical waste management among healthcare staff in dental clinics.

In the present study, only 29.9% of the participants knew of medical waste management legislation. This might attribute to a lack of clear legislation related to the management of medical waste in Yemen. This result was contrasted with previous studies. A study conducted in India showed that 88.4% knew of the medical waste management legislation[20]. Another study conducted in Allahabad city, India showed that 89% knew of the medical waste management rules[17].

The present study showed that 50% of the respondents knew that sterilization of medical waste should be done before disposal. This may be because of a lack of clear legislation that forcing them to sterilize medical waste before disposal. This result was in contrast with previous studies. A study conducted in India showed that 72.9% knew that sterilization of medical waste should be done before disposal[14]. Another study conducted in Allahabad city, India showed that 81.9% knew that sterilization of medical waste should be done before disposal[17].

In this study, 96.4% of participants believed that the safe management of medical waste is an issue at all. This result was agreed with previous studies. A study conducted in Sudan showed that 82.4% believed that safe management of health care waste is an issue at all[8]. A study conducted in India showed that 80% believed that the safe management of health care waste is an issue at all[18]. However, was in contrast with a previous study conducted in Peshawar, Pakistan showed that 51% believed that safe management of health care waste is an issue at all[7].

In this study, 69.6% of participants believed that the safe management efforts by the clinic decrease the financial burden on management. This may be attributed to a lack of enough knowledge about the benefits of safe management of medical waste in decreasing its risks. This result was in contrast with previous studies. A study conducted in Peshawar, Pakistan showed that 40% believed that the safe management efforts by the hospital decrease the financial burden on management[7]. A study conducted in India showed that 54.3% believed that the safe management efforts by the hospital decrease the financial burden on management[20].

The present study showed that 69.6% of participants believed that the safe management of health care waste is not an extra burden on the work. This result was in contrast with previous studies. A study conducted in Peshawar, Pakistan showed that 60% believed that the safe management of healthcare waste is not an extra burden on the work[7]. A study conducted in India showed that 54.3% believed that the safe management of healthcare waste is not an extra burden on the work[20].

In the present study, 24.2% of the participants were disposing of medical waste according to the color-coding system. This might because of the unavailability of color-coded bins for the waste collection in most of the studied clinics. This result was in contrast with previous studies. A study conducted in India showed that 88.1% were followed by color-coding for medical waste[20]. Another study conducted in Allahabad city, India showed that 76.3% were using color-coding of wastes[17].

In this study, 12.4% of participants were using proper disinfection of medical waste before final disposal. This may be attributed to the unavailability of medical waste sterilization devices in dental clinics' addition to lacking clear legislation that forcing them to sterilize medical waste before disposal. This result was like a previous study result conducted in Peshawar, Pakistan showed that 19% used proper disinfection of medical waste before final disposal[7].

This study showed that over two-thirds (77.8%) of participants were disposing of sharps in puncture-proof containers. This may be attributed to that most of the participants had enough knowledge and positive attitudes about the prevention system of sharps wastes risks. This result was agreed with a previous study conducted in Allahabad city, India showed that 68.7% were disposing of sharps in puncture-proof containers[17]. However, was in contrast with a previous study conducted in India showed that 56% were disposing of sharps in puncture-proof containers[18].

In the present study, 44.3% of participants had correct and safe practices of medical waste disposal in their clinics, 71.7% had a history of needle-stick injury, 10.8% of them were reported the needle-stick injuries, and 87.8% were adequately treated. This might be attributed to a lack of information and policies related to the safe management of medical waste. Display of Information about the risks linked to medical waste on posters in healthcare clinics and at strategic points (such as near waste bins), also, polices that giving instructions in the safe handling of medical waste will contribute to implementing proper practices of medical waste management.

In this study, 69.6% of participants were vaccinated against Hepatitis B, and only 31.4% were vaccinated against tetanus. The low vaccination coverage of hepatitis B and tetanus vaccine might be attributed to a lack of

awareness about the high effectiveness of these vaccines to preventing the disease, also, might be attributed to a lack of occupational safety rules relating to the protection for healthcare staff from the risks of blood diseases in dental clinics. This result agreed with a previous study conducted in Yemen showed that 71.7% of dental students were vaccinated against Hepatitis B[19].

5. Conclusion

We concluded that the level of adequate knowledge and positive attitudes of healthcare staff of dental clinics in Sana'a city were good, while the level of practice was low. These findings highlight the necessity of continued medical waste management programs for dental healthcare workers to improve their knowledge, attitudes, and practices regarding medical waste management in addition to the necessity of issuance of legislation and policies of safe management of medical waste with obliging dental clinics to implement it.

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