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RESEARCH ARTICLE - MEDICAL TECHNIQUES

Knowledge and Practices of HealthCare Workers Regarding of Medical Waste Management in Hospitals of Al Najaf Governorate

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Article Info.	Abstract
	Medical waste (MW) is a serious problem in many developing countries. Iraq being one of them it faces challenges in waste management due to the environmental and human health risks. This study aims to assess the knowledge and practices of healthcare workers on medical waste management and determine the relationship between socio-demographic characteristics of healthcare workers with knowledge and practices. A descriptive; cross sectional study conducted at Al-Najaf governorate hospitals. It includes 443 participants collected during the period of 2nd January until 31th March 2022 using a structured questionnaire which depends on the National Guide to Infection Control in the Iraqi Health Institution and the previous studies. 443 participants with the mean ± SD of their ages was 29.18 ±7.68 years, female was represented (58.9%). The highest percentage of the studied samples were paramedical staff (70%), had Baccalaureate certification (44%), period of experience (1-5) years (62.98%). The majority of them (69.1%) did not undergo any training program. In general, knowledge about MWM is fair (69.9%), good (25.1%) and (4.9%) poor, while about practices, (38.6%) had poor practices, (38.6%) fair, (25.1) good. This study concluded that healthcare workers in Al-Najaf hospitals had fair knowledge and practices about Medical Waste Management.

Keywords: Medical waste; Knowledge; Practices; Healthcare worker; Al-Najaf governorate.

1. Introduction

Hospitals are health institutions which provide heath treatment, protect people's health, and save their lives. Simultaneously, they produce waste and by-products. The management of this waste is a complicated process and in order to be influential, it should be understood and directed by all healthcare workers starting from the cleaners to the senior administrators [1]. Hospitals emit massive amounts of various types of liquid, solid, and gaseous waste [2]. Globally, each country generate medical waste at a rate ranging from 0.5 to 3.0 Kg/bed/day [3] and approximately 85% of this waste is non-hazardous or general waste while the rest (15%) is hazardous waste [4]. Medical Waste Management (MWM) is one of elements that reflects the ability of hospitals to provide a good standard of heath care. Hospitals, especially in developing countries, usually face difficulties in monitoring (MWM) [5], including Iraq where the process of management is not safe and medical waste is not classified into hazardous or general waste , which makes the actual volume of hazardous waste higher, thus possesses a threat to the environment and public health [6]. MWM is refers to separation, transportation, storage, treatment, and disposal of hazardous and non-hazardous waste that are generated as a result health care providing process [7]. The responsibility of MWM is shared between various sectors starting from the health institution down to the municipality services and the major role of the environment ministry that participates in monitoring different phases of waste disposal [8].

Since 2020 so far, the already unsustainable increase in the generation of medical waste was suddenly exacerbated by the COVID-19-pandemic [9] and rapid utilization of masks, gloves, protective clothing, and large amounts of other medical supplies has generated large amounts of hazardous medical waste which can lead to a number of environmental hazards, mainly pollution of the atmosphere, waters, and soil [10]. Healthcare workers have an important role in managing medical waste and one of the major key factors for proper (MWM) is the knowledge, attitudes, and practices (KAP) of the healthcare workers in hospitals regarding (MWM). Furthermore, research on this critical issue has been very limited, and there is a grave need for information on this matter for planning in the future and providing data are needed to obtain a reliable picture of this situation [11].

1.1. Aims

This study aimed to assess the knowledge and practices of healthcare workers on medical waste management (MWM) and determine the relationship between socio-demographic characteristics of healthcare worker with their knowledge and practices.

Nomenclature			
MWM	Medical waste management	WHO	World health organization
MW	Medical waste	SPSS-25	Statistical Packages for Social Sciences- version 25

2. Methodology

A descriptive; cross sectional study continued for the period from 2nd January to 31th March 2022 and conducted at government hospitals of Al-Najaf governorate (Al-Sadder Medical City, Al-Zahraa Teaching Hospital, Al-Hakeem General Hospital, Al-Furat Al-Awsatt Teaching Hospital, Al-Manathera General Hospital, Imam Sajjad General Hospital, Al-Haydaria General Hospital, Al-Mushkhab General Hospital and Al-Qadisiyah General Hospital). Al-Najaf located to the southwest of Baghdad, capital of Iraq, by about 160km. It surrounding by Babylon, Karbala, Al-Anbar, Al-Qadisiyah and Al-Muthanna governorates and has international borders with Saudi Arabia [12].

2.1. Ethical considerations

One of the most important measures taken before collecting the information from the sample. Firstly, ethical approval and all administrative agreements were obtained from the College of Health and Medical Technology/ Baghdad/ Community Health Department and the research committee at Middle Technical University. This is one of most basic principles before gathering the data, to protect the participant values and dignity. Secondly, followed by a formal agreement from AL-Najaf Health Directorate/ Human Development Training Center that in turn provided official permissions directed to all hospitals of the study. Finally, the researcher obtained orally agreement from participants to participate voluntarily in the study.

2.2 Study population and sample size

The study population consist of all healthcare workers who works in hospitals of Al-Najaf governorate which were 9447 persons according to (the Al-Najaf health directorate/ Statistics Department, 2022). The sample size was 443 participants estimated using Steven K. Thompson sample size calculator shown (1) and addition 20% for the loss or refusal to participate by some respondents:

$$n = \frac{N \times P(1-P)}{\left[(N-1)\left(\frac{d^2}{z^2}\right)\right] + P(1-P)} \qquad (1)$$

Where: n= sample size
      N= Population size
      z= Confidence level at 95% (1.96)
      d= Error proportion (0.05)
      P= Probability (0.5)

2.3. Sampling Technique

The sampling technique was conducted in two stages, at first stage, a proportional random sampling technique (Stratified random sampling technique) was done to select a number of participants from each of the 9 hospitals based on the number of health care workers in each hospital. This was based on the numbers of health care workers obtained from Al-Najaf Health Directorate where healthcare workers were grouped into 9 strata at second stage (on level each hospital), a Stratified random sampling was a again employed to select the participants to ensure adequate representation from all categories of healthcare workers. The healthcare workers were grouped into three strata (medical staff, paramedical staff and housekeeping staff), then participants were selected randomly by simple random sampling from each strata.

2.4. Instrument of the study

The researchers develops a structured questionnaire depends on the National Guide to Infection Control in the Iraqi Health Institution and the previous studies [13]. The questionnaire was consisting from 3 parts, the first part about demographic data. The second part about the knowledge, which contain 5 domains including the four stages of medical waste management in addition to the general information on MWM. The third part about the practices.

2.5. Scoring of knowledge and practices

Using 3 points Likert's scale. About Knowledge score, this forma of 26 questions each question had three responses (yes, no and don't know). The score was 3 point for accurate answer, 2 point for don't know answer and 1 point for incorrect answer. Then evaluation of Knowledge categorized into: poor <52, fair 52-64, good =>65.The same for practices score, this forma of 16 questions each question had three responses (always, some of time and never). The score was 3 points for accurate answer, 2 points for some of time answer and 1 point for incorrect answer. Then evaluation of practices categorized into: poor <32, fair 32-39, good =>40.

3. Statistical data analysis

Analysis of data carried out using the available statistical package of SPSS-25 (Statistical Packages for Social Sciences- version 25). Statistical significance considered whenever the P value was equal or less than 0.05.

4. Results

4.1 Demographic characteristics

The study conducted on 443 participants with the mean ± SD of their ages was 29.18 ±7.68 years ranging from 20 to 59 years. The age group 20-29 years had the highest percentage (69.1%), female was represented (58.9%) compared to (41.1%) male. The highest percentage had Baccalaureate certification (44%) and period of experience (1-5) years (62.98%). The majority of the participants were paramedical staff (70%) while medical staff (21%) and housekeeping staff (9%). About workplace, the highest percentage was (27.8%) working at wards. Regarding training on MWM, (69.1%) of them did not undergo any training program, Table 1.

Table 1 Demographic characteristics of study sample

Demographic characteristics		No.	%
Age (years)	20-29	306	69.1
	30-39	79	17.8
	40-49	48	10.8
	≥50	10	2.3
	mean ± SD	29.18 ±7.68	
Gender	Male	182	41.1
	Female	261	58.9
Years of experience	1-5	279	62.98
	6-10	91	20.54
	11-15	22	4.97
	16-20	24	5.42
	>20	27	6.09
Educational level	Secondary or less	94	21.2
	Diploma	140	31.6
	Baccalaureate	195	44.0
	Master	11	2.5
	PHD	3	0.7
Profession	Medical staff	93	21
	Paramedical staff	310	70
	housekeeping staff	40	9
Hospital name	Al-Sadder Medical City	114	25.7
	Al-Zahraa Teaching Hospital	62	14
	Al-Hakeem General Hospital	72	16.3
	Al-Furat Al-Awsatt Teaching Hospital	57	12.9
	Al-Manathera General Hospital	52	11.7
	Imam Sajjad General Hospital	40	9
	Al-Haydaria General Hospital	22	5
	Al-Mushkab General Hospital	15	3.4
	Al-Qadisiyah General Hospital	9	2
Work place	Wards	123	27.8
	Laboratory	104	23.5
	Pharmacy	57	12.9
	Emergency	55	12.4
	Public health unit	21	4.7
	Consulting clinic	13	2.9
	Resuscitation unit	12	2.7
	Infection control unit	9	2
	*Other	49	11.1
Training	Trained	137	30.9
	Non trained	306	69.1

* Other: blood drawing unit, Intensive care unit I.C.U, vaccine unit, dialysis unit, blood bank, surgery room, operation room, isolation room and delivery room.

4.2. Knowledge of healthcare worker about MWM

In general, the overall assessment of participant's knowledge about MWM is fair (69.9%), good (25.1%), while (4.9%) had poor knowledge. The percentage of good knowledge among paramedical staff were 29.35%, higher than medical and housekeeping staff who have the same percentage approximately 15%. Participants 'responses according to their knowledge regarding MWM demonstrated in Table 2.

Table 2 Responses of participants according to their knowledge regarding MWM

Items	yes		No		Don't know		Evaluation
	No.	%	No.	%	No.	%	
General information on medical waste and MWM							
MW generated from hospital are consider all hazardous (100% hazardous)	281	63.4	114	25.7	48	10.8	Poor
cultures and stocks , human tissue, sharps, chemical solvents ,expire medicine are hazardous MW.	410	92.6	18	4.1	15	3.4	Good
Paper, carton boxes ,plastic water bottles, food cans, metal, glass and wood are hazardous MW.	112	25.3	302	68.2	29	6.5	Good
Process of Medical Waste Management include the following stages: Separation , collection and storage, transportation, treatment and disposal	375	84.7	13	2.9	55	12.4	Good
The hospital is consider major source of medical waste.	375	84.7	38	8.6	30	6.8	Good
Associated risks with inappropriate medical waste management can effects on Healthcare workers only and don't effects on the patients and the environment.	83	18.7	318	71.8	42	9.5	Good
Separation of medical waste							
The key to effective MWM is Separation of waste.	362	81.7	20	4.5	61	13.8	Good
MW should be separated after 24 hours.	168	37.9	138	31.2	137	30.9	Fair
The color coding for highly infectious waste is black.	74	16.7	225	50.8	144	32.5	Good
The color coding for other infectious waste and pathological waste is yellow.	210	47.4	105	23.7	128	28.9	Fair
The color coding for pharmaceutical waste is brown.	95	21.4	69	15.6	279	63.0	Fair
The color coding for chemical treatment waste is blue.	104	23.5	62	14.0	277	62.5	Fair
The color coding for general waste is red.	52	11.7	257	58.0	134	30.2	Good
Sharp MW should be mixed with other waste.	14	3.2	398	89.8	31	7.0	Good
Sharp MW must be put into a Puncture-proof box.	408	92.1	11	2.5	24	5.4	Good
The infectious medical waste is labeled with the following Bio-Hazard Symbol:	267	60.3	31	7.0	145	32.7	Good
Transportation of medical waste							
MW container should be filled completely.	166	37.5	223	50.3	54	12.2	Fair
MW should be collected weekly and transported to the storage site.	127	28.7	174	39.3	142	32.1	Fair
MW should be transported within the hospital by wheeled trolleys	241	54.4	60	13.5	142	32.1	Good
Storage of medical waste							
A storage site should be located within the hospital boundary.	105	23.7	87	19.6	250	56.4	Fair
Maximum time limit for which MW can be stored at winter is 72 hours.	107	24.2	118	26.6	218	49.2	Fair
Maximum time limit for which MW can be stored at summer is 48 hours.	107	24.2	127	28.7	209	47.2	Fair
Treatment and disposal of medical waste							
The most common techniques that use in hospitals for disposal of hazardous MW is incineration.	326	73.6	52	11.7	65	14.7	Good
The recommended method of dispose of non-hazardous (general) waste is chemical disinfection.	190	42.9	99	22.3	154	34.8	Fair
The recommended method of dispose of sharp waste (needle and syringe) is landfill.	223	50.3	111	25.1	109	24.6	Fair
the recommended method of dispose of infectious waste is Incineration or disinfection prior of disposal.	305	68.8	49	11.1	89	20.1	Good

4.3. practices of healthcare worker about MWM

The overall assessment of participant's practices about MWM, 38.6% which is the highest percentage of the studied sample had poor practice, 36.3% of them had fair practice and the lowest percentage 25.1% had good practices. In general, our results also showed that 30.3% of paramedical staff have good practices compared to 12.9% of medical staff and 12.5% of housekeeping staff by a slight difference.
Responses of participants according to their practices regarding (MWM) are demonstrated in the Table 3, in which 63.9% of them follow the guidelines laid down by the Iraqi ministry of health and environment for medical waste management and 69.5% of them (separate hazardous medical waste from general waste at the place of generation. Approximately more than half of the studied sample 54.6% separate hazardous medical waste into different categories, while only 36.6% of them follow the color of containers according to the type of waste while disposing of medical waste.

Relating the use of personal protective equipment PPE, 72.9% of the study sample used PPE when handling medical waste. The majority of participants 82.4% said they collect liquid waste; blood waste and human tissue remains in bags that prevent leakage and 86.5% of them put sharp medical waste into a safety box. Only 28.9% of them said they don't recap the needle after use and 42.3% don't Experience injury by the used needle/sharps during their work, while 66.4% informed the person in charge when injured by needle/sharps and only 8.6% of them filled accident form. About 37.7% of participants don't dispose of liquid waste into the sewage system directly, none of them 0% maintain a register for medical waste disposal in their ward, while the majority of them 88.5% wash their hands thoroughly after contact with medical waste and 56.0% of them take the necessary vaccinations for health care worker and post-exposure prophylaxis and 40.4% educate themselves on medical waste management continuously.

Table 3 Responses of participants according to their practices regarding (MWM)

Items	Always		Some of time		Never		Mean score	Evolution
	No.	%	No.	%	No.	%		
Follow the guidelines laid down by Iraqi ministry of health for medical waste management	238	63.9	104	21.2	23.5	12.6	2.51	Good
Separate hazardous medical waste from general (non-hazardous) waste at the place of generation.	308	69.5	83	18.7	52	11.7	2.58	Good
Separate hazardous medical waste into different categories	242	54.6	110	24.8	91	20.5	2.34	Good
Follow color of containers according to the type of wastes while for disposing medical waste.	162	36.6	131	29.6	150	33.9	2.03	Fair
Use personal protection tools when handling medical waste.	323	72.9	78	17.6	42	9.5	2.63	Good
Collect liquid waste, blood waste and human tissue remains in bags that prevent leakage.	365	82.4	48	10.8	30	6.8	2.76	Good
Put sharp medical waste into a safety boxes	383	86.5	35	7.9	25	5.6	2.81	Good
Recap needle after use.	274	61.9	41	9.3	128	28.9	1.67	Fair
Experienced injury by used needle/sharps during your work.	97	21.9	157	35.4	189	42.3	2.21	Fair
When injured by needle/sharps, informed person in charge.	294	66.4	71	16.0	78	17.6	2.49	Good
When injured by needle/sharps, filled accident form.	38	8.6	9	2.0	396	89.4	1.19	Poor
Dispose of liquid waste into the sewage system directly.	202	45.6	74	16.7	167	37.7	1.92	Fair
Maintain a register for medical waste disposal in your ward.	0.0	0.0	0.0	0.0	443	100	1	Poor
Wash your hands thoroughly after contact with medical waste	392	88.5	25	5.6	26	5.9	2.83	Fair
Take the necessary vaccinations for health care worker, such as seasonal influenza, HBV and post exposure prophylaxis.	248	56.0	95	21.4	100	22.6	2.33	Fair
Educate yourself on medical waste management continuously	179	40.4	70	15.8	194	43.8	1.79	Fair

Good *(mean of score 2.34 - 3),* Fair *(mean of score 1.67-2.33),* Poor *(mean of score 1-1.66)*

4.4. Association between participant's Knowledge about MWM and their demographic data

Statistically, our study results showed the association between knowledge of participants with their socio-demographic characteristics. It had been found that a significant associated with years of experience (0.041) and highly significant associated with (profession, workplace and training) (0.001, 0.004 and 0.001) respectively, while the remaining variables have no significant association with their socio-demographic characteristics. Knowledge score among healthcare workers about MWM shown in Fig. 1.

4.5. Association between participant's practices about MWM and their demographic data

Statistically, the current study showed the association between practices of participants with their socio-demographic characteristics. It had been found that a significant associated with (gender and years of experience) (0.029 and 0.026) respectively, and highly significant associated with (Profession, workplace and training) (0.001), while the remaining variables (age and educational level) have no significant association. Practices score among healthcare workers regarding MWM shown in Fig. 2.
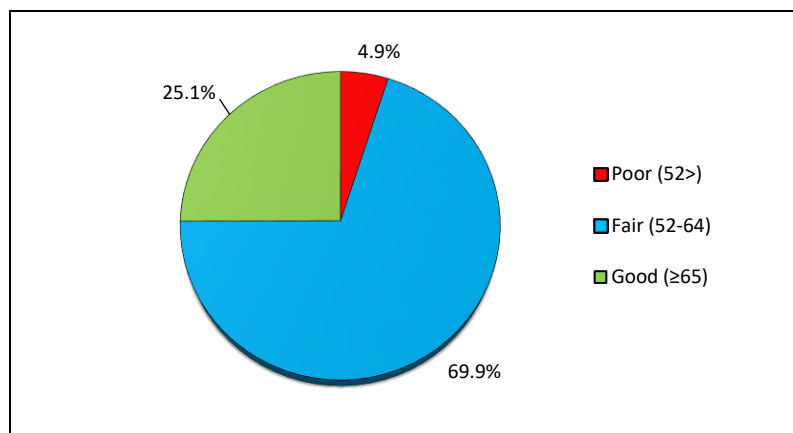

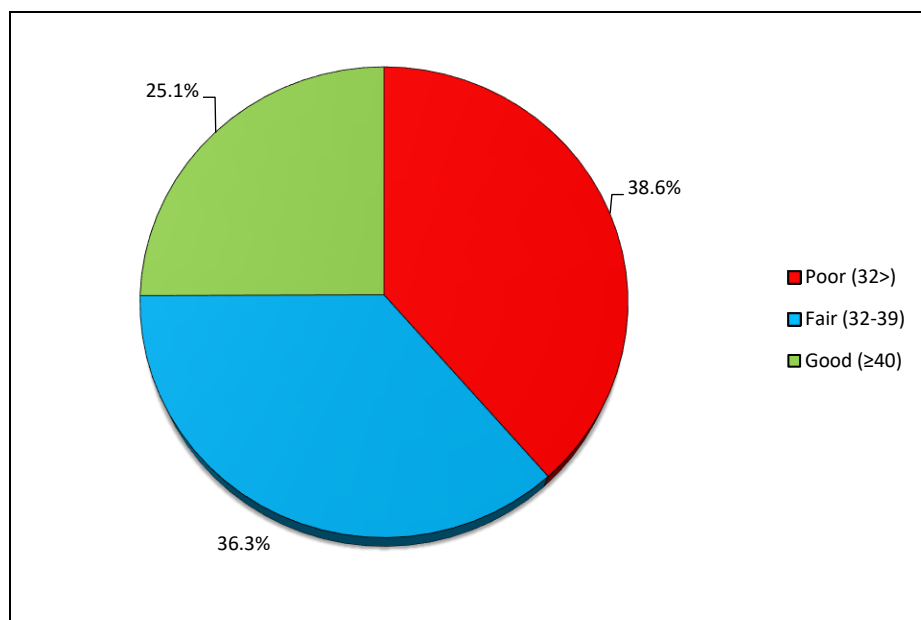Fig 1. knowledge score of MWM among healthcare workers

Fig 2. practices score of MWM among healthcare workers

5. Discussion

5.1. Knowledge of MWM among Healthcare workers

This study showed only 25.1% of the study sample had good knowledge about (MWM) while (69.9%) had fair knowledge, this may be because the majority of studied sample were new staff who had experience less than 5 years and were not trained about the stages of MWM. This result is similar with [14] in India. In general, paramedical staff demonstrated have better knowledge 29.35% compared with medical and housekeeping staff who have the same percentage (15%). This result agree with a study done in Basra/ Iraq by [15], but disagree with [16] in Pakistan, [17] and [18] in Egypt in which medical staff were highest good knowledge than others. These results might be the highest percentage of trained healthcare workers about MWM in our study were from paramedical staff. However, all healthcare workers have regular contact with MW and must be knowledgeable about MWM.

The study showed few of participants 25.7% which agree with [19] in Iraq, [20] in Ethiopia, and in India by [21] that had information about the percentage of hazardous medical waste to general waste, this may be due to the absence of the national guideline in the hospitals that contain this important information. About 84.7% of the studied sample was knowledgeable about the four stages of MWM process as well as the major source of medical waste. These results agree with [22] in India, and it considers a logical result because they in direct contact with medical waste and every day they see large amounts of medical waste generated by their hospitals. The present study shows that 81.7% of the studied sample have good knowledge that separation of medical waste is a golden step in MWM, but they lacking knowledge about the time of medical waste separation where only 31.2% of them have idea about the separation of medical waste must be happened immediately not after 24 hours, this may be that the majority of them were not trained about MWM especially the separation, in addition to unavailability of educational posters that explain this importance easy step. These results agree with [23] in India that 78.8 of study population considered the separation of waste as the effective key in management of medical waste but disagree with [24] in Thailand in which 94.8% of participant said the separation of medical waste must be happened immediately.

Depending on color coding of medical waste, approximately half of participants correctly determine the color coding for highly infectious waste, other infectious waste and general waste, while low percentages 21.4% and 23.5% of them knew the color coding for pharmaceutical waste and chemical treatment waste respectively. These results disagree with [25] in Saudi Arabia and [26] in India, this difference in results may be due to the color coding system in all Al-Najaf hospitals isn't implemented correctly according to Iraqi Health Ministry Guide. Regarding to dealing with sharp medical waste and safe method of its separation, the current study shows that 89.8% and 92.1% which corresponded with [24] in Thailand where participant have good knowledge about importance of separation of sharp waste from other waste and put them in hard container respectively, due to the availability of safety boxes for the disposal of sharps medical waste. That 60.3% of the studied sample agree with [27] in India where they can identify Bio-Hazard Symbol depending on present many posters, billboards, and sometimes waste containers, which make this symbol familiar to the healthcare workers.

Because of insufficient waste containers in hospitals of the present study or inconsistency with the amount of generated waste, half of studied sample 50.3% that disagree with [24] in Thailand that found 82% have good knowledge about filling of waste container to no more than 3/4 full, as well as 39.3% of our study participants conflict with [16] in Pakistan in which 88.5% of the total participant had good knowledge about the daily collection of medical waste, and about 54.4% of our studied sample knew about the transport of medical waste by wheeled trolleys which also conflict with a study in Yemen by [28] that showed 77.3% had knowledge about transportation vehicles. This difference in results may be attributed to the majority of our studied sample don't deal with the transportation of medical waste except housekeeping staff.

Depending on the perfect time of medical waste storage, about 26.6% and 28.7% of the studied sample which were lower than [29] and [30] in India knew about the maximum time limit storage in cold and hot seasons respectively. According to [31], medical wastes in Al-Najaf hospitals were stored for multiple days, a practice which is not recommended, so make the healthcare workers lack the information about maximum storage time. Finally and depending on concepts of treatment and disposal, this study showed that 73.6% of participants prefer incineration as

the most common techniques for disposal and treatment of hazardous medical waste which agree with [26] in India. This come back to the fact that incineration is considered the typical way used for the management of hospitals waste in Iraq [32] and this method have a great ability in minimizing and reducing the infectious waste [33].

5.2. Practices of MWM among Healthcare workers

In the current study, only 25.1% of the studied sample had good practices regarding MWM which is similar to [34] in Rwanda and lower than [35] in Eastern Ethiopia which was 42.3% had good practices. In general, our study also shows (30.3%) of paramedical staff have good practices compared to (12.9%) of medical staff and (12.5%) for housekeeping staff which disagrees with [16] in Pakistan that shows housekeeping staff has good practices higher than medical and paramedical staff. The Poor practices among housekeeping staff in our study may be interpreted due to workload, shortage of staff relative to patients, and lack of strict supervision and training, while relating to medical staff, there is a tendency among medical staff in Iraq to overlook MWM because of the common perception that dealing with the issues of medical waste is not a medical staff's responsibility; therefore, most of the time they neglect this issue.

According to the fact that the guideline laid down by Iraqi ministry of health is an old guideline and has not updated since 2009, as well as the lack of hospitals color-coding containers, this led to that 63.9% of the studied sample in the present study were always following the guideline as well as only 36.6% of them followed color of containers according to the type of wastes which were lower than [13] in Saudi Arabia and [36] in India that showed higher results.

In the same context of waste separation, the current study shows 69.5% of the studied sample which is lower than 92.9% a study done in Ethiopia by [37] that were always separate hazardous medical waste from general waste at the place of generation, as well as 54.6% of our studied sample which it also lower than [21] in India that shows 91.7% and [38] in Qatar that shows 99.4% about the separation hazardous medical waste into different categories. These lower results of our study may be attributed to the unavailability color-codding containers for different categories of medical waste in Iraqi hospitals.

Concerning the participants' prevention practices, 72.9% and 88.5% which is better and higher results than [36] in West Bengal confirmed that they always use PPE when handling medical waste and wash their hands thoroughly after contact with medical waste respectively, this may be attributed to that present hospitals were provided with disposable PPE continuously and also reflection the clean habit of the Iraqi person.

About the dealing of participants with sharp medical waste, 86.5% of studied sample which agree with Iraqi previous study [19] confirmed putting sharp medical waste into a safety boxes always. This may be because of the safety boxes were available in adequate number in hospitals to ensure the safe disposal of sharps waste, but regarding the recapping of used needle practice, only 28.9% of our studied sample confirmed that they don't do this wrong practice, which disagree with [39] in Sultanate of Oman that showed 65.6%. It is a wrong practice lead to exposure of healthcare workers to risks, so our results may attributed to the majority of studied sample were not undergo to any training program on dealing with medical waste and they continuation of an old habit.

About the accidents of needle and sharps waste, the current study showed similar results with [19] in Iraq where 42.3% of studied sample protected themselves from experiencing injury by used needle or sharps during their work, but only 8.6% of them filled the accident form if the injury occur .This result may be due to the recapping needle practices by majority of studied sample make them experience the injury. In the same context, and because the importance of reporting any such injuries to the authorities and in order to provide treatment and support needed for injured healthcare workers, the present study showed 66.4% of the studied sample inform person in charge when injury by sharps waste, but this result disagree with [28] in Yemen that showed only 10.8% were reporting this injuries to supervisor perhaps due to their lack of treatments in their country.

In relation to practices of our studied sample about liquid waste disposal, current study shows only 37.7% of them which is dissimilar with [24] in Thailand that shows 86.3% confirmed that they don't dispose liquid waste into the sewage system directly. A possible explanation of this difference in result might be explain by [8] that mention about 98% of Iraqi hospitals have no liquid waste treatment units, and it drain their liquid waste without any treatment, as well as supported by [31] that shows the chemicals utilized in Al-Najaf hospitals laboratories were discharged into general sewers.

When asked about documentation records of medical waste, it was found the concept about the maintenance of records related to medical waste is not prevailing, where none of studied sample which was the opposite of [13] in Saudi Arabia 70.7%, [40], [22] and [41] in India 74.5%, 57% and 93.18 % respectively maintained a medical waste records. These results may be come back to the failure that falls on hospitals administrations in Iraq by not paying attention to providing records for medical waste and training staff on it.

In spite of availability all necessary vaccines for healthcare workers in Iraq, 56% of our studied which lower than [42] in India taken the seasonal influenza and HBV vaccines, this might be attributed to a lack of awareness about the high effectiveness of these vaccines to prevent them from the disease.

6. Conclusion

The current study concluded that the knowledge and practices of healthcare workers about Medical Waste Management in Al-Najaf hospitals are fair, and paramedical staff demonstrated better knowledge and practices than medical and housekeeping staff.

7. Recommendation

Workshops and training programs regarding MWM should be planned, developed and implemented to increase the knowledge level of healthcare workers and to enhance the practices among them with special highlighting to the new staff with stick supervision and monitoring.

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