

Medical Waste Management in Jordanian Healthcare Institutions and their Effect on Human and Environment (Analytical Study)

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Abstract

Jordan is considered one of the best healthcare provider in the Middle East and North Africa. The health care sector has grown rapidly which reflected the large amount of medical waste. There is a need for a deep exploration for the national strategy of medical waste management as well as the level of knowledge, perception and practices in our healthcare centers. Transversal study has discussed knowledge, perception and practices of all healthcare providers working under Ministry of Health and follow its instructions regarding medical waste management. The study data were collected by two methods, the first was the annual reports issued by Ministry of Health and the second was by conducting a survey that was filled by 127 respondents, using questions to detect the socio-demographic characteristics and questions to measure the level of perception and the common practices in Jordan health care institutions. Using t-test and one-way ANOVA statistics analysis by SPSS V28 it had noted that there was significant difference on respondents' responses with differences in sector type while the other characteristics showed similarities. The growth rate of population that used in calculations was estimated by 2% and the rate of medical waste per one medication in healthcare center was measured by 100 gram. The healthcare centers produced 1030.9 tons of medical waste at 2018 and the numbers will jump to 1240 tons in 2025. The levels of knowledge need more work by trainings while the quality control and authorities should take immediate actions on the application of instructions and regulations.

Keywords: Medical waste, medical waste management, health care institutions, Jordanian health care system.

إدارة النفايات الطبية في المؤسسات الصحية الأردنية وتأثيرها على الإنسان والبيئة / دراسة تحليلية

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ملخص

يعد الأردن من أفضل مقدمي الرعاية الصحية في الشرق الأوسط وشمال إفريقيا؛ حيث إن النمو السريع لقطاع الرعاية الصحية أدى إلى زيادة كبيرة في كمية النفايات الطبية مما يستدعي إلى استكشاف عميق للاستراتيجية الوطنية لإدارة النفايات الطبية، وكذلك مستوى المعرفة والإدراك والممارسات في مراكز الرعاية الصحية لدينا. ناقشت الدراسة المستعرضة المعرفة والتصور والممارسات لجميع مقدمي الرعاية الصحية العاملين تحت إشراف وزارة الصحة واتباع تعليماتها في ما يتعلق بإدارة النفايات الطبية. جمعت بيانات الدراسة بطريقتين: الأولى هي التقارير السنوية الصادرة عن وزارة الصحة والثانية بإجراء استبيان جرى ملؤه من قبل 127 مستجيباً، باستخدام أسئلة لكشف الخصائص الاجتماعية والديموغرافية وأسئلة لقياس مستوى الإدراك والممارسات الشائعة في مؤسسات الرعاية الصحية الأردنية. لوحظ باستخدام اختبار T وتحليل إحصاءات ANOVA أحادي الاتجاه بواسطة SPSS وجود اختلاف كبير في استجابات المستجيبين مع وجود اختلافات في نوع القطاع، بينما أظهرت الخصائص الأخرى أوجه تشابه. جرى تقدير معدل النمو السكاني المستخدم في الحسابات بنسبة 2٪، وجرى قياس معدل النفايات الطبية لكل عملية معالجة في مراكز الرعاية الصحية بـ 100 جرام. أنتجت مراكز الرعاية الصحية 1030.9 طنًا من النفايات الطبية في عام 2018 وستقفز الأعداد إلى 1240 طنًا في عام 2025، وتحتاج مستويات المعرفة والوعي إلى مزيد من العمل عن طريق التدريبات، بينما يجب على السلطات مراقبة الجودة واتخاذ إجراءات فورية بشأن تطبيق التعليمات واللوائح. الكلمات الدالة: النفايات الطبية، إدارة النفايات الطبية، إدارة النفايات الطبية في المراكز الطبية بالأردن.



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1. Introduction

Medical waste, or clinical waste generated in hospitals, clinics, health care centers and pharmaceutical manufacturing because of the diagnosis, treatment, immunization of humans and medicine that is being produced across the healthcare system. This waste can have a severe effect on both the environment and population health. Overall, between 75% to 90% of the waste produced by healthcare providers is non-risk general waste or domestic waste. It is therefore, mandatory for healthcare organizations to have an effective medical waste management plan to eliminate real health and environmental hazards (Al-Momani H., 2019).

Healthcare waste has been a growing concern across the world over the last few years (Shinee, 2008), it is defined as all types of waste generated from health care establishments, whether it is infectious or noninfectious in nature, chemicals, and hazardous as well as nonhazardous materials(Jang,2006).

The World Health Organization (World Health Organization-Center for Environmental Health Activities, 2002). Classified the health care wastes into five main categories:

- A- Non-risk health care waste like papers, cardboards and plastic cans and bottles usually come from kitchen.
- B- Human anatomical waste, sharps, pharmaceutical waste, cytotoxic pharmaceutical waste, blood and body fluids waste.
- C- Infectious waste, highly infectious waste.
- D- Other health-care waste.
- E- Radioactive waste (National Health-Care Waste Management Plan Guidance Manual).

The management and remediation of the medical waste is a critical concern for health and environmental institutions because of the severe effect they can have on human being life and the planet environment in particular the developing countries (Aukour, 2008).

Generally, waste management practices in Jordan suffer from poor collection services and the improper disposal of waste at open dumpsites. Problems with disposal become even more severe as the health care population increases. As a result, the increase in waste requires special treatment at all stages, especially because between 10–25% of the waste generated in the healthcare system is classified as hazardous, which can create a variety of health risks (WHO, 1999).

As well as the collection process is important, the separation of different medical wastes regarding their risk level is considered a fatal point in the procedure of medical waste management.

According to the World Bank, Jordan is considered the best healthcare provider in the Middle East and North African region and is a top destination for medical tourism, Its healthcare system is a mix of both private and public institutions with 70% of Jordan's population having medical insurance after 2007(MTI, 2019).

The continuous expansion in the number of public and private health care centers, the upgrading and expanding of existing health medical care centers ,expanding health insurance coverage, and the shift from older conventional methods to modern treatment, drives the demand for more medical equipment and services. Moreover, imports currently supply approximately 80% of Jordan's demand for medical equipment (The International Trade Administration, 2016; Jordan Investment Commission, 2018).

This research is considered extremely important because it demonstrates how effective medical waste management plan can reduce public health risks in Jordanian health care organizations such as: hospitals both governmental and private, government and private health centers, as well as all in home care programs. Medical waste management greatly affects the environment by protecting the environment from any inappropriate chemical reactions and gases emissions, which could harm the animals and the eco system too.

2. Objectives of the study

The main objectives of this research are:

1. To explore the level of knowledge and perception implementation of the stages of medical waste management including collection, transportation, segregation, storage and disposal of medical waste among the different health care institutions in Jordan.

2. To highlight on the rapid growth in quantities of medical waste at present and in the future, taking into consideration the different risks and their effects on the environment and public health.
3. To illustrate a comprehensive analysis of healthcare waste management practices and the technological options for its better management.

3. Methodology

This chapter will present the methodology used to find the answers for the research questions and headlines in connection firstly, with levels of medical waste produced and what would be the quantities in the soon future secondly, the level of knowledge, behavior and practices across medical waste management among health care providers in public, private and services sectors in comparison with the ministry of health instructions , starting from the case study design, ending with the data collection and analysis and including most of cross sectional methodology.

3.1 Medical wastes rates

The study highlights on the Jordanian healthcare institutions and the produced medical wastes as a result for medications number at the base year of 2018 and what would the growth in demand cause for the total quantities.

Data were collected from Ministry of Health departments in particular the environment department, and then this data was analyzed to predict the quantities for the horizon year of 2025.

3.2 Data collection

Data collection process was done through distributing the digital form of survey on health care providers especially the nursing staffs who deal with medical waste daily and the survey targeted them in particular, the researcher asked nurses throughout Jordan institutions by phone call for the responsible departments in the hospitals and health care centers to fill in survey form taking into consideration the full privacy and confidentially assurance for their personal information as well as their opinions and answers on the survey. The survey started and distributed from 11th to the 25th of October with a total number of 127 respondents, and as mentioned previously, the digital survey faced the challenge of spread and response due to the huge load on the health care providers during this pandemic of Covid-19 because there is no obligation on the participants to fill this survey.

3.3 Statistical analysis method

With a view to obtain the study objectives, statistical processes for the Social sciences was used in analyzing data to gain all the findings for this research. Data were transformed to code version and entered to the (SPSS V28).

The statistical analysis was performed as follow:

Normal adjective statistics such as (frequency, percentages, mean and the standard deviation) were done to characterize the respondents details collected and to know sample response for each question in the questionnaire, also T-test and one way ANOVA test were calculated to determine whether there were significance difference in the level of perception and practices among health care providers across medical waste management based on the characteristics of the study respondents.

4. Results and Discussion

This section will present the results of data descriptive statistical analysis that collected from the (MOH) to estimate the quantities of medical wastes in the near future and their risk. In addition, the survey data was statistically analyzed for the attitudes and practices of the health care providers using (SPSS V28) to find the relation and effect of the different categories of participants on their responses.

4.1 Medical wastes rates and quantities for the different healthcare centers in the Jordanian governorates

The quantities of medical wastes is a crucial concern so the expected grown quantities based on the growth of population. The rate of 2% for population growth used as per Department of statistics rates for the last ten years (MOH,2019), which were fluctuated between 2.4%, and 1.8% growth rates in the different cities of Jordan, Knowing that the one medication case in the health care center produce about 100 gram in average as per environment department in the ministry of health statistics, the table below shows the descriptive statistics resulted.

Table 4.1: Distribution of population and number of medications in the governmental health care centers and the quantities of medical wastes produced in the base year of 2018 and the horizon year of 2025

City	2018 population	2018 Number of Medications	Quantities of medical waste. kg	2025 population	2025 Number of Medications	Quantities of medical waste. kg
Amman	4,327,800	3,410,301	341,030.1	4,971,282	3,917,370	391,737
Irbid	1,911,600	2,343,923	234,392.3	2,195,828	2,692,085	269,208.5
Zarqa	1,474,000	1,273,358	127,335.8	1,693,163	1,462,893	146,289.3
Balqa	531,000	859,999	85,999.9	609,952	987,878	98,787.8
Mafraq	593,900	743,019	74,301.9	682,204	853,437	85,343.7
Karak	341,900	483,041	48,304.1	392,736	554,936	55,493.6
Jerash	256,000	501,100	50,110	294,064	575,483	57,548.3
Madaba	204,300	417,254	41,725.4	234,677	479,210	47,921
Ajloun	190,200	338,513	33,851.3	218,480	388,676	38,867.6
Aqaba	203,200	228,136	22,813.6	233,413	262,053	26,205.3
Ma'an	171,100	226,078	22,607.8	196,540	259,629	25,962.9
Tafilah	104,000	181,997	18,199.7	119,463	209,048	20,904.8
Sum	10,309,000	11,006,719	1,100,672	11,841,801	12,643,260	1,264,326

The numbers show that governmental health care centers produced about 1100 tons of medical waste regardless the type and hazardousness of that waste, and these numbers will jump to reach 1264 tons by 2025 just taking into consideration the factor of population growth and neglecting the different factors that would effect on the process of medication such as the medicine development solutions as well as the crisis and pandemics.

Based on (MOH) the governmental health care centers contribute with about 20% of the total quantity of medical waste so when the quantities of hospitals and the other institutions added the numbers will exceed the limit of 6000 tons per year and for that, the control on the total value of medical waste will be hard and fatal.

Figure 4.1 Shows the predicted population and medical waste generated for the period (2018-2025).

Number of medications had calculated based on the number of medications for each city that obtained from (MOH) then we were able to calculate the percent of medications for each city.

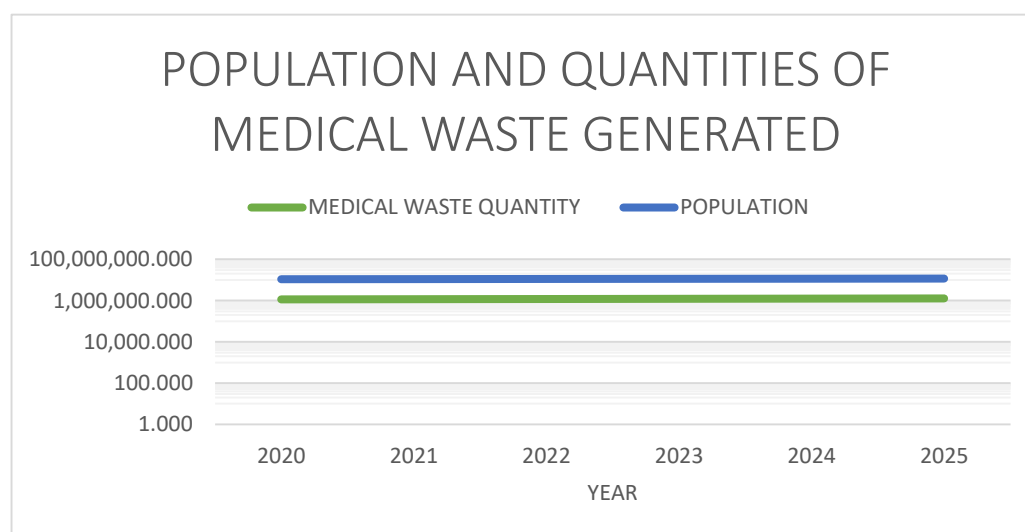


Figure 4.1: Predicted Numbers of Population and the amount of Medical waste for the years (2018- 2025) in governmental health care centers

4.2 The level of attitude and practices for the study respondents

In order to answer the study main questions the survey second and third parts focused on the perception of respondents as well as the general practices by the health care institutions and workers there, in the below tables level of responding participant is illustrated by obtaining values of average, frequency number and percentage for each statement and question.

4.2.1 YES or NO Questions

Table 4.2 T-Test Results for Yes or No questions affected by Gender Type-Group Statistics

	Gender	No.	Mean	Std. Deviation	Std. Error Mean	Mean diff.	t-value	Sig.
Q1: Does your department have signs that warn of the danger of medical waste?	F	61	2.70	0.72	0.09	-0.08	-0.70	0.49
	M	66	2.80	0.62	0.08	-0.08	-0.70	0.49
Q2: Does medical waste management have a strong and important impact on the performance of your entire job duties?	F	61	2.80	0.56	0.07	-0.06	-0.64	0.53
	M	66	2.90	0.48	0.06	-0.06	-0.63	0.53
Q3: Is there a specific timetable for medical waste removal?	F	61	2.60	0.80	0.10	-0.09	-0.67	0.51
	M	66	2.70	0.72	0.09	-0.09	-0.67	0.51
Q4: Each medical waste container has a label that includes all the information about the content of this container?	F	61	2.60	0.80	0.10	0.02	0.11	0.91
	M	66	2.60	0.80	0.10	0.02	0.11	0.91
Q5: Is there an immunization record for the medical staff and employees?	F	61	2.30	0.96	0.12	-0.03	-0.15	0.88
	M	66	2.30	0.96	0.12	-0.03	-0.15	0.88
Q6: Is there a special record of past injuries related to medical waste in your department or medical center in general?	F	61	2.50	0.87	0.11	0.35	2.11	0.04
	M	66	2.10	0.99	0.12	0.35	2.12	0.04
Q7: Is there a daily record showing the types and quantities of medical waste?	F	61	2.18	0.99	0.13	-0.05	-0.27	0.79
	M	66	2.23	0.97	0.12	-0.05	-0.27	0.79

*Male represented by M, Female represented by F.

It is clear from Table 4.2 that the values of significance were greater than (0.05) in all questions except question 6, and this means that there are no statistically significance correlation at the level of significance less than (0.05) among most of respondents' responses (6 questions out of 7) with respect to perception and practices about medical waste management based on gender.

Table 4.3 One Way ANOVA Test Results for Yes or No Questions Affected by Socio-Demographic Characteristics-Significance Level

Questions	Experience.Sig.	Sector.Sig.	Qualification. Sig.	Center Type. Sig.
Q1: Does your department have signs that warn of the danger of medical waste?	0.49	0.004	0.49	0.11
Q2: Does medical waste management have a strong and important impact on the performance of your entire job duties?	0.72	0.76	0.91	0.52
Q3: Is there a specific timetable for medical waste removal?	0.34	0.60	0.88	0.14
Q4: Each medical waste container has a label that includes all the	0.52	0.44	0.08	0.22

Questions	Experience.Sig.	Sector.Sig.	Qualification.Sig.	Center Type.Sig.
information about the content of this container?				
Q5: Is there an immunization record for the medical staff and employees?	0.16	0.31	0.25	0.52
Q6: Is there a special record of past injuries related to medical waste in your department or medical center in general?	0.82	0.39	0.69	0.66
Q7: Is there a daily record showing the types and quantities of medical waste?	0.58	0.06	0.11	0.14

Table 4.3 shows that the values of significance were greater than (0.05) in all questions except question 1, and this means that there are similarity at the level of significance less than (0.05) among most of respondents' responses with respect to perception and practices about medical waste management based on the Experience that is divided into three categories: (0-5 years, 5-10 years, 10 years and more), Sector that is divided into four categories:(governmental, private, military and other), Qualification that is divided into three categories:(diploma, Bachler and master) and center type that is divided into three categories(hospital, health care center and other).

Question number one just has value of significance less than (0.05) for sector which means that there is a statistically significance correlation at the level of significance less than (0.05) among respondents' responses with respect to perception and practices about medical waste management based on the sector they work in.

4.2.2 Agree and Disagree question

Table 4.4 T-Test Results for Agree-disagree questions affected by Gender Type-Group Statistics

Questions	Gender	No.	Mean	Std. Deviation	Std. Error Mean	Mean Diff.	t	Sig.
Q1: In your department, medical waste is being treated in the correct way.	F	61	3.85	1.01	0.13	-0.06	-0.32	0.75
	M	66	3.91	0.99	0.12	-0.06	-0.32	0.75
Q2: The person taking medical waste from your department is a qualified person wearing special clothing.	F	61	3.61	1.04	0.13	0.17	0.82	0.41
	M	66	3.44	1.24	0.15	0.17	0.83	0.41
Q3: Medical waste is classified and sorted into bags according to colors and capacities?	F	61	4.07	1.06	0.14	-0.15	-0.82	0.41
	M	66	4.21	0.95	0.18	-0.15	-0.82	0.42
Q4: Specific collection tools and bags always available in your department?	F	61	3.87	0.96	0.12	-0.07	-0.40	0.69
	M	66	3.94	1.04	0.13	-0.07	-0.40	0.69
Q5: Transport containers are cleaned every day.	F	61	3.56	1.03	0.13	-0.16	-0.79	0.43
	M	66	3.71	1.17	0.14	-0.16	-0.79	0.43
Q6: Are there special stores for medical waste that are completely separate from other wastes?	F	60	3.92	0.94	0.12	-0.16	-0.92	0.36
	M	66	4.08	0.99	0.12	-0.16	-0.92	0.36
Q7: In the event of an emergency, does your department have a clear medical waste pollution management plan?	F	61	3.84	1.16	0.15	-0.23	-1.18	0.24
	M	66	4.06	0.99	0.12	-0.23	-1.17	0.24
Q8: Training courses and lectures are held periodically to find out the importance of medical waste	F	61	3.56	1.25	0.16	-0.064	-0.30	0.77
	M	66	3.62	1.19	0.146	-0.064	-0.30	0.77

*Male represented by M , Female represented by F.

It is clear from table 4.4 that the values of significance were greater than (0.05) in all questions and this means that there are no statistically significance correlation at the level of significance less than (0.05) among all respondents' responses with respect to attitude and practices about medical waste management based on gender.

Table 4.5 One Way ANOVA Test Results for Agree-disagree Questions Affected by Socio-Demographic Characteristics-Significance Level

Questions	Experience.Sig.	Sector.Sig.	Qualification. Sig.	Center Type. Sig.
Q1: In your department, medical waste is being treated in the correct way.	0.94	0.05	0.08	0.58
Q2: The person taking medical waste from your department is a qualified person wearing special clothing.	0.66	0.06	0.11	0.75
Q3: Medical waste is classified and sorted into bags according to colors and capacities?	0.44	0.01	0.05	0.74
Q4: Specific collection tools and bags always available in your department?	0.12	0.04	0.10	0.73
Q5: Transport containers are cleaned every day?	0.10	0.05	0.33	0.05
Q6: Are there special stores for medical waste that are completely separate from other wastes?	0.85	0.01	0.27	0.03
Q7: In the event of an emergency, does your department have a clear medical waste pollution management plan?	0.74	0.01	0.16	0.74
Q8: Training courses and lectures are held periodically to find out the importance of medical waste?	0.85	0.21	0.32	0.01

And in Table 4.5 the values of significance were greater than (0.05) in all questions concerning experience and this means that there are similarity at the level of significance less than (0.05) among all respondents' responses with respect to attitude and practices `

However, the values of significance were less than (0.05) in all questions concerning Sector except Q2 and Q8 and this means that there are statistically significance differences at the level of significance less than (0.05) among most respondents' responses (6 responses out of 8) with respect to perception and practices about medical waste management based on the sector they work in weather it is governmental, private or military.

But the values of significance were greater than (0.05) in all questions concerning qualification and this means that there are similarity at the level of significance less than (0.05) among all respondents' responses with respect to perception and

practices about medical waste management based on the qualification they have.

However two question out of eight their significance level were less than (0.05) for center type responses and that means there are similarity at the level of significance less than (0.05) for most of the respondents' responses with respect to perception and practices about medical waste management based on the center type.

4.3 Practices of health care providers regarding the medical waste management

This study focused on some of the practices of healthcare providers who daily deal with medical wastes in health care institutions like hospitals, healthcare centers and the other types of health care providers in Jordan. For example, the percentage of workers who follow the instructions and wear the proper suits while they are collecting and transport medical waste was 78% as per agreement respondents' responses.

On the other hand, we found that the institutional practices upon the responses on the question of medical waste classification and sorting into bags according to colors and capacities was high as most of the respondents positively agree with a percentage of 91.4%

Which means that institutions in general work to meet the standards and we have to maintain these percentages high throughout the periodic lectures and training course of standards and their importance for medical waste management.

When we look at the recoding and achieves statistics process, we found big gap that shall be treated. If the respondents' responses on the question of existence of daily record showing the types and quantities of medical waste illustrated; we found about 40% responded with negative answers to this question and 36% for the question of existence of special record of past injuries related to medical waste in their department or medical center in general, theses reflections shall be deeply studied by the authorities represented by Ministry of Health and its departments and all necessary instructions and their implementation take action directly as the quantities of medical wastes and their influence increasing.

Concerning labeling the responses were to somehow moderate as 20% of the responses said that their departments and institutions do not label every box or container with the proper label of components details which reflect again wrong doings in documentation and labeling.

All Jordan health care providers shall concentrate on the primary medical waste management processes such as the segregation and sorting as they will enable them to decrease the total quantities that are classified hazardous wastes need treatment, this will reduce the pressure on the treatment plants and make them work effectively.

All of these results showed that could improve the medical waste management if they lunch periodic awareness trainings for junior and senior health care workers to clarify the importance of medical wastes control and classification crucial role for less emissions and better environment for being life.

4.4 Impact based on the socio-demographic characteristics

4.4.1 Gender

Based on the results of this research there are no effect for gender type on the level of attitude and practices toward medical waste management. This result was similar to other studies one of them conducted in Turkey named by "Medical waste management training for healthcare managers - a necessity" Faculty of Medicine, Department of Family Medicine, Bezmialem Vakif University, Fatih, and Istanbul, Turkey.

4.4.2 Experience

The results show similarity among respondents regarding the level of attitude and practices toward medical waste management in both yes or no questionnaire part and the agreement level part. This result came even if we knew that the experience of respondents had distributed almost equally by around 30% for each party.

4.4.3 Sector

For Yes or No questions the results show significance difference at levels of attitude and practices at the question of signs and posters that warn from the danger of medical wastes and all of the negative responses were by governmental institutions employees which shall be taken with more seriousness from the authorities. However, for the agreement question there were high and significant difference level on attitude and practices for health care providers toward medical waste

management with difference of sector.

4.4.4 Qualification

There was no significant difference at levels of attitude and practices toward medical waste management in both Yes or No questions and Agreement level questions, this maybe came as a result that all the respondents have different level of qualifications but they all educated with the majority 72% have bachelor degree.

4.4.5 Center type

The research results show similarity among respondents' responses regarding the level of attitude and practices toward medical waste management in yes or no questionnaire part, while it shows significant difference levels of attitude and practices in the questions of periodic trainings and lectures application to increase the level of knowledge and awareness as well as the question of medical waste separation in special stores inside the health care institutions in the agreement level part, the negative answers concentrated in the governmental and military institutions which means that they don't give the priority for such needs.

5. Conclusions and recommendations

5.1 Conclusions

Based on the results of the study, the conclusions can be make:

- The level of perception and practices of health care providers working in the different Jordanian institutions was high on some parts and quite moderate on others.
- There were significant difference between the sectors that provide health care toward practices like sorting, labeling, collection and storage processes.
- The level of perception and practices of health care providers toward awareness and training courses for different types of health centers.
- Level of experience and qualification type left no significant difference among answers as they reacted in similar way to the different types of perception and practices.
- The numbers show that governmental health care centers produced about 1030.9 tons of medical waste regardless the type and hazardousness of that waste in 2018, and these numbers will jump to reach 1240 tons by 2025 just taking into consideration the factor of population growth and neglecting the different factors that would effect on the process of medication such as the medicine development solutions as well as the crisis and pandemics.
- Governmental health care centers contribute with about 20% of the total quantity of medical waste so when the quantities of hospitals and the other institutions added the numbers will exceed the limit of 5000 tons per year and for that, the control on the total value of medical waste will be hard and fatal.
- The overall average calculated for the sample size concerning the Yes or No questions measuring the perception and practices levels was 2.51 out of 3, which mean that the majority of respondents' answers were in the positive reactions side of Yes Answer.
- The overall average for agreement questions recorded by 5-point Likert scale was 3.83, which considered on the positive side of the scale and in the Agree range.

5.2 Recommendations

Based on the results of the study, the recommendations can be make:

- The ministry of health shall enrich the awareness level by special periodic trainings to increase level of knowledge regarding medical waste management.
- To lunch, strict rules concerning separation process to treat each type of medical waste effectively without large gas emissions and environmental pollution.

- Some notes came through survey form said that normal housekeeping and cleaning labors are responsible for collection and transportation of medical waste management and they deal through these processes the same way they deal with domestic wastes which make them directly in face of injuries and infections possibilities, so the ministry of health shall supervise and inform all institutions to follow the instructions issued or to take the whole responsibility of consequences for neglecting.
- Paths and transportation way shall be different compared to those used by public to decrease the possibility of contact and infection.
- The quality control department in both the authorities and the institutions themselves shall contribute effectively in the medical waste management processes as the need for medication in Jordan is getting higher with time and without a precise disciplined application for the management procedures, we will fail rapidly by the accumulation of mistakes and errors.
- Based on the results of the study it is necessary to develop the medical waste management protocols that has used in Jordan, especially in the governmental institutions because our results showed that the significance level based on sector type is less than 0.05 which means that the type of sector has an important role in the medical waste management processes.
- The used techniques in all processes of medical waste management shall be improve, in order to get to the required level of precision and safety.

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