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Assessment of knowledge, Attitude and practices for housekeepers regarding safe handling of hospital waste at Main Assiut University Hospital

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Abstract: *Medical waste management is of great importance due to its infectious and hazardous nature that can cause undesirable effects on humans and the environment.* ***Aims of the study:*** *The study conducted to assess knowledge, Attitude and practices of housekeepers in most infectious department about safe health care waste management.* ***Subjects and methods:****descriptive study. The total number of housekeepers was 159 housekeepers who conducting in the following departments General and special surgical departments, Private departments, Separation waste rooms and Incineration were included in the study.* ***Study tools****: It include three different tools .It include knowledge, an observation checklist, an attitude scale, first one is a structured interview questionnaire sheet which include, socio-demographic characteristics of studied sample. Second parts include housekeepers, knowledge about Infection, and, waste management Second tool is observation checklist covered the performance of the studied housekeepers. Infection control, safe handling and waste disposal.Thrid tool isan attitude scale****Results*** *of this study illustrated that* ***(85.5%)*** *had unsatisfactory knowledge* ***(87.4%)****had inadequate level of performance (****71.1%)*** *had negative attitude regarding health care hospital waste****.Recommendations*** *are suggested: a regular in-service education program for all housekeepers and an orientation program for all new ones is essential .This training program should be done every six months or at least once a year.*

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I. Introduction

Management of healthcare waste is an integral part of infection control and hygiene programs in healthcare settings. These settings are a major contributor to community acquired infection, as they produce large amounts of biomedical waste. Biomedical waste can be categorized based on the risk of causing injury and/or infection during handling and disposal. Wastes targeted for precautions during handling and disposal include sharps (needles or scalpelblades), pathological wastes (anatomical body parts, microbiology cultures and blood samples) and infectiouswastes (items contaminated with body fluids and discharges such as dressing, catheters and I.V. lines). Otherwastes generated in healthcare settings include radioactive Management of healthcare waste is an integral part ofinfection control and hygiene programs in healthcare settings.These settings are a major contributor to communityacquired infection, as they produce large amounts of biomedicalwaste. Biomedical waste can be categorized basedon the risk of causing injury and/or infection during handlingand disposal. Wastes targeted for precautions duringhandling and disposal include sharps (needles or scalpelblades), pathological wastes (anatomical body parts,microbiology cultures and blood samples) and infectiouswastes (items contaminated with body fluids and dischargessuch as dressing, catheters and I.V. lines). Otherwastes generated in healthcare settings include radioactive wastes, mercury containing instruments and polyvinyl chloride (PVC) plastics. These are among the most environmentally sensitive by-products of healthcare **(Ombelet et al,2018)**

Aims of the study: The present study conducted to assess knowledge, attitude and practices of housekeepers about safe health care waste management.of housekeepers in most infectious department.

II. Subjects and methods

Design: The present study was carried out using the descriptive study:

Study Location: The study was carried out in Main Assiut University Hospital at some different setting. General surgical departments, special surgical departments, Private departments, Separation waste rooms and Incineration were included in the study.

Sample size:159 housekeepers

Subjects: The target selected population in the current study are housekeepers working in the most infectious areas.The total number are (159) housekeepers divided to 26 housekeepers from general surgical department, 33 from private department ,9 from waste collection rooms ,7 housekeepers from incinerator and 84 housekeepers from special surgical**:** It aims to assess housekeepers' knowledge regarding safe hospital waste management. It covers the following topics.It was designed by researcher who visited the selected settings and was request the housekeepers to participate in the study through face to face interviews it was structured into two parts

Part (1)*:* Personnel characteristics such as name, age, educational qualifications, years of experiences, unit of work, and attendance training of course.

Part (2)*:*It was included questions regarding knowledge about definition of Infection ,Nosocomial infection and knowledge about waste management as types of health care wastes ,classification of hazardous waste ,when wearing hard work gloves,deal with blood on the floor or on the wall and how deal with blood splash in eye/mouth from the patient**.**

Scoring system: The test was multiple choice items. A correct response was scored 1 and the incorrect zero. The sum of correct answer total grade were computed if the scores percent of response were ≥ 50% this means satisfied knowledge but ≤ 50% this means unsatisfied knowledge**(Mohamed,2013)**

Tool(2): Attitude Scale:

Likert scale used to assessthe attitude of housekeepers .This tool developed and translated by researcher in Arabic and it consists of 10 questions with positive and negative statements.The responses are three points "agree, uncertain, disagree". The form was filled out before implementation of the program, immediately after implementation, and follow up after three months later.

Scoring system:

The responses "agree", "uncertain" and "disagree" were respectively scored 3,2and 1 respectively. The scoring was reversed for negative statements. Attitude was considered positive if the score was ≥60% and negative attitude if the score < 60% **(Fayaz et al,2014).**

Tool (3) :An observation checklist

This tool is based on **(Asha et al,2016)**.

It consists ofthe following procedures:Housekeepers practices concerning handwashing**,** Personnel protective equipment, Waste management (segregation, handling, Transportation, final disposal).How to dispose body substances,excretions and secretions .

Scoring system:

In the observation checklists, the items" done" take grade "1" and "not done" take "0",grade .For each part , The scores of the items were summed up and the total was divided by the number of the items, giving a mean score for the part . These scores were converted into a percent score . The performance wasconsidered adequate if the percent score was 60% or more and inadequate if it is less than 60%. **(Gamal, 2011)**

Pilot Study:

After developing the necessary tools of the study. Apilot study included 15 housekeepers (10%) was carried out to ensure clarity and applicability of the developed tools.Also estimate the time needed to fill the questionnaires. This sample was not included in the total study sample and the final forms of the tools were developed.

Ethical consideration:

The purpose of this study was explained for every interviewed individualof the studied sample. Housekeeper have ethical rights to participate or refuse participation in the study; oral consent was taken from all Housekeeper who participated in the study to ensure active participation and cooperation informed that the information obtained will be confidential and used only for the purpose of the study.

Statistical Analysis :

Statistical analysis was done using SPSS 19.0 softwarepackages statistical. Data were presented using descriptive statisticsin the form of frequencies for qualitative variables and mean± standard deviations for quantitative variables. Qualitative variables were compared using chi-square test. Whenever the expected values in one or more of the cells in a 2×2 cells was less than 5, statistical significance was considered at p -value<0.05.

III. Results

Table (1): Distribution of housekeepers regarding their personnel characteristics at Main Assiut University Hospital (2016)

	No. (n= 159)	%
Age: (years)		
< 30	**36**	**22.6**
30 - < 40	**61**	**38.4**
≥ 40	**62**	**39.0**
Mean ± SD		**38.22 ± 10.02**
Experience: (years)		
< 5	**57**	**35.8**
5 – 10	**44**	**27.7**
> 10	**58**	**36.5**
Mean ± SD		**10.33 ± 8.58**
Unit/department:		
Special surgery	**84**	**52.8**
General surgery	**26**	**16.3**
Private Wards	**33**	**20.8**
Incinerator	**7**	**4.4**
Waste collection room	**9**	**5.7**
Education:		
Illiterate	**76**	**47.8**
Read/write	**61**	**38.4**
Preparatory	**13**	**8.2**
Secondry school	**9**	**5.7**
Attended training in waste management:		
Yes	**7**	**4.4**
No	**152**	**95.6**

Table (2): Distribution of housekeepers' knowledge about infection control at Main Assiut University Hospital (n= 159)

knowledge of waste management	No.	%
Definition of infection	35	22.0
Hospital acquired infection	22	13.8
Importance of hand washing	152	95.6
Hand disinfection	21	13.2
Things help to remove microbes better when washing hands	32	20.1

Table (3): Distribution of housekeepers' knowledge about waste management at Main Assiut University Hospital (n= 159)

Knowledge about waste	No	%
The types of waste in the hospital	71	44.7
The wastes that are you collected	58	36.5
The colors of waste collection bags in the hospital	136	85.5
The colour of the bag, which collects the dressing, gloves, and solution devices	153	96.2
The benefits of segregation	16	10.1
The fill level of the waste collection bag .	37	23.3
Time of wearing hard work gloves	31	19.5
Way of dealing with blood on the floor or on the wall	32	20.1
Way of dealing Blood splash in eye/mouth from the patient	26	16.4

Table (4): Distribution of housekeepers 'practices about waste management at Main Assiut University Hospital(2016)

Practice of waste management	No.	%
Wearing the uniform for housekeepers	98	61.6
Wearing the heavy work gloves and heavy duty boots when dealing with the waste	51	32.1
Put a yellow plastic bag for the normal waste	140	88.1
Put a red plastic bag, for the hazardous waste	141	88.7
Change the bag when the fullness to two thirds of the bag	44	27.7
Separated hazardous waste bags from non-hazardous bags when the collection of waste product	54	34.0
Closes bags collected well	35	22.0
Put symbol the name of the department on the collected bags	22	13.8
Collect the bags and transferred by us using a special car for the waste product	21	13.2
Stores the bags in special room in the hospital	141	88.7
Washes his, her hands after waste collection	32	20.1
Deal with blood on the floor or on the wall	11	6.9

Table (5):Relation between housekeepers' knowledge and their personal characteristics

	Knowledge				**X2**	**(P-value)**
	Satisfactory		**Unsatisfactory**			
	NO	**%**	**NO**	**%**		
Age:						
<30	**9**	**25.0**	**27**	**75.0**		
30	**12**	**19.7**	**49**	**80.3**	**0.51**	**0.78**
35+	**15**	**24.2**	**47**	**75.8**		
Experience(years)						
<30	**11**	**19.3**	**46**	**80.7**		
30	**6**	**18.8**	**26**	**81.3**	**1.45**	**0.48**
35+	**19**	**27.1**	**51**	**72.9**		
Unite/ department:						
Special surgery	**19**	**22.6**	**65**	**77.4**		
General surgery	**4**	**15.4**	**22**	**84.6**		
Waste collection room	**4**	**44.4**	**5**	**55.6**	**5.68**	**0.22**
Incinerator	**0**	**0.0**	**7**	**100.0**		
Wards	**9**	**27.3**	**24**	**72.7**		
Education:						
Illiterate	**11**	**14.5**	**65**	**85.5**		
Read/write	**12**	**19.7**	**49**	**80.3**	**19.89**	**(<0.001*)**
Preparatory	**13**	**59.1**	**9**	**40.9**		
Attended training in waste						
No	**32**	**21.1**	**120**	**78.9**		
Yes	**4**	**57.1**	**3**	**42.9**	**Fisher**	**0.047**

Table (6): Relationship between housekeepers' practices and their personal characteristics at Main Assiut University Hospital (2016)

	Level of practices				**P-value**
	Inadequate N= 139		**Adequate N=20**		
	No.	**%**	**No.**	**%**	
Age: (years)					**0.055**

< 30	**35**	**97.2**	**1**	**2.8**	
30 - < 40	**54**	**88.5**	**7**	**11.5**	
≥ 40	**50**	**80.6**	**12**	**19.4**	
Years of experience:					
< 5	**52**	**91.2**	**5**	**8.8**	**0.062**
5 - < 10	**41**	**93.2**	**3**	**6.8**	
≥ 10	**46**	**79.3**	**12**	**20.7**	
Level of educated:					
Illiterate	**67**	**88.2**	**9**	**11.8**	
Read & write	**52**	**85.2**	**9**	**14.8**	**0.896**
Preparatory	**12**	**92.3**	**1**	**7.7**	
Secondary school	**8**	**88.9**	**1**	**11.1**	
Attendingtraining courses:					
Yes	**6**	**85.7**	**1**	**14.3**	**0.889**
No	**133**	**87.5**	**19**	**12.5**	

Table (7): Relation between housekeepers' attitude and their personal characteristics at Main Assiut University Hospital (2016)

	Attitude				P-value
	Negative N= 113		Positive N= 46		
	No.	%	No.	%	
Age: (years)					
< 30	**24**	**66.7**	**12**	**33.3**	**0.725**
30 - < 40	**43**	**70.5**	**18**	**29.5**	
≥ 40	**46**	**74.2**	**16**	**25.8**	
Years of experience:					
< 5	**42**	**73.7**	**15**	**26.3**	**0.830**
5 - < 10	**30**	**68.2**	**14**	**31.8**	
≥ 10	**41**	**70.7**	**17**	**29.3**	
Level of educated:					
Illiterate	**65**	**85.5**	**11**	**14.5**	
Read & write	**37**	**60.7**	**24**	**39.3**	**0.001***
Preparatory	**7**	**53.8**	**6**	**46.2**	
Secondry school	**4**	**44.4**	**5**	**55.6**	
Attendingtraining courses:					
Yes	**3**	**42.9**	**4**	**57.1**	**0.108**
No	**110**	**72.4**	**42**	**27.6**	

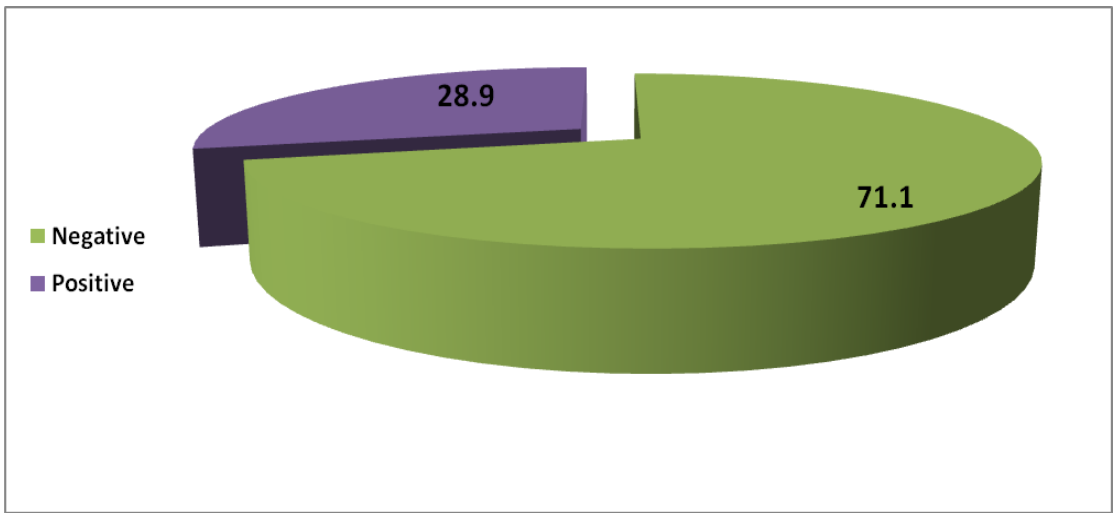

Fig (1): Distribution of housekeepers' Attitude about waste managament at Main Assiut University Hospital (2017)

Table (1): Illustrates the distribution of the housekeepers regarding their Personnel characteristics. It was found that about two fifth of the study sample **(39.0%)** had aged ≥ 40 years. Concerning their experiences it was found that more than one third (36.5%) had more than 10 years of experiences. About more than half **(52.8%)** of study sample from special surgery departments. Nearly half **(47.8%)** of the study sample were illiterate. While the vast majority **(95.6%)** of study sample had not attended training about waste.

Table (2):the table reveals that**(22.0% and 13.8% respectivly)** mention the correct meaning of infection correctly and Hospital acquired infection. It clears that **95.6%** stated it's importance of hand washing. **13.2%** of the studied sample answer correctly the hand disinfection and **20.1%** mention the things help to remove microbes better when washing hands

Table (3): the table Shows that **85.5**mention the colors of waste collection bags in the hospital. The knowledge of studied sample regarding the limits of the waste collection bag **(23.3%)**answer correctly two-thirds of the bag. **(20.1% and 16.4% respectivly)** knows how to dealing with blood on the floor or on the wall and blood splash in eye/mouth from the patient.

Table (4): Shows that **61.0%** of the studied samples not wear special uniform and more than three quarters **89.8%** of them not wear hard work gloves and special shoes. Also about **88.0%** don't wash hands after collection of waste .As regard to how deal with blood on the floor or on the wall the majority of the studied sample **95.6%** don't know.

Table (5): There were statistically significant difference between level of knowledge and attending training with p-value (0.000 and 0.006) respectively.

Table (6):There was no significant relation between the housekeepers', practices about health care hospital waste and the level of education and attending the training courses.

Table (7): There was no significant relation between the housekeepers'' attitude about health care hospital waste and the age ,years of experience and attending the training courses but from the same table there is a significant relation between the housekeepers'' attitude and their level of education with p value (0.001*).

Fig (1): Shows that**71.1%** of the studied sampleshad negative attitude about health care waste

IV. Dissicusion

The safe disposal of clinical waste has received much attention over many years. Emphasis is placed on the correct segregation and disposal of waste from clinical areas, and on technical developments in the destruction of waste. The present study was conducted with the aim to assess the knowledge ,Attitude and practices of housekeepers regarding tosafe health care hospital waste management at Main Assiut University Hospital.As regards pesonnel characteristics of the studied sample the most of study group had aged ≥ 40 years . These results agreed with **Asha & Tukaram,2014** who conducted a study about assessment of effectiveness of educational intervention on knowledge among bio-Medical waste handlers in Krishna Hospital India.They reported that 37.9% of biomedical waste handlers have been in the age group between46 to 59 years**.(table,1)**

More than one third **(36.5%)** from the current study were more than 10 years of experiences .These results disagreed with **Rakesh et al ,2010** who conducted a study about knowledge and awareness regarding needle stick injuries among health care workers in Tertiary care hospital in Ahmed abad Gujarat. They founded 61% of the subjects had been working as health care workers for less than 5 years.In the present study more than half of study group from special surgery department. Nearly half of the study group is illiterate . The vast majority of study group had not attended training about waste because there limited number of housekeepers in the hospital. So it is difficult to leave work to attend any training program, this results is in the line with their study of **Mustafa et, al 2008** who implemented their study in Helwanhospital,Egypt. the result revealed that the majority of the health care workers had not attended any training related to waste management program or conference. Similar findings were reported in study by **El-Sayed,2012** who conducted in Al-Mansoura Intervention Program for Nurses about Health Care Waste These studies reported that the majority of the hospitals' staff did not receive any training on health care waste management, which explained their poor knowledge and practice results. Moreover **WHO, 2005** advised that proper training and education must be offered to all workers from doctors to ward personnel, and most health workers require the same basic set of skills, knowledge and attitudes towards good waste management. These training programs should take into consideration the level of education of the housekeepers. On the other hand the present study disagree with **Soliman, 2004** who reported that **80.0%**of housekeepers in Ain Shams had training program about good

housekeeping and waste disposal practices and how protect themselves from any infection. .Regarding housekeeper's knowledge about infection control the researcher found that the studied sample had poor knowledge about meaning of infection, hospital acquired infection, importance of hand washing and hand disinfection due to absence of in-service education programThese results were in contrast with **Elnour, (2015)** who carried out study in Sudan at White Nile State main hospitals about Impacts of health education on knowledge and practice of hospital staff with regard to Health care waste management. Who mentioned that there was a significant improvement in knowledge after the educational intervention program, with the participants showing good knowledge (81%) immediatelyand (87%) after three months. The previous finding is disagrees with **Taha, 2000**who conducted study in Egypt about needs assessment concerning infection control measures in the operating theater, Ain Shams University. Who found that the majority of the operating room (OR) housekeepers were oriented to the infection control, cleaning and disinfection, and the majority of them had high level of knowledge about sterilization and self-precaution in Ain Shams University hospital.Also the researcher found that the studied sample had poor knowledge about waste management in the hospital, the wastes that are you collected ,the benefits of segregation, the fill level of the waste collection bag, when must be wearing hard work gloves,deal with blood on the floor or on the wall and Blood splash in eye/mouth from the patient in the departments or from incinerator because open burning poses arisk to workers due to the chemical exposure to heavy metalsand halogenated hydrocarbons, namely, dioxins and furan, that are generated from the combustion of biomedical waste. These pollutants may directly affect the housekeepers and the community.The poor knowledge of housekeepers may be due to absence of in-service training program in the hospital. These results supported by **Madhukumar& Ramesh, (2012**) Study about awareness and practices about health care wastes management among hospital staff in a medical college hospital, Bangalore. Iranian.The findings of the present study showed that most housekeepers had inadequate practices about handwashing, infection control and safe handling of hospital waste before the implementation of the educational training program. This findings could be explainedby unavailability of appropriate technologies, inadequate finances and a lack of waste management training programs, lack of supervision, lack of incentive for safe waste management, housekeepers do not believe biomedical waste management as an important qualification for a good patient care service, some also felt that this is not their duty and that biomedical waste management is the responsibility of the administration. After the implementation of the program,there were significant improvements with the number of housekeepers who achieved adequate score in the post and follow–up 85.5% and 84.3% respectively. This is most likely due to the effect of the educational program. These findings were supported by **Mostafa et al, 2008** who assessed the knowledge & practice related to waste management among doctors, nurses & housekeepers at Al Mansoura university hospital & to design and validate a waste management protocol for health team in these settings, revealed that inadequate housekeeping practices in most areas of waste management. While this finding agree with **Shafee et al, 2010** study conducted in India about Knowledge, Attitude and Practices Regarding Biomedical Waste among Paramedical Workers. showed that found **70%** of the housekeeping practiced waste management.The process of segregation,collection, transport, storage and final disposal of infectious waste was done in compliance with the standard procedures. It was also found that the non-infectious waste was collected separately indifferent containers and treated as general waste. Regarding intermediate storage, Regarding the attitude of housekeepers about hand washing is important. Working in the hospital expose to infection,Separated of waste its responsibility for all health team work and Correct separation of waste provide budget to the hospitalthe researcher found that the studied sample had negative attitude with percentage **71.1%**This result in the line with **Fayaz,2014** who mentioned that the attitude of healthcare workers towards waste disposal at hospital, he was found that, overall, more housekeeping staff had satisfactory attitude scores (61.9%).This is disagree with the present study and in contrast to another study from India where nurses had better attitudes towards separation of waste, proper disposal, implementation of rules and cooperation in programs than did technicians and housekeeping staff .In addition the present study disagree with **Mohamed &Wafa,2013** from Bangalore the study conducted about The Effects of an Educational Program on Nurses Knowledge and Practice Related to Hepatitis C Virus who showed that the nurses had significantly more positive attitudes compared with technicians and housekeeping staff.The current study shows that highly significant statistical difference between education level and attending training program with (p=0.000* and 0.006* respectively). This study disagree with **Hakim et al,2014**who found thatexperience and havingever received training on waste managementwere not significantly related tosatisfactory scores in any of the studieddomains among physicians and housekeepers.

V. Conclusions

There isunsatisfactory knowledge and inadequate practice and negative attitudetoregarding safe health care hospital waste management

VI. Recommendations

Periodic regular in-service education program for all housekeepersabout safe handling, storage, treatment, and disposal.Periodic medical checkup for all housekeepers working in the hospital.Housekeepers should be sure vaccinated against viral hepatitis B.

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