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Assessment of Knowledge attitude and practices of Nurses towards Health Care Waste Management in Port Sudan city, Sudan 2019-2020

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Introduction

Knowledge is usually gained through information provided by teachers, parents, friends, books, newspapers etc. (1) In many countries, knowledge about the potential for harm from HCW has now become more prominent to governments, medical practitioners and civil society. Increasingly, managers and medical staff are expected to take more responsibility for the wastes they produce from their medical care and related activities. Knowledge of staff regarding Healthcare Waste (HCW) can help patients and visitors to understand their role in maintaining good hygiene, and to become more responsible for the wastes they produce. (2) Practices of HCW management should be a part of total hygiene practice of the society rather than confining it to hospital and healthcare facilities. It is also very important that strict supervision and surveillance is followed in day-to-day HCW management activities. (3) Nurses play a key role in the management of HCW. They should be able to segregate the waste and store it in the correct bins at the point of generation; and in order for them to fulfill this function efficiently, it is important that they have adequate knowledge about the importance of segregation and how to distinguish the different containers and bins for the various types of HCW. (4) Nurses and all the sanitation staff working in a hospital need to know the health hazards of hospital waste and the proper techniques and methods of handling the waste. This knowledge and proper practice can go a long way towards the safe disposal of hazardous hospital waste and the protection of healthcare personnel, patients, as well as the community at large and the environment. (5)

The aim of the current study was to assess nursing staff knowledge and practice regarding HCW management in the port Sudan city (general and private) hospitals in

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Sudan.

Objectives: - General objectives

To assess the nurses knowledge, attitude and practice towards health care waste management in port Sudan city ,Sudan 2019- 2020.

Specific objective:

1.To determine the knowledge of nurses regarding health care waste management

2.To assess the attitude and practice of nurses toward health care waste management.

Methods

Study design: this is Descriptive cross-sectional hospital based study.

Study area: Port Sudan state the capital of the Red Sea State ,estimation population of approximately 18,25180 ,the are 22 governmental hospital and 10 non-governmental hospital

Study population :

Nurses how work in selected hospital

Sampling: Type of sample simple randomized sample

1.Sample size:

The sample size was calculated by using the following equation to estimate the required sample size:

$$\text{Sample size} = \frac{Z2/PQ}{D^2}$$

N = Sample size

Z = the normal standard deviate (Z=1.96)

P = the anticipated population proportion or frequency of event.

d = Absolute precision required on either side of the proportion

q = 1-P

Other formula can be used when the researcher is confronted with limitation of resources. The formula to determine of sample size is:

$$n = \frac{\frac{n_0}{1 + (n_0 - 1)}}{N}$$

N= is the population size

n_0 = is the sample size

N=130 nurse

The sample size from government hospital ,osman degna(18),obstetric (18)and pediatric (17) total (53)

From private hospital , al shorta(25),al mawany (30)and al jamark(22) total (77)

Data collection:

By.

1. questionnaire was designed of asset of question of knowledge and practice.
2. ckick list for practice

Data analysis: To analyses data by SPSs program version 21.

Inclusion and Exclusion Criteria: -

The ethical clearance of approval was obtained before data collection and analyses from the following:

1. Selected government Hospital.

2. Participants in the study through verbal and written informed consent forms was obtained from each participant before gathering data and any participant has choice to refuse or accept to be included in this study. The participants' names was not involved in the data collection tool, and there was no harm or costs to participate.

RESULTS

Table 1: Frequency of nurses to knowledge questions regarding health care waste management:

	Question	Yes	%	No	%
	Part 1: Knowledge about the sources and classification of HCW by WHO:-				
1	The major classification is-infectious non- Infectious/ Hazardous non- Hazardous?	103	79.2	27	20.8
	Sources of health care waste: Who generates the health care waste:				
	a) Hospitals and medical clinics and dental clinics?	125	96.2	5	3.8
	b) Medical laboratories?	109	83.8	21	16.2
2	c) Veterinary hospital?	101	77.7	29	22.3
	Part 2; Awareness about risk associated with HCW:				
3	hazards associated with HCW are due to:				
	a) Presence of infectious agents?	112	86.2	18	13.8
	b) Presence of toxic or hazardous chemicals pharmaceuticals?	106	81.5	24	18.5
	c Presence of radioactivity?	95	73.1	35	26.9
	d) Presence of used sharps?	112	86.2	18	13.8
4	**diseases spread via HCW: -**				
	a) HIV/AIDS may be acquired through contact with HCW?	114	87.7	16	12.3
	b) Hepatitis (A), (B), (C), may be transmitted through contact with HCW?	106	81.5	24	18.5
	c) Gastro enteric infections, may be transmitted through contact with HCW?	76	58.5	54	41.5
	d) Respiratory infections, may be transmitted through contact with HCW?	74	56.9	56	43.1
5	The main group of people / persons at risk from exposure to HCW?				
	a) Exposure to HCW could lead to the transmission of infections among HCWs in HCFs?	120	92.3	10	7.7
	b) Exposure to HCW could lead to the transmission of infections among Patients in HCFs?	107	82.3	23	17.3
	c) Exposure to HCW could lead to the transmission of infections among Visitors to HCFs?	93	71.5	37	28.5
	d) Exposure to HCW could lead to the transmission of infections among cleaners and waste workers in HCFs?	111	85.4	19	14.6
	e) Exposure to HCW could lead to the transmission of infections among general public?	80	61.5	50	38.5
6	vehicles or means of transmission of infectious diseases in the hospital from HCW to HCWs (source of infection from health care waste to health care personnel IS through):				

	a) Linen and cotton fabrics, which contaminated by body fluids of patient?	94	72.3	36	27.7
	b) Sharps (broken glass ampoules scalpels, needles and scalpels?	123	94.6	7	5.4
	c) Concentrated cultures of pathogens (samples)?	97	74.6	33	25.4
7	**Part 3: knowledge regarding segregation:**				
	Who should segregate HCW (responsibility of HCW segregation)				
	a) Doctor?	41	31.5	89	68.5
	b) Nurses?	100	76.9	30	23.1
	c) Waste workers and cleaners?	92	70.8	38	29.2
8	Where segregation of HCW should take place?				
	a) In the point of generation in wards and laboratories?	65	50.0	65	50.0
	b) Final disposal of medical waste?	51	39.2	79	60.8
	C)Storage area?	47	36.2	83	63.8
9	Attitude regarding importance of segregation of HCW, segregation is to avoid mixing of infectious non Infectious waste?	103	79.2	27	20.8
10	Colors coding for the waste containers				
	a)Yellow container is used for infectious waste materials?	61	46.9	69	53.1
	b)Black container is used for general waste ?	65	50.0	65	50.0
	c) Puncture proof container is used for disposal of sharp items?	97	74.6	33	25.4
11	When the HCW container or bin should be sealed ready for collection (when the cover in the waste container has to be tied?	48	36.9	82	63.1
12	**Part 4: -storage and transportation of HCW with in the hospital**				
	If you have put Wastes in wrong bins as put some HCW in general waste, what is your responsibility if mixing of waste?				
	a) Whole waste, has to be treated as infectious waste?	104	80.0	26	20.0
	b) Replace the waste into its containers?	78	60.0	52	40.0
13	storage and transportation of HCW with in the hospital				
	a. Storage times for infectious waste should not exceed 48 hours?	102	78.5	28	21.5
	b) Routes preferred for transport of HCW inside the hospital must be separated from that used by public?	113	86.9	17	13.1
14	**Part 5: Health care waste treatment:-**				
	Criteria should be consider in selecting treatment technology for health care:-				
	a. Volume and mass reduction	50	38.5	80	61.5
	b. Social and political acceptability	15	11.5	115	88.5
	C, Operation and maintenance consideration.	11	8.5	119	91.5
	d. Type and quantity of waste for treatment .	73	56.2	57	43.8
15	Most common technology and process used in health care waste treatment:-				
	a. Thermal				
	b. Chemical	98	75.4	32	24.6
	c. biological process	15	11.5	115	88.5
	d ..irradiation	16	12.3	114	87.7
		19	14.6	111	85.4
16	Requirement for storage facilities:-				
	a-The storage area should have impermeable – hard standing floor with good drainage .	96	73.8	34	26.2
	b.There should be lighting and adequate ventilation	33	25.4	97	74.6
	c. The storage area should be in accessible to animal, insects and birds.	47	36.2	83	63.8
	d. Essay access for waste collection vehicles is essential.	15	11.5	115	88.5

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Table 2: Frequency of respondents to practice items **to health care waste management**

Item		Proper	Fair	Poor	Note done
Are you making sure for color coding system of waste, while disposing off the health care waste?	N	-	-	-	130
	%	-	-	-	100.0
Are you segregating the waste in different categories, while dealing with healthcare waste?	N	-	48	64	18
	%	-	36.9	49.2	13.9
Are you wash your hands properly when collect and segregate HCW?	N	-	-	130	-
	%	-	-	100.0	-
Are you wearing gloves when dealing with HCW?	N	-	87	43	-
	%	-	66.9	33.1	-
Are you wearing protective clothes during HCW operation?	N	18	69	43	-
	%	13.8	53.1	33.1	-
Had previous vaccination to hepatitis B?	N	77	-	-	53
	%	59.2	-	-	40.8
Are using one hand to hold the cap and the other to hold the needle?	N	-	-	-	130
	%	-	-	-	100.0
Discard of sharp in safety box	N	-	-	130	-
	%	-	-	100.0	-
How often do you use the provided health care waste bins to dispose of?	N	-	-	130	-
	%	-	-	100.0	-
How often do you think you put waste in wrong bins (mixing of waste as put some general waste in medical waste bins)?	N	-	-	130	-
	%	-	-	100.0	-

Discussion

The findings of the present study revealed that one third of the nurses gave incorrect answers related to classification , sources, health hazards of health care waste, who are at greater risk to the hazard of waste & responsibility of waste segregation , These findings were supported by (Goddu et al,2007) (6) who compared the existing health care waste management practices in a general government hospital in India,
with that of the practices in a national health service hospital in England founded that the staff nurses are not aware of the potential hazards of the material (of waste) they were handling.

The findings of the present study revealed that more than fifty of the studied nurse gave incorrect answers related to segregation, collection, storage and treatment of health care waste, These findings disagree with the result reported by(Singh et al,2002)(7) who found that less than half of staff nurse were aware of methods of treatment & disposal of biomedical waste Also(Patil and Pokhrel (2005)(8) .

found that 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 in different containers and treated as general waste. Similarly Shafee et al,2010)(9)

The finding in the present study revealed that 43% of the studies nurse gave incorrect answer related to color coding system. this was similar to a study done in Pondicherry- India reported that

50% of HCPs had the knowledge of color coding and segregation of MWM [M. Azage, G. Haimanot, and M. Mesafint,2013](10), this result was also comparable to a study done in Pakistan reporting that 86% HCPs have information about waste color codes(A. Malini, B. Eshwar,2015](11). Another similar study from West Bengal revealed that 76% HCPs knew about various types of color coding bags for collection of MW[] R. Kumar, A. Zulfiqar, AG. Zulfikar,2013].(12)

In relation to experiencing injuries, in the current study100% of nurses not avoid injury by used needle/sharps during their working time, which was consistent with a study from India reporting that 55% HCPs had experienced needle prick injuries in their work life [Sabbah, H. Sabbah, S. Sabbah, H. Akoum,2013(13)]. Another study done in Cairo revealed that 46 % of HCPs had needle prick injury or sharp injury and 19% of health care worker had sharp or needle prick injury within the last year [M. Asadullah, GK. Karthik, B. Dharmappa,2013].)(14) Another study identified that 51% HCPs were subject to injuries caused by a sharp tool in a 6-month period and that 80% of those injuries were inflicted by injectors [SA. Hakim, A. Mohsen, I. Bakr,2014](15). In a study from Karnataka, India experiencing of needle prick injury was less than the present study and only21% of medical staff reported needle prick injuries [H. Fiedler,2007](16). Concerning hand washing practice after collection and segregation of HCW, the majority (100%) of the nurses showed poor practices. The finding of the present study was consistent with two studies implemented in Egypt in Damietta city in 2009(18) and in Mansoura International Specialized Hospital in 2008. (19) These studies revealed that the majority of nurses wash their hands after dealing with blood or patient body secretion and after using infected equipment.

On the other hand, the study by El-Sayed, Zakaria, and Gheith in Egypt in 2012 (17) reported a low percentage of nursing and sanitation staff washing their hands (12.8%). Potter and Perry in 2009(20) mentioned that hand washing is the most basic and effective infection control measure that prevents and controls the transmission of infectious agents and that barrier minimize the risk of exposure to blood and body fluids.

Barrier precautions mainly consist of using personal protective measures, such as masks, gowns, and gloves to create a barrier between the person and the microorganisms . In the current study, 68.2 of the nurse reported poor practices wearing protective clothes during HCW operations, This may be attributed to inadequate knowledge about the importance of wearing personal protective clothing, lack of sufficient training in infection control, and/or shortage of disposable supplies and protective personal equipment (PPE) Also the attitude of the nurses toward wearing personal protective clothing . These explanations are generally supported by previous study findings in Egypt in 2012, (17) and in 2004, (21) where a low percent of nurses regularly wore protective clothing.

On the other hand, the present study revealed that the majority of nurse always not wore gloves when dealing with HCW This result was in agreement with the previous studies conducted in Mansoura in Egypt in 2012 (17) and in England and India in 2007. (6) These studies reported that staff nurses were handling HCW with appropriate health and safety

measures by using impervious gloves. Regarding previous vaccination to Hepatitis-B virus, 40.8% of the nurses in the intervention group were not vaccinated for hepatitis B. This result is still lower than the result reported by the study conducted by Assadallah in India in 2013, (22) which showed that 74.5%of the study respondents were vaccinated for the Hepatitis-B virus.

Conclusion:

The current study indicates knowledge, attitude and practices of nursing staff regarding classification , sources, health hazards of health care waste.

The study findings pointed to upgrading nurse's knowledge, attitude and practice related to segregation, collection, storage, color coding system and treatment of health care waste

The Study has suggested that the knowledge, attitude practice of nurses towards safety measures (immunization, wearing protective cloth , periodic examination , hand hygiene), need awareness raising through training .

Recommendation:

1. In the light of the foregoing the following recommendations are suggested.
2. Orientation programs are recommended to provide newly appointed nurses with enough information and training relevant to waste management.
3. Continuous assessment of nurses knowledge attitude and practice toward waste management in hospital is essential to identify nurses training needs.
4. Based on analysis of the results of assessment, continuous in-service programs and refreshing courses should be conducted for all staff nurses to fill the deficiency of their knowledge attitude and practice.
5. A close monitoring, systematic supervision and quality assessment of healthcare waste management to ensure the application of safety regulations in waste handling continuously.
6. Establishment of waste management auditing system.
7. The availability of essential supplies, such as color-coded plastic bags and puncture- resistant containers is necessary.
8. Healthcare waste management duties must be including in the job description of the staff nurses.

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