Knowledge and Practices Regarding Biomedical Waste Management among Registered Nurses of Tertiary Care Hospital, Lahore

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Abstract

Background: *The healthcare services including curative, primitive or preventive inevitably create waste which itself may be hazardous to health. It carries a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate knowledge of handling the healthcare waste may have serious health consequences and a significant impact on the environment l. (Suwarna Madhukumar April 2012). Insufficient knowledge about the type of waste and its handling may have serious health problems.*

Objective: *To determine level awareness of infectious waste management among staff nurses and describes their level of knowledge, attitude and practice towards infectious waste management.*

Methodology: *Quantitative descriptive cross-sectional design was used to assess the knowledge and practices of registered Nurses regarding biomedical waste management. A cross-sectional is the study that collects information about population at specific time of period (*Lisa B 2014). *Data was collected from 90 nursing staff through convenient sampling techniques. Those who meet the inclusion criteria were included in the study and those who don't meet the criteria were not the part of this study. Data was analyzed in SPSS version 22.*

Result: *Results suggests that the nursing staff have unsatisfactory knowledge about biomedical waste management in the selected tertiary care hospital, Lahore. More than 50% of the study participants had (have) inappropriate knowledge about different knowledge based statements, other 50% had (have) poor knowledge regarding waste management techniques and procedures. The attitude and practices were moderately around 40 % to 70% of participants. Conclusion: According to study, results of nursing staff of selected tertiary care hospital had poor knowledge about biomedical waste management, Therefore their practice was also poor and unsatisfactory .They all need regular training and monitoring for practice improvement.*

Keywords: *waste management, Knowledge, attitude, Practices*

I- INTRODUCTION

Biomedical waste is defined as the waste produced during medical research activities; prognosis, treatment and immunization of human beings and animals .It might be harmful for the people involved (Deb et al., 2017). Inadequacy of appropriate information while dealing with biomedical waste may enhance the health risks for the concerned workers and lead to critical impact on environment as well. Healthcare waste is a heterogeneous mixture, which may be very difficult to control (Acharya, Rekha, et al., 2017). Though legal provisions [Biomedical Waste Rules 1998] exist to reduce the impact of hazardous hospital waste in the community, these provisions are yet to be fully implemented. Lack of awareness about the health hazards from biomedical wastes, insufficient financial and human resources and poor control of waste disposal are the most critical problems connected with the healthcare waste. The hazardous impact of medical waste on the public and environment is enhanced if appropriate handling of these wastes is not adopted. The hospital waste management has diverse consequences, as it not only affects the health of patients but also of healthcare workers i.e. doctors, nurses, sanitary staff, etc. and public. (Ream et al 2016) Adequate knowledge about the health hazards of hospital waste, proper technique and methods of handling the waste, and practice of safety measures can go a long way toward the safe disposal of hazardous hospital waste and protect the community from various adverse effects of the hazardous waste. (Chartier,Y.Ed., 2014) Various studies in the past have shown that health care workers in our country are still not fully aware about proper biomedical waste handling and disposal. In fact globally there is an increasing awareness about

proper biomedical waste handling and disposal. (Lama, L., 2016) Waste minimization means the reduction, to the extent feasible, in the amount of hazardous waste generated prior to any treatment, storage, or disposal of the waste. Because waste minimization efforts eliminate waste before it is generated, disposal costs may be reduced, and the impact on the environment may be lessened. (Chartier,Y.Ed., 2014) A study by Mathur V. et al, on knowledge and practices about biomedical waste management among healthcare personnel opined overall color coding and waste segregation at source was found to be better among nurses as compared to doctors, which were similar findings reported from another study. (Jahan,I., 2018) There are primarily 4 broad functions for Biomedical management at source of generation, placement of waste receptacles or bins lined with waste bags at source of generation, segregation of waste, mutilation of recyclable waste and disinfection of waste(Lohani,N.,Dixit,S., 2016) Waste management usually benefits the waste producer: costs for both the purchase of goods and for waste treatment and disposal are reduced and the liabilities associated with the disposal of hazardous waste are lessened. Collection, transportation and disposal of medical wastes according to world standards were mandated by the publication of "Regulation on the Control of Medical Wastes" in the issue 25883 of the Official Gazette dated 22.07.2005. It is therefore necessary to develop hygienic and economical systems for the disposal of medical wastes where they are regularly collected, categorized and separated at the point of their source (Issue 25883 of the Official Gazette, dated 22.07.2005); (WHO) (Ozder,A., et al.,2013). The scientific " Hospital waste Management " is of vital importance as its improper management poses risks to the health care workers, waste handlers, patients, community in general and largely the environment. Keeping this in view, bio-medical waste management at this tertiary care Government set up was studied.(Mathur,P.,Patan,S.,2018) According to a WHO (2011) report, over 80% of waste produced by both hospitals and clinics is of general type while remaining 20% is considered highly risky that might be toxic, infectious and radioactive. It is mentioned that one in twelve human beings suffer from persistent hepatitis due to improper biomedical waste management. The WHO policy paper suggests that government organizations adopt recycling, polyvinyl chloride (PVC)-free medical devices, risk assessment and sustainable technologies to promote environmentally sound management of Biomedical waste (Capoor ,MR. et al.,2017) Nurses play a key role in the management of Health care waste. 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 Health care waste. 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. (Elnour,A.M. et al.,2015) Since the industrial revolution and advancements in science, technology and medicine, the average life expectancy and general human population has increased to an unprecedented number. At the same time industrialization has led to a sharp increase in morbidity and mortality rate. As a result, there is a worldwide increase in the number of hospitals and healthcare facilities in order to meet the demands of an ever-growing population leading to even larger amounts of healthcare waste being produced. (Farooq, M. et al, 2017) The objective of biomedical waste control is mainly to reduce waste generation, to make certain its green collection, managing, as well as secure disposal in such a way that it controls infection and improves protection for employees operating in the system. For this to take place, an aware, coordinated, and cooperative effort has to be made from physicians to ward-boys for improving the situation in future (Saini, S et al., 2013).

. The Significance of the Study:

This study will help to determine the knowledge and practices about waste disposal among nurses and will

further facilitate in prevention from future infectious diseases. It will also help the health care organization to determine the need of conducting workshops and seminars to improve the knowledge of health care workers. It will also help to minimize the risk of accidental injuries to the staff, visitors and the community. Study will help to reduce the like hood of contamination of soil or ground water with chemicals or microorganism and will help to lessen the risk associated with hazardous chemicals and other biomedical waste.

II- METHODS

SETTING

This Study was carried out at tertiary care Hospital, Lahore.

RESEARCH DESIGN

Quantitative descriptive cross-sectional design was used to assess the knowledge and practices of registered Nurses regarding biomedical waste management. A cross-sectional is that study that collects information from a population at specific time of period (Lisa B 2014).

POPULATION

Registered Nurses working Medical, Surgical and Gynecological departments of Services Hospital Lahore

SAMPLING

Total population of Registered Nurses working in Services Hospital is six hundred. By using 90% confidence level and 10% precision level, out of the 600 population, a sample size of 86 nurses will be taken. Yamane, Taro. 1967. Statistics, an Introductory Analysis, 2nd Ed., New York: Harper and Row

RESEARCH INSTRUMENT

Non-probability convenient sampling .It is probably the most common of all sampling techniques. With convenience sampling, the samples are selected because they are accessible to the researcher. Subjects are chosen simply 90 because they are easy to recruit. This technique is considered easiest, cheapest and least time consuming.

DATA GATHERING PROCEDURE

Data Collection Tool: The data has collected by using a predesigned and pretested Questionnaire which consists of forty closed-ended questions. (Alok Sharma, Varsha Sharma, Swati Sharma, Prabhat Singh, Awareness of Biomedical Waste Management Among Health Care Personnel in Jaipur, India 2013)

METHODS USED TO ANALYZE DATA

9. Data Analysis: By using the latest SPSS 22 versions and Excel. Statistical analysis was carried out using SPSS for Windows version 16. The data was summarized by descriptive statistics using the frequency, percentage and tables for categorical variables. The relationship between variables scores and socio-demographic variables was tested by using linear regression. The significance level for all statistical analysis was set at 0.05.

STUDY TIMELINE

The data was collected from DEC, 2018 to MAR, 2019.

ETHICAL CONSIDERATION

The study has conducted after taking permission letter from the Institution Review Board (IRB). A permission letter from the concerned Hospital and informed consent from the study participant also collected, after giving complete info on study's purpose. Respect for the dignity of research participants has prioritized. The protection of the privacy of research participants has ensured. Adequate level of confidentiality of the research data ensured.

PROFILE OF THE RESPONDENTS

Table 1. Demographic frequency

. RESULTS

- Level of knowledge of biomedical waste generation, hazards and legislation among health care personnel

Excellent: 6> correct answer out of 10 Good to Average: 3 correct out of 10 Poor: 3> correct out of 10 (Excellent knowledge of biomedical waste generation 65% General Nursing & 2 year BS Nursing and 50% 4-Year BS Nursing, good or average knowledge of biomedical waste generation 3% General Nursing Diploma and 17% 4 Year BS Nursing. Poor knowledge of Biomedical waste generation 32% General Nursing, 33% 4 Year BS Nursing & 35% 2 year BS Nursing.

- Level of awareness of biomedical waste management practices

Excellent: 5> correct answer out of 10 Good to Average: 0 correct out of 10 Poor: 4> correct out of 10(Excellent knowledge of biomedical waste generation awareness 58% General Nursing, 59% 2 year BS Nursing and 50% 4-Year BS Nursing. Poor knowledge of waste generation awareness 42% General Nursing, 50% 4 Year BS Nursing & 41% 2 year BS Nursing.)

- Level of knowledge of needle-stick injuries among health care Nurses

Excellent: 6> correct answer out of 10 Good to Average: 0 correct out of 10 Poor: 3> correct out of 10(Excellent knowledge of needle-stick injuries 64% General Nursing, 65% 2 year BS Nursing and 60% 4-Year BS Nursing. Poor knowledge of needle-stick injuries 36% General Nursing, 40% 4 Year BS Nursing & 35% 2 year BS Nursing.)

- Only 79.1% population know about the biomedical waste generation and legislation, 15,1% not sure about the biomedical waste generation and legislation and 5.8% don't know about the biomedical waste generation and legislation

- 67.4% population answer about the agencies that state regulates this work, 20.9% said private and 11.6% don't know about the agencies.
- Only 86% population know about the BM waste generation, hazards and legislation, 5.8% somewhat about the BM waste generation, hazards and legislation and 8.1 % don't know about the BM waste generation, hazards and legislation
- 30.2% population state that "Materials that may be poisonous, toxic, or flammable and do not pose disease-related risk." 62.8 % said "Waste that is saturated to the point of dripping with blood or body fluids contaminated with blood." And 7% said Waste that does not pose a disease-related risk.

Variables	n	Percent
Gender		
Male	0	0
Female	150	100.0
Marital; status		
Single	95	63.3
Married	55	36.7
Age of the participant		
18-25 years	45	30.0
26-35 years	75	50.0
36-50 years	30	20.0
Education of the participants		
General nursing	106	70.7
BSN/PRN	44	29.3

- According to the rule 73.3% population state that waste should not be stored beyond the 12 hours, 12.8% said 48 hours and 14% said 72 Hours.
- Only 81.4% population knows about the permit to transport BM waste, 9.3% said they can't about the permit to transport BM waste, and 9.3 % said they no need any permit.
- 84.9% population knows about color coding segregation of BM waste, 11.6% they not sure about the color coding and 3.5 % they don't have any knowledge.
- 77.9% population follow the color coding for BM waste, 12.8% they state that sometimes they follow the color coding for BM waste and 9.3 % they don't follow the color coding for BM waste.

- As per 79.1% population they said hospital follow the waste disposal practice in their hospital, 9.3% said hospital is not following the practice and 11.6% population said they don't want to comment on this question.
- As per the question related to wastage of needle, glass ampoules & scalpels, 52.3% population said that they used "Sharp container", 44.2% said they use "Yellow Bags", 1.2% use "Black Bags" and 2.3% using "Clear Bags"
- 41.9% population state that documents with confidential patient information are to be disposed of into the paper recycling bins, 40.7% state that the statement is false and 17.4% state they don't know.
- 27.9% population state that color code for BM waste to be autoclaved disinfected is "Red", 10.5% state "Black", 34.9% state "Yellow" and other 26.7% state "Blue/White
- 4.7% population state that 10-20% infectious waste generated from health care facility and 25.6% state 30-40%, 57% population state that 50-60% waste generated from healthcare facility and 12.8% state that 80-90% generated from health care.
- 10.5% population state that color code for disposal of normal waste from the hospital is "Red", 20.9% state "Black", 46.5% state "Yellow" and 22.1% state that "Blue" Color
- 36% population state that glassware & metallic body implants are dispose of in "White", 19.8% state that in "Blue" and 44.2% state that they don't know.
- 50% state that red coding for "Sharp waste", 25.6% state that for "Needle Hub and 24.4% state nothing
- 89.5% population state that color code is not including in code is "Brown" and rest of population state 10.5% for "Yellow"
- 15.1% state that iv bottles should dispose in "Red Bags" 76.7% said in "Yellow Bags" and 8.1% state that in "Blue Bags"
- 14% population state that BM waste handlers should "Be made aware of the risk involved in handling biomedical waste", 43% state Use personal protective equipment like gloves, mask, protective glasses, gumboots and 43% state both of the above.
- 70.9% population state that they follow the color coding while disposing of waste, 15.1% state they don't follow and 14% state that sometime they follow rules.
- 27% people state that they followed the "Exposed parts to be washed with soap and water", 34.9% State "The pricked finger should be kept in antiseptic lotion", 26.7% state "Splashes to eyes should be irrigated with sterile irritants and 10.5% "Splashes to the skin to be flushed with water."
- 3.5% population state that this statement is not true regarding hazardous waste container "Containers must be closed except when removing or adding waste", 20.9% said this statement is not true "Containers must be clean on the outside", 12.8% said this not true "Contents must be compatible with the type of waste containers and 62.8% state this one is not true "Any type of container, including food containers, can be used to contain hazardous"
- 36% people said that they "agree" safe management of healthcare waste is not an issue, 51.2% population are "disagree" and 12.8% population cannot pass any comment.
- 82.6% population state that they "agree" waste management is teamwork, 10.5% "disagree" and 7% state that they can't comment.
- 37.2% people "agree" with the statement 51.1% "disagree" with the question statement and 11.6% can't comment about the safe management efforts is financial burden on management,
- 40.7% people "agree" with the statement and 59.3% "disagree" with the statement "safe management of healthcare is extra burden on worker".
- 93. % population are "agree" that separate or continuous education program for BM management should be organized, 5.8% are not agree and 1.2% didn't pass any comment
- 90.7% population are "agree" to join voluntarily program about BM management, 5.8% state they don't and 3.5% population didn't pass any comment.
- 51.4% population say "Yes" infectious waste should be sterilized from infections by autoclaving Before shredding and disposal, 38.4% said "No" and 10.5% population they can't comment.

- 77.9% population state "Yes" an effluent treatment plant for disinfection of infected water should be set up in hospital, 14% says "No" and 8.1% they can't comment.
- 81.4% population says "Yes" it is important to report to government if any institute is not following the BM waste management and 8.1% says "No" and 10.5% they can't comment.
- 87.2% population says "Yes" they think labeling the container before filling it with waste is of any clinical significance, 7% says "No" and 5.8% they can't comment
- "Yes" 90.7% says needle-stick may cause injury concern, 8.1% says "No" and 1.2% they can't comment
- 72.1% says "Yes" re-cap the used needle, 26.7% says "No" re-cap the needle and 1.2% they can't comment.
- 93% says "Yes" discards the used needle immediately and 7% says "No".
- 87.2% population says "Yes" they are aware of consequences of needle-stick injury and 11.6% says "No" they are not aware of consequences of needle-stick injury and 1.2% says they have not Any concerned
- 45.3% population says "Yes" they sustained a needle-stick injury in the last 12 month and 52.3% says "No" and 2.3% don't remember.
- 33.7% says they face recent incident because of "Poor disposal of needle", 10.5% says recent incident by "individual carelessness/accident", 46.5% don't remembered and 9.3% due to other cause.
- 20.9% report to "Line Manager, 18.6% report to "Occupational Health", 15.1% report to " Infection Control", 17.4% report "Nobody", 25.6% can't remembered and 2.3% no answer.
- 40.7% population says "Yes" they fill in an incident report, 50% says they "Don't" and 9.3% Population can't remember.

DISCUSSION

Discussion: The study was conducted on predesigned and pretested questionnaire and a cross-sectional study design was selected. knowledge about color coding of containers, and waste segregation which itself is probably the most important pivotal point and crucial for further waste management, was found to be lower among the Generic staff as compared to Diploma staff and Post RN staff. Training of staff nurses is critical for the proper and appropriate management of biomedical waste. The practice of reporting of injuries resulting from improperly disposed biomedical waste was found to be low among the Generic staff as compared to Diploma staff and Post RN staff. Low reporting of injuries may be attributed to the fact that most of the stakeholders are unaware about a formal system of injury reporting which should be established within all the health facilities.

LIMITATIONS

Limitations of the study were following

- Lees sample size 150 due to which we cannot generalize this study on whole population.
- One of limitations of is study was lack of time
- Convenient sampling technique was used which often suffer from biasness

CONCLUSION

The purpose of this study was to assess knowledge, attitude and practice among nursing students at mayo hospital, Lahore among 150 students .Over result show that the patients perception about quality of nursing care are good and patients have positive response about quality of nursing care in all four hospitals.in which most students have positive attitude towards oral care, good practice and have more knowledge. Very less participants were ignoring good practice of the oral care negative attitude. But overall result is positive

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