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Biomedical Waste Management: A Study of Assessment of Knowledge, Attitude, Practices among Healthcare Experts in Private Hospital

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ABSTRACT: Biomedical waste (BMW) generated in our country day by day which creates infectious disease and hazardous materials. It is very important to know the value of hazardousness to employees in the work of environment and make its disposition effective and in a scientific manner. It is very typical to engage in to biomedical sector have adequate knowledge, Attitudes and Practices (KAP) with respect to biomedical wastes management for different professionals. By doing many professional studies across the country have shown that there are still deficiencies in the KAP of the employees in the organization hence it is important to make it appraisal of the same. It is very important to teach regarding biomedical waste to doctors, post graduates, staff nurses, laboratory technicians and house-keeping staffs. There is a cross sectional study was carried out using questionnaire as the study tool among the health care professional in a tertiary care teaching Hospital. The study shown gaps in the knowledge amongst all the cadres of the study respondents. The knowledge in relation to BMW management including the Hospital BMW protocols was more desirable to doctors, but practical facts are better in nurses, lab technician and house keeping staffs.

Keywords: Biomedical Waste, Doctors, Nurses, Attitude, Knowledge

INTRODUCTION

Health care waste is a unique class of waste by the quality of its composition, source of generation. It is necessary for hazardous nature to do the need for appropriate protection during handling, treatment and disposal. The mismanagement of the waste affects not only the generators, operators but also the common people too.

Biomedical waste (BMW) is a type of any solid or liquid waste including its container and their product, which is generated during the diagnosis, treatment or immunization of human beings or animals or during research work. At the time of procedures that are carried out at the various health care setups. The excessive amounts of waste have been generated at big scale Hospitals.

India approximately generates 2 kg/bed/day[3] and this biomedical waste like anatomical waste, cytotoxic wastes, of the whole. The practices by which healthcare personnel start their carrier is not easy to change. The importance of addressing BMW management issues amongst healthcare personnel. The BMW management was the current study was conducted to assess the knowledge and attitudes of various groups of healthcare. By the help of this knowledge we can determine

the following: Namely, their existing knowledge and attitudes. The second stage of study was to assess the effectiveness of a practical oriented training program in our Hospital on BMW management.

Review Of Literature

Vikas Thakur and A Ramesh(2008)studied the: (i) the trends in healthcare waste management literature regarding journals published; (ii) main topics of research in healthcare waste management; (iii) methodologies used in healthcare waste management research; (iv) areas most frequently researched by researchers; and (v) determined the scope of future research in healthcare waste management.

Method: The authors conducted a systematic review of 176 articles on healthcare waste management taken from the following eight esteemed journals: International Journal of Environmental Health Research, International Journal of Healthcare Quality Assurance, Journal of Environmental Management, Journal of Hazardous Material, Journal of Material Cycles and Waste Management, Resources, Conservations and Recycling, Waste Management, and Waste Management & Research.

Result: The authors have applied both quantitative and qualitative approaches for analysis, and results were useful in the following ways: (i) showed the importance of healthcare waste management in healthcare operations; (ii) findings gave a comparative view of the various publications; (iii) study gave the light on future research areas.

Odiem Marymina (2009)determined the frequency of practice of the health care waste management practices on segregation, minimization, collection, storage, transport, disposal and treatment in the hospitals in Tabuk City.

Method: The study utilized a descriptive cross-sectional design. Interviews and ocular surveys/on site observation, and the interviewer-administered questionnaire were utilized to gather data from the head nurse, waste handler during collection, waste handler during transport and waste manager Data collected were treated using a five point Likert scale, and quantified using the frequency count, ranking, percentage and the Weighted Mean.

Five hospitals were selected, and a questionnaire was developed, based on the World Health Organization (WHO) guidelines for the assessment of hospital waste management. Moreover, hospital waste managers, hospital authorities, and other involved personnel were interviewed to gather further information.

Results: The study revealed that the health care wastes management practices are sometimes implemented in the hospitals in Tabuk City; segregation of wastes was generally often practiced, however, the use of plastic bags/plastic-lined cardboard boxes/leak-proof as containers of infectious and pathological wastes was seldom practiced. Waste minimization was often practiced, but composting was seldom practiced. Waste collection was sometimes practiced, but the collection of general wastes every shift and collection of biohazard wastes every shift was seldom practiced by the respondents. The average rate of waste production was 4.72 Kg/bed/day

(infectious waste, 2.3 Kg/bed/day). General and medical wastes were routinely segregated, and disinfection was accomplished in nearly 43% of hospital waste containers. The sanitary status of storage systems was strong in 20%, moderate in 60%, and poor in 20% of hospitals.

Conclusions: Observations indicated the unsuitable conditions of waste storage systems. Implementation of management activities can improve health and environmental aspects of hospital waste management.

Stephen Obekpa Abah 1 and Elijah Ige Ohimain (2011) A cross sectional descriptive study was carried out between June and September 2011 at a tertiary health facility (Teaching Hospital) in Nigeria with the aim of assessing the current practices and commitment to sustainable HCW management in a tertiary healthcare facility.

Method: The study approach involved the estimation of the quantity of HCW generated, evaluation of the waste segregation practices and determination of the knowledge of healthcare workers regarding HCW management. Daily waste inventory of each ward was carried out. A total of 52 health workers, including doctors and nurses were interviewed to determine their knowledge and practice with regards to HCW. An evaluation of the status of the waste management practice in the health facility was carried out using the following criteria: waste management (responsibility, segregation, storage and packaging); waste transport; waste recycling and reuse; waste treatment and final disposal.

Result: The Result showed that the average amount of HCW was 0.62 kg/person/day at the out - patient units and 0.81 kg/bed/day in the inpatient wards. The proportion of respondents who had received specific training in the management of HCW was 11.5% (6/52). The number who understood the importance of HCW management in the provision of safety to the public was 46% (24/52). The level of healthcare waste management practice was found to be 0% (that is unsustainable).

Conclusion: This paper has highlighted the pitfalls of HCW management in Nigeria, a developing country where resources are limited. The paper concluded by recommending measures to improve the HCW management practices in the country.

Agunwamba J C (2012)A cross sectional descriptive study of Medical Waste Management (MWM) practice and their implication to health and environment was carried out between August and September 2012 in Calabar metropolis, Cross River State, Nigeria with the aim of assessing the current practices and commitment to sustainable HCW management in three (1 tertiary, 1 General and 1 Private) hospitals ranging in capacity from 30 to 500 beds.

Method: The study approach involved the estimation of the quantity of HCW generated, evaluation of the waste segregation practices and determination of the knowledge of healthcare workers regarding HCW management. Daily waste inventory of each ward was carried out. An evaluation of the status of the waste management practice in the health facility was carried out

using the following criteria: waste management (responsibility, segregation, storage and packaging); waste transport; waste recycling and reuse; waste treatment and final disposal.
Result: Comparing the results gotten from the tertiary hospital and results gotten from developed countries, Analysis of Variance (ANOVA) was used which showed a less non-significant value. Out of the 189 people that participated in the survey of medical waste management, 19% of the people were highly concerned. 38% of the people were slightly concerned and 33% of them were neutral in their approach. The remaining people were not at all concerned with the MWM. Profession and age seemed to have an effect on the result.
Conclusion: The result obtained from the study showed wastes generation at the rate of 1.31, 1.16 and 0.78 kg/day/patient for large, medium and small sized hospitals, respectively. The remaining people were not at all concerned with the MWM. Profession and age seemed to have an effect on the result. The paper concluded by suggesting the better HCW management practices in the Country.

Amin R, Gul R, Mehrab A(2013) examined Medical Waste Management Practices in different hospitals of Peshawar.
Methodology: Simple observational, cross-sectional study was conducted with a case study approach. Aug-Sep 2011, with selection of 15 hospitals. The data was collected through a pre-designed questionnaire with a checklist.
Results: The study showed that 80% of the hospital personnel knew hospital waste and its management. There was waste management plan present in 30% of hospitals. Although hospitals did not quantified waste amounts but on average the amount of waste generated daily was 0.5-1 kg/bed/day. Segregation into risk and non-risk waste was done in 93.3% of hospitals. For non-risk waste, disposal through Municipal Corporation was conducted in 86.67% of the hospitals, while in 13.3%, it was burnt. For risk waste, either it was buried or burnt. Proper incineration was carried out in only 33.3% of the hospitals.
Conclusions: Hospital waste generation, segregation, collection, transportation & disposal practices were not in accordance with standard guidelines. The average waste generation in most of the hospitals was almost equivalent to other under developed countries but less than that of developed countries. The hospital waste in the majority of hospitals of Peshawar was mismanaged. No proper hospital waste management plan existed except at few hospitals

Objectives

1. To assess the levels of knowledge, attitudes and practices among Doctors, Nurses, GDA, Patient, and Patient Attendant's in the different departments of a tertiary care teaching Hospital.

2. To assess the gaps in knowledge, Doctors, Nurses, GDA, Patient, and Patient Attendant's in the different departments of a tertiary care teaching Hospital.

Methodology

Study design: Cross-sectional study.
Study setting: Tertiary care teaching Hospital
Study population: Staff working in the different departments of the Hospital

Eligibility criteria: All consenting individuals amongst the different cadres of staff were included into the study. There were 2056 eligible participants, which was taken as the sampling frame.

Sample size: Expecting that 50% of the study population had precise knowledge (considering the outcome variable) about the rules and legislation of biomedical waste management with an allowable error of at 10% at 95% confidence interval, and accounting for the finite population correction for 2056 participants, a minimum sample size of 472 was calculated.

Sampling strategy: The study population was classified according to the different strata based on their designation as doctors, postgraduates (junior residents), interns, staff nurses, laboratory technicians and house-keeping staff. Allocation of the population according to the strata

Ethical approval: The ethical clearance for the study was obtained from the Institutional Ethics Committee.

Materials and Methods

The tool used for study could be pre-tested, semi – structured closed ended questionnaire with 42 questions on knowledge, attitudes and practices.

The questions used to ask on knowledge appraised the knowledge of participant's knowledge which related to color coding, their implications, and identification of biomedical hazard symbol, waste categories and Hospital policies for biomedical waste management.

The questions on attitude could related to matters like biomedical waste hazardous ant their management with additional burden on their work.

The questions on practice appraised if the study respondents had received any training on biomedical waste management, if they were immunized against hepatitis B and if disinfection of sharps were carried out at the point of generation.

The literature review was done on which the questionnaire was formulated that is according to the requirements of the study. The questionnaire was pretested and validated by a post-test and a pilot survey was conducted with a sample of 60 respondents, with representations from the various strata of the study respondents. The study tool consisted of 12 questions assessing the knowledge with yes/no/not sure responses, 10 questions assessing the attitude with

agree/disagree/no comment as answers and 20 questions assessing the practices with yes/ no responses.

The participants could fill the self administered questionnaires without scope for undue help.

The questionnaire was adapted from English to local language by an experienced professional who is involved in translating of health survey questionnaires to accommodate the housekeeping staff. The questionnaire was also back translated to English for checking of possible discrepancies and in corpora ting if any changes were required .The identity of the study respondents were maintained anonymous at various stages of the study.

Strata	Participants
Doctors	55
Nurses	172
GDA	37
Patients	29
Patient attendant	29

Results

The results were evaluated by 3 domains for all cadres of the study populations.

Table 1: The participant's knowledge on biomedical waste management

	Yes(%)	No(%)	Not sure(%)
Doctor	93.8	93.4	7.4
Nurse	58.2	67.4	71
Patient	61.7	74.2	61.6
Patient attendant	90	70	39.6
GDA	47	54	99

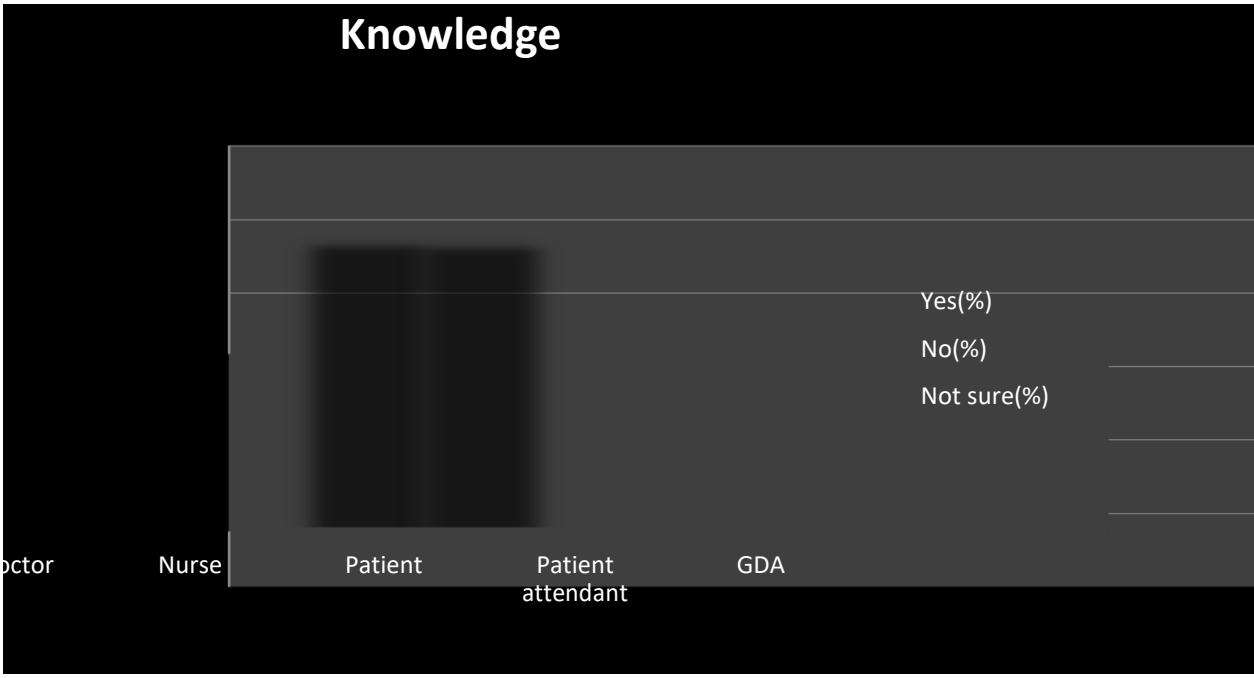


Fig 1: Percentage representation of the participant's knowledge on biomedical waste management

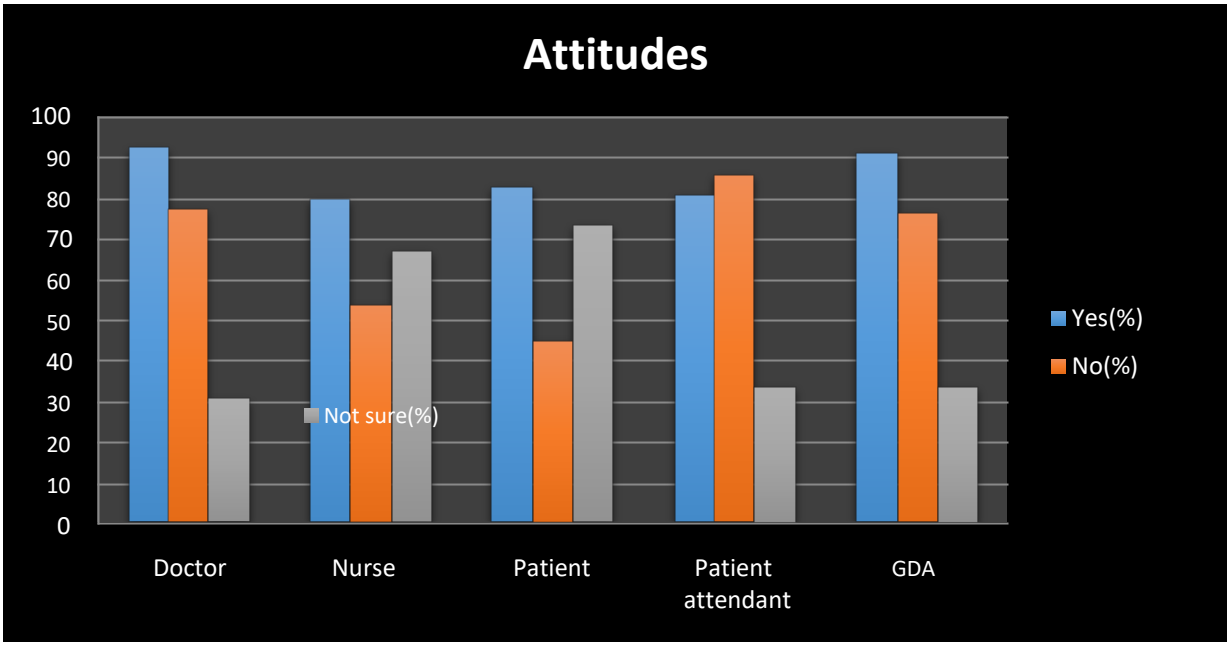
Table 2: The participant's attitudes towards biomedical waste management

	Yes(%)	No(%)	Not sure(%)
Doctor	92.3	77	30.6
Nurse	79.3	53.6	67
Patient	82.3	44.6	73
Patient attendant	80.6	85.6	33.6
GDA	90.6	76.3	33.3

	Yes(%)	No(%)	Not sure(%)
Doctor	80	93.3	30
Nurse	65.6	47.3	53.6
Patient	81.6	45.6	66.3
Patient attendant	76.6	51.6	65
GDA	81	52	67

Table 3: The participant's practices regarding biomedical waste management

Fig 2: Percentage representation of the participant's attitude towards biomedical waste management



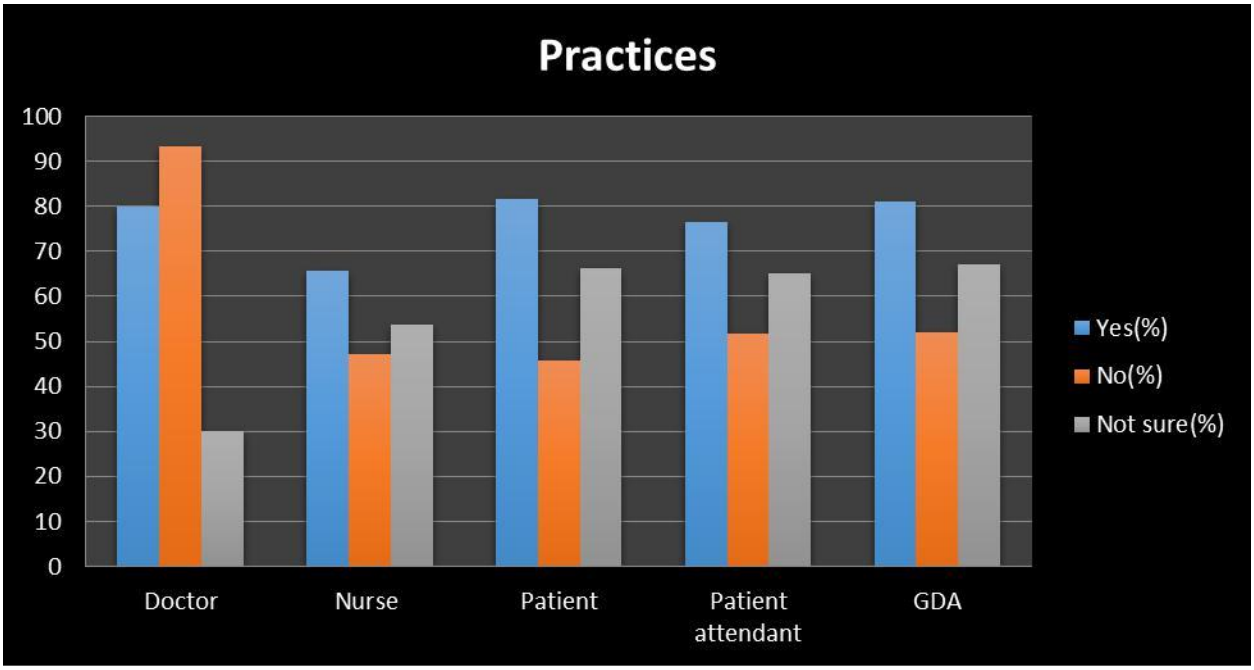


Fig 3: Percentage representation of the participant's practices on biomedical waste management

The results are displayed as under

Statistical Methods

Data was analysed using MS – excel and R version 3.4.3. Percentage (with 95% confidence intervals) were calculated and the same are presented graphically. Chi – square test was performed to test the association between the different cadres related to their knowledge, attitude and practices towards BMW.

Knowledge Score

The knowledge regarding general information about HCW was assessed, the score was highest in doctors (10) followed by nursing staff (9.3) and least in patients and patients attendant(7.5). This is found to be statistically significant.

Overall, the study respondents showed satisfactory knowledge regarding biomedical waste management. The knowledge about BMW among doctors was the distinctively better, followed by the nurses, patients, Patient Attendant and GDA. The gaps in knowledge were in the areas regarding the fate of the waste after it was segregated and as well as who the regulator for the safe transportation of biomedical waste from the Hospitals.

The mean attitude score was 9.20 for the nurses and 9.18 out of 10 for the doctors for the doctors. The favorable attitude was shown by most of the study respondents towards biomedical waste management. The best attitudes were displayed by the nurses showed, subsequently by doctors only. It was concerning that the lacuna in this domain was that biomedical waste management was considered as additional burden on work.

The mean practice score was 17.30 for the nurses and staff and 15.27 out of 20 for the doctors, in the study. Though greater number of the study respondents displayed fvourable biomedical waste management practices followed patients and patients attendants, doctors, GDA. It was noted that the staff ware following the preventative measures of immunization against hepatitis B and also routine health check-ups were conduct for the staff. Excplicit training on BMW management was desired by most of the staff.

Chi-Square Test

The null hypothesis which was to be tested here was "The two attibutes were independent".
Here three hypothesis were there to be tested:

1. Cadre and knowledge are independent.
   (chi – square = 160.8, Degrees of freedom = 10. P-value < 0.0001)

2. Cadre and attitudes are independent.
   (chi – square = 160.8, Degrees of freedom = 10. P-value < 0.0001)

3. Cadre and attitudes are independent.
   (chi – square = 538.45, Degrees of freedom = 15. P-value < 0.0001

Findings Of The Study

a) Major part of respondents are female.
b) 47% respondents are nurses by professionally.
c) Doctors and Nurses are more knowledgeable and practices regarding the biomedical waste as compared to other other staff.
d) 8% respondents not sure about the disposal of biomedical waste and 24% are not adequate practices.
e) Demographic variables like gender, age and experience has no association with knowledge and practices regarding disposal of biomedical waste.
f) Most of the respondents having 10-12 years of experience.

Conclusion

The study gives the general views regarding the level of knowledge and practices regarding the medical waste management among the health care professionals working in private hospitals of Mohali district. Adequate knowledge and practices among the staff of heath care institutions plays a very important role in controlling the infection and heath related issues. The respondent's falls in category of doctors and staff nurses are more knowledgeable about the biomedical waste than other health care workers. Regular training and awareness programmes must be needed at that level in all aspects. Sorting of wastes at source using the color coded system should seriously practice. Regular inspection from the government health departments or Ministry of health care should be carried out in hospitals on regular basis. Housekeeping staff must be trained well, so that the infection among the patients and other medical staff can be avoided at the time.

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