



KNOWLEDGE, ATTITUDE AND PRACTICES OF STAFF NURSES REGARDING BIOMEDICAL WASTE MANAGEMENT IN HOSPITALS OF PUNE.

Community Medicine

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ABSTRACT

Background: Since the implementation of the Biomedical Waste Management Rules 1998, every concerned health personnel is expected to have proper knowledge, practice and capacity to guide others for waste collection and management, and proper handling techniques. Nurses in the hospitals generate a number of hazardous wastes that can be detrimental to the environment and patients if not properly managed. With this background, the study was conducted to assess the knowledge, attitude and practice of biomedical waste management among staff nurses working in the hospitals of Pune.

Objectives: To assess the knowledge, attitude, practices regarding biomedical waste management of staff nurses.

Materials and methods: A cross-sectional questionnaire based survey containing 22 knowledge related questions, 10 attitude related items and 8 items to observe the practices of staff nurses regarding Biomedical Waste Management. The samples were the staff nurses of hospitals in Pune, Maharashtra.

Results: The mean, median and mode of knowledge, scores were 42.8, 50, 50 respectively. The p-value of the t-test came out to be 0.212 (t statistic = -1.265, d.f = 49).

Conclusion: The study revealed that although the attitude regarding Biomedical Waste Management among faculty members and students of the institution was high, knowledge and practice remained low.

KEYWORDS

Biomedical waste management, Staff nurses, Knowledge, Attitude, Practice

Introduction:

Biomedical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but also to the environment. The bio-medical wastes generated from health care units depend upon a number of factors such as waste management methods, type of health care units, occupancy of healthcare units, specialization of healthcare units, ratio of reusable items in use, availability of infrastructure and resources etc.^[1]

The proper management of biomedical waste has become a worldwide humanitarian topic today. Although hazards of poor management of biomedical waste have aroused the concern world over, especially in the light of its far-reaching effects on human, health and the environment.^[2]

Now it is a well established fact that there are many adverse and harmful effects to the environment including human beings which are caused by the "Hospital waste" generated during the patient care. Hospital waste is a potential health hazard to the health care workers, public and flora and fauna of the area. The problems of the waste disposal in the hospitals and other health-care institutions have become issues of increasing concern.^[3]

Inadequate Bio-Medical waste management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms and may lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from syringes and needles contaminated with human.^[4]

Health-care waste refers to all the waste generated by a health care establishment. It is estimated that 10-25% of health care waste is hazardous, with the potential for creating a variety of health problems.^[5]

An important pre-requisite and key to successful waste management program is segregation which is the separation of different types of waste as per treatment and disposal option. Segregation and collection of various categories of waste should be done at the source, in separate containers so that each category is treated in a suitable manner to render it harmless.

For waste management to be effective, the waste should be managed at every step, from acquisition to disposal. "With this background, the

study was conducted to assess the knowledge, attitude and practice of biomedical waste management among staff nurses working in the hospitals of Pune.

Methodology:

The study was a cross-sectional questionnaire based survey. The target population was the staff nurses working in Hospitals of Pune. A prefabricated validity tested questionnaire that was administered to the target population. The questionnaire was divided into four sections. The first part consisted of questions on personal and professional data. The second section contained 22 questions on assessment of knowledge, the third section contained attitude related items and fourth section has contained 8 items. All questions in the questionnaire were close-ended. Questionnaires were distributed among staff nurses and collected immediately after completion of filling of the questionnaire.

All returned questionnaires were coded and analyzed. Results were expressed as a number and percentage of respondents for each question and were analyzed using the SPSS Version 17 software.

Results:

Section I: Distribution of samples according to their characteristics

Table 1: Distribution of samples according to their characteristics in terms of frequency and percentages.

DEMOGRAPHIC VARIABLES	Frequency (n = 50)	Percentage (%)
AGE		
• 21-30 years	33	66%
• 31-40 Years	14	28%
• 41-50 Years	3	6%
GENDER		
• Male	5	10%
• Female	45	90%
EDUCATIONAL QUALIFICATION		
• GNM	45	90%
• B.Sc Nursing	5	10%
• M.Sc Nursing	0	0%
WORK EXPERIENCE (IN YEARS)		
• 1-5 yrs	37	74%
• 6-10 yrs	9	18%
• Above 10	4	8%

WARD OF WORK		
• Medical	20	40%
• Surgical	20	40%
• Emergency	10	20%
SOURCE OF INFORMATION		
• Induction	15	30%
• Conference	9	18%
• Workshops	24	48%
• CNE	2	4%
• Journals	0	0%
TYPE OF HOSPITAL		
• Government	50	100%
• Private	0	0%

Section II(A): Knowledge (Graphical Analysis) The respondents were asked a set of 12 questions, with a view to know their level of knowledge regarding Biomedical waste management. Three options namely 'Yes', 'No' and 'Do Not Know' were provided, and the respondent was required to mark one of these as their response.

Table 2: Assessment of the level of knowledge among the staff nurses N: 50

S. No	Question	Response			Total
		Yes	No	Do not Know	
1.	Are all healthcare wastes hazardous?	31 (62%)	19 (38%)	0 (0%)	50 (100%)
2.	Are you aware that biomedical waste management rules are applicable to nurses?	50 (100%)	0 (0%)	0 (0%)	50 (100%)
3.	Can any plastic bag be used for waste disposal?	37 (74%)	13 (26%)	0 (0%)	50 (100%)
4.	Do you agree that biomedical wastes should be segregated into different categories?	48 (96%)	2 (4%)	0 (0%)	50 (100%)
5.	Do you think your knowledge regarding biomedical waste management is adequate?	45 (90%)	3 (6%)	2 (4%)	50 (100%)
6.	Do you think you require any further training on biomedical waste management?	28 (56%)	20 (40%)	2 (4%)	50 (100%)
7.	Is the functional needle destroyer / hub cutter easily available at the site of injection	40 (80%)	10 (20%)	0 (0%)	50 (100%)
8.	Are the guidelines/ charts for the management of health care related wastes are displayed.	37 (74%)	13 (26%)	0 (0%)	50 (100%)
9.	Is there a register / log book to record the quantity of wastes produced at the point of generation?	39 (78%)	6 (12%)	5 (10%)	50 (100%)
10.	Does your waste handling staff wear Personal Protective Equipment e.g.Mask / Gloves/ Apron/ Boots	46 (92%)	4 (8%)	0 (0%)	50 (100%)
11.	Are the color coded bags stored separately in the storage area	45 (90%)	5 (10%)	0 (0%)	50 (100%)
12.	Whether bags are tied and labelled with source of generation, weights etc	50 (100%)	0 (0%)	0 (0%)	50 (100%)

The above table shows clearly shows that 62% (i.e. 31 out of 50) respondents are of the opinion that all healthcare wastes are hazardous. 100% (i.e. 50 out of 50) respondents are aware that biomedical waste management rules are applicable to nurses. 74% (i.e. 37 out of 50) respondents feel that plastic bags can be used for waste disposal, whereas 26% (i.e. 13 out of 50) respondents opined that plastic bags cannot be used for waste disposal. 96% (i.e. 48 out of 50) respondents feel that biomedical wastes should be segregated into different categories. 90% (i.e. 45 out of 50) respondents feel that knowledge regarding biomedical waste management is adequate. 56% (i.e. 28 out of 50) respondents feel that they require any further training on biomedical waste management, whereas 40% (i.e. 20 out of 50) respondents feel that they do not require any further training on biomedical waste management. 80% (i.e. 40 out of 50) respondents say that the functional needle destroyer / hub cutter is easily available at the

site of injection. 74% (i.e. 37 out of 50) respondents said that the guidelines/ charts for the management of health care related wastes are displayed. 78% (i.e. 39 out of 50) respondents said that register / log book is available to record the quantity of wastes produced at the point of generation. 92% (i.e. 46 out of 50) respondents said that their waste handling staff, wear Personal Protective Equipment e.g. Mask / Gloves/ Apron/ Boots. 90% (i.e. 45 out of 50) respondents said that color coded bags are stored separately in the storage area and 100% (i.e. all 50 out of 50) respondents said that bags are tied and labelled with source of generation, weights etc.

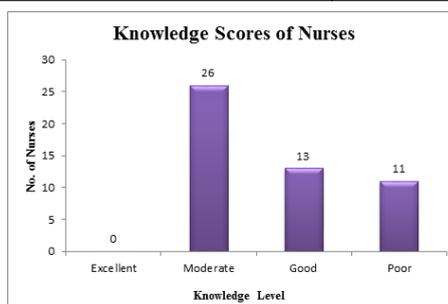
Section II (B): Knowledge (Numerical + Graphical Analysis)

The respondents were each required to answer 10 questions regarding their knowledge regarding Biomedical waste management. They were given a set of options for every question. A respondent was awarded a 10 points if he/ she encircled the correct option. An answer key was prepared so as to facilitate the scoring and compiling process. The levels of knowledge were adjudged as per the following criteria:

- Excellent knowledge >70%
- Moderate knowledge score between 50-70%
- Good knowledge, score between 40-50%
- Poor knowledge: <40%

Since the scores for each respondent were available, it enabled us to go for a more objective Statistical analysis beyond graphs. We categorized the respondents as per the above four classes of scores as below:

Knowledge Level	Score	No. of Nurses
Excellent	> 70%	0
Moderate	51% - 70%	26
Good	40% - 50%	13
Poor	< 40%	11
Total		50



Based on the 50 values of knowledge scores of respondents in the sample, the measures calculated are Mean = 42.8, Mode = 50, Median = 50 and Standard Deviation (SD) = 12.1721

It was our estimate that no matter who the sample entrants were, the average knowledge score would be around 45%. In order to assess whether the average knowledge score can be considered as equal to 45%, we carried out the one sample t-test. The null hypothesis is $\mu = 45$, where μ stands for the average knowledge score of the entire target population of nurses involved in biomedical waste management. The corresponding alternative hypothesis is that μ , i.e. average knowledge score of the entire target population of nurses involved in biomedical waste management cannot be considered as 45. The 95% confidence interval for the population average knowledge score is (39.306, 46.294) and the 99% confidence interval for the population average knowledge score is (38.140, 47.460). Hence, the confidence intervals also validate the above conclusion.

Section III: Attitude of staff nurses regarding Biomedical Waste Management

The respondents were asked a set of 10 questions, so as to judge their attitude towards Biomedical waste management. Three options namely 'Agree', 'Disagree' and 'Undecided' were provided, and the respondent was required to mark one of these as their response.

S. No	Question	Response			Total
		Agree	Disagree	Undecided	
1.	Safe disposal is of utmost important to prevent infection transmission	50 (100%)	0 (0%)	0 (0%)	50 (100%)
2.	Waste disposal is a team work not a hospital responsibility	45 (90%)	5 (10%)	0 (0%)	50 (100%)
3.	Do you dispose all kinds of waste into general garbage	30 (60%)	20 (40%)	0 (0%)	50 (100%)
4.	Efforts in safe waste disposal are a financial burden on the administrative department of the hospital	37 (74%)	10 (20%)	3 (6%)	50 (100%)
5.	Wearing PPE decreases the risk of contracting infection at the hospital	44 (88%)	4 (8%)	2 (4%)	50 (100%)
6.	Likes to cooperate in hospital waste management team	45 (90%)	5 (10%)	0 (0%)	50 (100%)
7.	Occupational safety of waste handlers is a must	47 (94%)	3 (6%)	0 (0%)	50 (100%)
8.	Excess mercury should be stored water or fixed solution	43 (86%)	4 (8%)	3 (6%)	50 (100%)
9.	Safe management of health care waste is the responsibility of the Government	45 (90%)	5 (10%)	0 (0%)	50 (100%)
10.	Hospital waste must be disposed as per color coding system	48 (96%)	2 (4%)	0 (0%)	50 (100%)

The above table clearly shows that 100% (i.e. all 50 out of 50) respondents feel that safe disposal is of utmost important to prevent infection transmission. 90% (i.e. 45 out of 50) respondents feel that that waste disposal is a team work not a hospital responsibility, 60% (i.e. 30 out of 50) respondents dispose all kinds of waste into general garbage, 74% (i.e. 37 out of 50) respondents feel that efforts in safe waste disposal are a financial burden on the administrative department of the hospital, 88% (i.e. 44 out of 50) respondents feel that wearing PPE decreases the risk of contracting infection at the hospital, 90% (i.e. 45 out of 50) respondents likes to cooperate in hospital waste management team, 94% (i.e. 47 out of 50) respondents feel that occupational safety of waste handlers is a must, 86% (i.e. 43 out of 50) respondents feel that excess mercury should be stored water or fixed solution, 90% (i.e. 45 out of 50) respondents feel that safe management of health care waste is the responsibility of the government and 96% (i.e. 48 out of 50) respondents feel that hospital waste must be disposed as per colour coding system, which is a very encouraging figure.

Section IV: Practices of staff nurses regarding Biomedical Waste Management

The respondents were observed a set of 8 questions, in order to know their practices regarding biomedical waste management in the hospitals. Only two options namely 'Yes' and 'No' were provided in the questionnaire, and the respondent was required to mark one of these as their response.

S. No	Question	Response		Total
		Yes	No	
1.	Do you separate the waste in to the different categories?	50 (100%)	0 (0%)	50 (100%)
2.	Do you treat sharp waste before disposal	45 (90%)	5 (10%)	50 (100%)
3.	Do use puncture proof plastic container to collect the waste sharps	45 (90%)	5 (10%)	50 (100%)
4.	Do you use personal protective (such as apron, gloves, mask) as per requirement	47 (94%)	3 (6%)	50 (100%)
5.	Do you follow the system of reporting and recording injuries and accidents	46 (92%)	4 (8%)	50 (100%)

6.	Have you taken vaccination against Hepatitis B	43 (86%)	7 (14%)	50 (100%)
7.	Do you follow the exposure prophylaxis after percutaneous exposure	41 (82%)	9 (18%)	50 (100%)
8.	Do you store excess of mercury in water or fixer solution	43 (86%)	7 (14%)	50 (100%)

The above table clearly shows that 100% (i.e. all 50 out of 50) respondents separate the waste in to the different categories. This is a very encouraging finding. 90% (i.e. 45 out of 50) respondents treat sharp waste before disposal, 90% (i.e. 45 out of 50) respondents use puncture proof plastic container to collect the waste sharps, 94% (i.e. 47 out of 50) respondents use personal protective (such as apron, gloves, mask) as per requirement, 92% (i.e. 46 out of 50) respondents follow the system of reporting and recording injuries and accidents, 86% (i.e. 43 out of 50) respondents have taken vaccination against Hepatitis B, 82% (i.e. 41 out of 50) respondents follow the exposure prophylaxis after percutaneous exposure and 86% (i.e. 43 out of 50) respondents store excess of mercury in water or fixer solution.

Discussion:

Hospitals and other health-care establishments have a "duty of care" for the environment and for public health, and have particular responsibilities in relation to the waste they produce. Today, hospitals/clinics use a wide variety of drugs including antibiotics, cytotoxics, corrosive chemicals, radioactive substances, which ultimately become part of hospital waste. The introduction of disposables in hospitals has brought in its wake many ills such as inappropriate recycling, unauthorized and illegal re-use, and an increase in the quantity of waste. The hazards of waste disposal from hospitals can be divided into two main areas. First, there is a wider environmental burden of a variety of hazardous products and second, the more immediate risks of potentially infectious materials that can be countered by individuals handling the waste. A study conducted on students nurse and staff nurses level of knowledge was better in student nurses than staff nurses as student nurses scored good(6-8correct answers) in more than half of the questions (65%) Whereas staff nurses scored good in only 33.33% questions by ShamimHaider. In our studythe level of knowledge among staff nurses ranged from moderate, good and poor and results were 26,13, 11 respectively.

Another study by Sanjeev R. revealed that although the attitude about biomedical waste management was high among the faculty members and students, the knowledge and practice was comparatively low which resulted similar to our

Conclusion:

The study revealed that although the attitude regarding Biomedical Waste Management among faculty members and students of the institution was high knowledge and practice remain low.

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