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Knowledge on Biomedical Waste Management among Medical Students in RIMS, Imphal, Manipur

Laishram Deben Singh[1], Vijaya Elangbam[2], Takhellambam Napolean[1], Soubam Christina[1]

PGT [1], Associate Professor[2] Department of Community Medicine Regional Institute of Medical Sciences, Imphal, Manipur, India

** Department of Community Medicine Regional Institute of Medical Sciences, Imphal, Manipur-795004. Corresponding author: Laishram Deben Singh,*

Abstract

Introduction: *Today, about one fourth of Biomedical waste (BMW) is considered as hazardous and may affect the health of both medical personnel and general community. Biomedical waste collection and proper disposal have become a significant concern for both the medical and the general community. Medical students as future professionals are soon going to be an integral part of health care system. They should have proper and sufficient knowledge on BMW management. Hence, this study was undertaken to assess the knowledge about BMW management among medical students of RIMS, Imphal.*

Methods: *A cross sectional study was done on 249 students by administering a structured questionnaire. The data was analyzed using software SPSS 21 version.*

Results: *Only 18.9% of the participants knew the approximate proportion of hazardous waste among total waste generated from a health care facility. Majority (72.3%) knew about colour-coding segregation of biomedical waste. Less than one third of them (19.6%) had received training on BMW management.*

Conclusion: *Interns had significantly better knowledge than the students. Two third of them were aware of correct time for waste disposal and could identify treatment methods in BMW. Based on the observation, the importance of training the medical students regarding bio medical waste management is emphasized.*

Keywords: *Awareness, Biomedical waste, Medical students.*

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I. Introduction

BMW is forming approximately 1%–2% of the total municipal solid waste stream [1]. Bio-medical waste (BMW) refers to the waste generated during the diagnosis, treatment or immunization of human beings or animals or in the research activities pertaining thereto or in the production or testing of biological and including categories viz. general waste, pathological waste, radioactive waste, chemical waste, infectious waste, sharps, pharmaceutical waste, pressurized containers[2]. Inappropriate treatment and disposal of waste can transmit diseases [2]. In India, Legal provisions (Bio-medical waste management and handling Rules 1998) exist to mitigate the impact of hazardous and infectious hospital waste on the community. However, these provisions are yet to be fully implemented [3]. However, owing to the absence of proper waste management, improper awareness about the health hazards from BMWs, dearth of financial and human resources, and inadequate methods of waste disposal biomedical waste management has become a problem to reckon with. The hazardous impact of medical waste on the public and environment is greatly enhanced if adequate and appropriate handling of these wastes is not adopted [4]. Hence, bio-medical waste collection and proper disposal have become a significant concern for both the medical and the general community [5,6]. A perusal of earlier studies conducted on awareness of BMW in various states of India reveal that the awareness among health professionals about the hazards and its appropriate management techniques are unsatisfactory [4,9,10]. As medical students are going to be one of the important components of health care system, they should have proper and sufficient knowledge on biomedical waste management. So awareness about various aspects of biomedical waste management has to be assessed frequently [7,8]. This study was therefore, conducted to assess the awareness regarding BMW management amongst the medical students enrolled in RIMS, Imphal, Manipur.

II. Materials And Methods

This cross sectional study, targeting health professional students of Regional Institute of Medical Sciences, Imphal, Manipur, was conducted during November to December 2016. Participants were 249 students of MBBS and BDS interns. The study was conducted in the institution after getting approval from RIMS

Research Ethics Board. The subjects were enrolled after verbal informed consent in our study. A pretested self-administered structured questionnaire was given to the participants during their regular class hours after explaining the purpose of the study. Those students who refused to participate and those who could not be contacted even on the third visit were excluded from the study. Questionnaire contains questions regarding general information, handling, disposal and health hazards of biomedical waste. After checking for completeness and consistency the data were analysed using SPSS version 21. Descriptive statistics like mean and percentages were utilised. Chi-square test was used for the association between proportions and P-value of <0.05 was taken as statistically significant.

III. Results

There were 288 participants (BDS students, MBBS & BDS Interns) enrolled in the study. Out of these 249 completed the questionnaire 133 was MBBS and BDS interns and 116 were BDS students. Response rate was 86.45%. Mean age was 22.92 ± 2.50 years. 58.6% were in the 21-25 year age group and females constituted 58.6%. (Table 1)

Table 1. Socio-demographic characteristics of the study participants (N=249).

Characteristics	**n (%)**
Education stream	
BDS Students	116 (46.6)
Intern (MBBS and BDS)	133 (53.4)
Age(years)	
<21	69 (27.7)
21-25	146 (58.6)
>25	34 (13.7)
Gender	
Male	103 (41.4)
Female	146 (58.6)

Knowledge	Yes %	No %
Aware of BMW Legislation	160 (64.3)	89 (35.7)
Know the definition of Bio Medical Waste (BMW)	216 (86.7)	33 (13.3)
Know about the approximate proportion of hazardous waste among total waste generated from a health care facility	47 (18.9)	202 (81.1)
Know about colour-coding segregation of biomedical waste	180 (72.3)	69 (27.7)
Know about the color code for disposal of general waste from the hospital	134 (53.8)	115 (46.2)
Aware of correct time for waste segregation	156 (62.7)	93 (37.3)
Know about the Biomedical Waste Management Rules, 2016	174 (69.9)	75 (30.1)
Know about Biohazard symbol	194 (77.9)	55 (22.3)
Aware of the treatment methods in biomedical waste management	196 (78.7)	53 (21.3)

Table 2: Knowledge about Bio Medical Waste Management Act, Handling and Management

Table 2 shows that 64.3% of the respondents were aware of BMW legislation. 81.1% of the participants did not know the proportion of hazardous waste among total waste generated from health care facility. However, majority (86.7%) knew the definition of Bio Medical Waste (BMW), 72.3% had knowledge regarding colour coding segregation of BMW. 62.7% and 77.9% of them were aware of correct time for waste disposal and identification of biohazard symbol respectively and 78.7% could identify treatment methods in BMW.

Table 3: Knowledge about diseases transmitted by BMW (Multiple responses allowed)

Diseases	Yes %	No %
HIV	205 (82.3)	44 (17.3)
Hepatitis B	201 (80.7)	48 (19.3)
Hepatitis C	173 (69.1)	76 (30.9)
Diabetes Mellitus	12 (4.8)	237 (95.2)
Tetanus	175 (70.3)	74 (29.7)
TB	179 (71.9)	70 (28.1)
Rheumatic Heart Disease	43 (17.3)	206 (22.7)

Table 3 reveals that majority of participants were aware of HIV, Hep-B, Hep-C, TB and Tetanus as the infectious diseases which can be transmitted by improper handling of BMW. Only 4.8% and 17.3% of them wrongly reported of Diabetes Mellitus and Rheumatic Heart Disease as the infectious diseases respectively which can be transmitted by improper handling of BMW in this study.

Table 4. Association of knowledge on Biomedical Waste Management with gender, age and course

CHARACTERISTICS	**Knowledge level**		**P value**
Gender(n)	Adequate n (%)	Inadequate n (%)	
Male	32(31.1)	71(68.9)	
Female	32(21.9)	114(78.1)	0.104
Age in years			
<23	28(18.7)	122(81.3)	
≥23	36(36.4)	63(63.6)	0.002
Course			
BDS	13(11.2)	103(88.8)	
Intern	51(38.3)	82(61.7)	0.000

Male had more knowledge as compared with female but there was no statistically significant association between knowledge on Biomedical Waste Management and gender. Higher age group had more knowledge than lower age group and it was statistically significant. Interns had more knowledge as compared with BDS students and it was statistically significant.

IV. Discussion

In this study, 216(86.7%) and 160(64.3%) were aware of bio medical waste definition and BMW legislation respectively. It is consistent with the finding of one study done at Udupi district, Karnataka conducted by Asadullah et al [11]. 77.9% of the participants in this study could identify the bio-hazard symbol but it was higher in a study conducted by Ukey UU et al in Andhra Pradesh [10]. One third of the participants 93(37.3%) responded correctly about the year in which BMW legislation was implemented i.e., 1998. This finding was similar to a study among dental students carried out by Saini R et al in Maharastra [12], revealed that 31% students answered the year 1998. Out of 249 students, 156 (62.7%) students responded that segregation is done at Source and 47 (18.9%) were aware that the percentage of hazardous Health care waste is 10-25%. On an average 134(53.8%) of the medical students have sufficient knowledge about BMW & colour of the disposal bag used. It is nearly 80% in other study [12] among dental students. A study conducted by Janhavi G et al [13] revealed nil response in this aspect. 18.9% and 80.7% of students responded for HIV and Hep-B respectively as the infectious diseases which can be transmitted by improper handling of BMW. In a similar study among medical students at Vizianagaram, Andhra Pradesh conducted by Ukey UU et al [10], it was found that 78.87% and 58.91% of students responded for HIV and Hep-B respectively. 12(4.8%) and 43(17.3%) students had misconception that diabetes mellitus and rheumatic heart disease respectively can be transmitted by improper handling of BMW. 196 (78.7%) participants were aware of BMW disposal/treatment methods like Incineration, Chemical disinfection. Further most of the students in this study were vaccinated against Hep-B 203 (81.5%) and TT in the last 5years 104 (41.7%).

V. conclusion

Level of awareness & knowledge regarding BMW management has to be assessed regularly and periodically among the medical students and interns. Subsequently any deficit pertaining to the knowledge about handling of BMW must be imparted as and when required. Concerned institutional authorities must make compulsory instruction that every medical student should get HBV and TT (every 5 years) vaccination at least at the time of entry into clinical postings.

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