Original Article

Assessment of knowledge and practice of biomedical waste management among health care personnel in a rural tertiary care hospital of Darjeeling District, West Bengal, India

Rishav Bakshi [1] , Nilanjana Ghosh [2] , Risheen Mukherjee [3] ,Sumanta Chakraborty [4]

[1,3]MBBS student, [2] Assistant Professor, Community Medicine,

[4]Post Graduate Trainee, Community Medicine, North Bengal Medical College

Abstract:

Background: Health care generates profuse amount of toxic biomedical wastes, which if not disposed appropriately turns out to be a potential health hazard. Biomedical waste management and handling rules thus are formulated, amended and universally implemented with health staffs playing a pivotal role in its success. This rural tertiary care hospital has wide catchment area, huge patient influx and face challenges unique to its remote settings. **Objectives and Methods :** The descriptive cross sectional study was conducted in North Bengal Medical College after obtaining ethical clearance among health care professionals of selected wards for one month to determine existing biomedical waste management practices and discern causes for any non-compliance to standard guidelines. Relevant tools and techniques were used and 53 participants pertaining to study criteria could be finally studied. Data was collected and analyzed accordingly. **Results:** Infrastructural support was inadequate. Knowledge and practice assessed under domains of biomedical waste segregation, use of designated equipment, waste storage before disposal, related trainings and workshops revealed discrepancies. Group D staffs had no training. Health care personnel unanimously agreed to importance of proper biomedical waste management but cited increased workload, inadequate administrative support and trainings as primary reasons for non-adherence. **Conclusion:** Biomedical waste management is grossly inadequate and gaps exist in knowledge and practice of concerned health care personnel. Addressing the discerned reasons is mandatory.

Keywords: Biomedical waste, health care personnel, knowledge, practice

Introduction :

Biomedical waste (management and handling) rules, 1998 of India, defines Bio Medical Waste (BMW) as any such waste which is generated during diagnosis, treatment or immunization of human beings, animals or in research activities pertaining thereto or in production and testing of biological and includes ten categories for the same[1]. Even after long time of their implementation most of the hospitals of India don't use the desired standards[2].. It is estimated that annually about 0.33million tons of Biomedical waste is generated in India and the waste generation rate ranges from 0.5 to 2.0 kg per bed per day[3]. The average number of needle prick injury per health care worker per year ranges from0.2 to 4.7%[4]. The source of biomedical waste can be varied, like, Private Hospitals, Physician clinics, dispensaries, government health care centers, medical research and training centers, blood banks, mortuaries, vaccinating centers, animal houses. Giving due seriousness to the chances of biohazards this law also gives provision for appropriate segregation of the wastes at source in appropriately color coded bags with specific guidelines for their appropriate segregation, collection and storage, transportation and disposal.

However though 75-90% wastes are general or non-risk, remaining 10-25% is considered to have hazardous potential , causing serious health problems in both medical and general community, AIDS, Hepatitis B, C, tuberculosis, hospital

Corresponding author: Dr. Nilanjana Ghosh ,
Assistant Professor, Department Community Medicine, North Bengal Medical College, ,
Sushrutanagar, Dist- Darjeeling, PIN-734012.Email address- drnilanjanaghosh@rediffmail.com

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acquired spread being the main concern[6]. General wastes can also cause health problems like air pollution, water pollution, scavenging by animals and rag pickers.

Health care institution is an organization where their serviced are utilized by people of various age sex and ethnicity[7,8]. Effective management of Bio Medical Waste being not only a legal but a social responsibility, appropriate measures needs to be taken by the hospital community involving administrators, doctors, nurses, paramedical staffs, ward boys and visitors. From early stage of waste generation, guidelines should be strictly followed throughout the process of waste segregation, collection, storage, disinfection, transportation and disposal, [9] otherwise inappropriate knowledge, training and responsibility will convert the hospitals into the hub of spreading disease rather than a house to contain them[10].

North Bengal Medical College and Hospital, in the sub Himalayan region is the only rural tertiary health care facility in West Bengal catering entire northern part of the state and also receiving huge amount of patients from neighboring 6 states and allied border regions of other three countries like Nepal, Bangladesh, Bhutan. Unfortunately waste management is inappropriate here being a municipality area and staffs are perceived to be negligent on strict enforcement of biomedical waste management guidelines. Moreover there is dearth of literature in the related area. Hence for current situational assessment the aforementioned study was planned among the related stakeholders with the following objectives

Objectives:

1. To identify the existing infrastructural support for bio-medical waste management and disposal in the study area
2. To assess knowledge and prevailing practice among healthcare personnel of the major wards – Medicine, Surgery, Gynaecology & Obstetrics, Paediatrics, Community Medicine regarding Bio-medical waste disposal.
3. To Elicit reasons for any persisting discrepancy in bio-medical waste management and handling along with noting remedial measures suggested.

Material and methods :

A descriptive cross sectional study for two months, August –September 2016 was conducted in North Bengal Medical College and hospital, Darjeeling in few selected major wards of Medicine, Surgery, Pediatrics, Gynecology and Obstetrics and Community medicine. Convenience sampling was done. The study subjects included one teaching faculty, two post graduate trainee, two house staffs, two interns, two nursing staffs and two group D staffs from each department. 53 health care personnel could be finally studied pertaining to inclusion criteria viz. willing to participate and exclusion criteria viz. absent even after two consequent visits. The study came with few limitations like guarded responses from health personnel and logistic constraints.

The study included variables relating to the basic descriptors like socio-demographic variables of age, sex, educational status, working experience, type of work, and variables related to knowledge, attitude and prevailing practice for Bio Medical Waste management and handling. After obtaining ethical clearance, permission from higher authorities and voluntary informed consent from study subjects, they were explained about the intent and benefit of the study. Anonymity and confidentiality was assured. Interview was conducted after administering the predesigned pretested questionnaires. Record review was also done and observation method was also applied for data collection. Relevant data was collected in accordance. Data was cleaned, compiled and entered in Microsoft Xcel and analyzed using principles of descriptive and inferential statistics. Data was represented in tabular form and presented diagrammatically by charts and Venn diagram.

Results :

Table-1: Sociodemographic characteristics of study population (n= 53)

Characteristics	No.	Percentage
Age		
20-40yr	47	88.68
40-60yr	6	11.32
Sex		
Male	31	58.49
Female	22	41.51
Working status		
Group D staffs	9	16.93
Nursing staffs	10	18.88
Junior doctors	28	52.86
Faculty	6	11.33

Table 2 : Appropriate knowledge and practice regarding various colour coded bags among the study subjects (n= 53)

Study Subjects	Red Bag		Yellow Bag		Black Bag	
	Knowledge	Practice	Knowledge	Practice	Knowledge	Practice
	Present	Present	Present	Present	Present	Present
Group D staffs (n=9)	0(0)	0(0)	3(5.66)	3(5.66)	7(13.20)	6(11.3)
Nursing staffs (n=10)	6(11.3)	2(3.77)	6(11.3)	6(11.3)	9(16.98)	7(13.20)
Junior doctors (n=28)	16(30.19)	8(15.09)	19(35.85)	22(41.50)	24(45.28)	24(45.28)
Faculty (n=6)	5(9.43)	3(5.66)	6(11.3)	6(11.3)	6(11.3)	6(11.3)
Total (n=53)	27(50.94)	13(24.53)	34(64.15)	37(69.81)	46(86.79)	43(81.23)

Figures in parentheses indicate percentages.

53 health care personnel were studied comprising of 6 teaching faculties, 10 post graduate trainees, 8 house staffs, 10 interns, 10 nursing stuffs, and 9 group D staffs. Majority were males (58.49%), in the age group of 26-30 years (30.19%) and availed training in biomedical waste management (57.4%) (Table 1) . Colour coded bins and bags black, yellow and blue were available in all the selected major wards. Guidelines on how to use them was available in print in all the wards though none except Medicine ward had a poster on it . Designated staffs were available in wards to collect the wastes though segregation at source was neglected at large. Equipments like hub cutters were present everywhere, however electric hub cutter was absent in Community Medicine Department

100 % of population had knowledge about importance of biomedical waste disposal and 89.92% had knowledge about its toxic potential. 58.49% had clear idea about the various existing categories of waste segregation.82% were aware of occupational hazards related to biomedical wastes and only 34% had knowledge about the new guidelines of 2016.

Huge gaps were found to exist in the knowledge about use of designated equipments, storage and color coded bags were assessed. Large gap was found between the knowledge (52.83%) and practice (26.41%) about use of red bags. For yellow, blue and black the knowledge vs. practice assessment was 64.15%vs 69 .81.13%, 81.13% vs. 82.9% and 94.2 vs. 81.1% respectively. Interestingly the biggest gap in this study was found in the knowledge and practice assessment about record maintenance. 97.2% expressed importance about maintenance of records regarding biomedical waste production and its disposal but only 13.2% of the entire population agreed to proactively participate in maintenance. (Table 2)

Reasons assessed for the identified gaps varied from increasing workload , to lack of knowledge and skill, inadequate trainings and poor monitoring and supervision. Monitoring officers for supervising appropriate biomedical waste management practices were missing in most of the wards. (Figure 1)

Discussion :

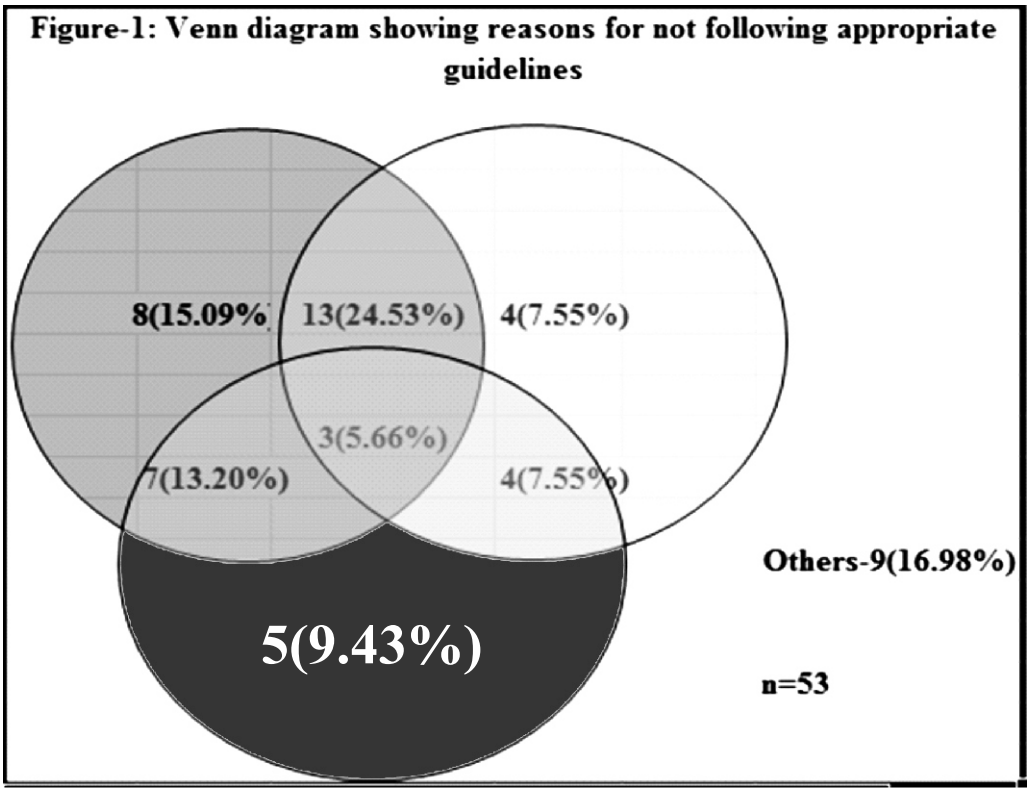
Biomedical waste management remains an important but a neglected issue in few health sectors , especially if located in remote settings. Other studies similar to the present study found that knowledge and skill regarding the issue was inadequate among many health care professionals. Trainings were insufficient and they often lacked clarity regarding the segregation and waste categorization. The health care personnel were reluctant to follow the guidelines and were unaware of the occupational hazards and its toxic potential.

The present study findings are in agreement with other study where huge gaps were identified regarding the knowledge of the colour coding of bags and bins and their skill in appropriate waste disposal. Waste segregation at source was lacking in most of the cases as reflected by present study as well. Reasons ascertained however varied as majority of health care personnel in other places cited that lack of designated people for biomedical waste management at workplace led to the non compliance of guidelines. Though monitoring officers were present and they had received training , fear of handling wastes and lack of proper handouts and charts in the wards led to inappropriate disposal. Workload was another issue as cited by our present study as

Table-3: Assessment of appropriate knowledge and practice about segregation of biomedical waste at source (n=53)

Study subjects	Knowledge		Practice	
	Present		Present	
	number	Percentage	number	Percentage
Group D staffs	5	9.43	1	1.89
Nursing staffs	8	15.09	9	16.98
Junior doctors	27	50.94	26	49.06
Faculty	6	11.32	6	11.32
Total	46	86.79	42	79.25

Figure-1: Venn diagram showing reasons for not following appropriate guidelines



Lack of trained or otherwise qualified human resource
Lack of Logistic support
Inadequate administrative support
Others causes

well. [11,12]. Similar to present study , other studies revealed that emphasis on good quality training of health care personnel working in hospital at regular time interval would help in improvement of the situation further [13]

Conclusion :

The study concludes that infrastructural support needed for appropriate Bio-medical waste disposal is inadequate in North Bengal Medical College & Hospital. Knowledge & practice regarding concerning issues varies among different personnel depending on their working status and other factors. Inadequate practice and inability to comply with the guidelines occurs in few cases and the reasons elicited were increased workload, improper training, lack of communication and other logistic constraints. Administrative support in the due matter, workshops and trainings organised on a regular basis, awareness generation, finding solutions for the identified gaps in bio-medical waste management may help the situation further.

Limitations :

The study faced logistic constraints in terms of time as it was mainly conducted as a part of undergraduate student project . Responses of the Group D staffs and other health workers may have been guarded and biased. Being a tertiary rural care hospital located in a non municipal area, idea of biomedical waste management was beyond purview of many respondents who related it with other wastes in the hospital. However a larger study with a more representative sample is recommended.

Source of support – None

Conflict of interest : Nil

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