Medical waste management practices in a selected district hospital

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Abstract :

Introduction : Living things and human activities produce huge waste every day. Globally medical waste is the second most hazardous waste after radiation waste. In this context, this study was a modest endeavor to examine the current situation of 'Jamalpur 250 Bed General Hospital's' medical waste management practice.

Methods : This cross sectional study was conducted among doctors, nurses, laboratory technicians and sanitary staffs at 'Jamalpur 250 Bed General Hospital'. 185 healthcare personnel were purposively interviewed (face to face) to assess previous and existing knowledge and practices of medical waste management. Informed written consent was taken from the study subjects before taking interview. Data was collected by a pretested semi-structured questionnaire.

Results : In our current study, out of 185 respondents, 10.0% were doctors and 43.0% were nurses. Five among six color coding segregation system, below 50.0% of the respondent answered correctly. Only 23.8% respondents revealed that the waste handler use PPE properly. 90.8% respondents were mentioned about the lack of storage place for medical waste at hospital premise. 55.7% respondents didn't know about the in house disinfection process, 56.8% respondents didn't know about the municipal vehicle support and 52.4% didn't know about the availability of waste management equipment. Poor knowledge with favorable attitude and risky medical waste management practice of this hospital's healthcare personnel were detected.

Conclusion : This study were indicated that the majority of healthcare personnel did not apply the recommended medical waste management practice set by WHO. Moreover, the current medical waste management practice in selected district hospital was not managed properly and could pose a risk for human health and the environment.

Key words : Medical Waste, Practices, District hospital, Jamalpur

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Introduction:

Living things and human activities produce huge waste every day. Aerobic and anaerobic process in the environment degrades such waste products.[1] The United States (U.S.) Environmental Protection Agency's (EPA) regulatory defines waste as any discarded items, things destined for reuse, recycle, or reclamation; sludge's; and hazardous stuffs. Globally medical waste is the second most hazardous waste after radiation waste.[2] Definitions and category of medical waste varies by countries and institutes. Medical waste is defined as any solid or liquid waste generated in diagnosis, treatment or immunization of human beings or animals, in research purpose, or the product of biological test. However, medical wastes are arising from diagnosis, monitoring and preventive, curative or palliative activities in field of the veterinary and human medicine.[3] Million tons of medical wastes are generated each year throughout the world. Different nomenclatures are in use to state waste from health facilities: 'healthcare waste' is the new European terminology; in the U.S. this types of waste is called 'medical waste', and in the text of basal convention for hazardous waste it is called

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'clinical waste'. However, according to the draft of medical waste management rules of Bangladesh, it is termed as 'Medical Waste'.[4, 5] According to World Health Organization (WHO), almost 80.0% of the wastes generated by health care activities are general waste comparable to domestic waste. Whereas, remained 20.0% of wastes are considered as hazardous waste like infectious, toxic or radioactive components.[6, 7, 8]

Bangladesh is the ninth most populous and twelfth most densely populated countries in the world. The seven largest cities of Bangladesh (Dhaka, Chittagong, Khulna, Sylhet, Barisal, Rangpur and Rajshahi) are city corporations, whereas other urban centers are known as 'Pourashava'. Jamalpur city is administrated by 'Pourashava'. The main town, situated on the bank Brahmaputra river, consists of 12 wards and 80 mahallas.[9] 'Jamalpur 250 Bed General Hospital' is the largest government hospital of that district. Currently 'Jamalpur 250 Bed General Hospital' has been developing as a tertiary level hospital. From hospital registrar record, average 800 to 1200 patients every day in summer and average 600 to 800 patients every day in winter had been taking treatment from this hospital. Due to increase medical facility, number of patients and patient's attendance has been increasing day by day in the hospital, waste production has been also rising gradually. Moreover, growing rush of patients also develop the problem of waste management particularly.[10] Secondary level hospital of Banglasdesh's medical waste management plot has so far been overlooked. In this context, this study was a modest endeavor to examine the current situation of 'Jamalpur 250 Bed General Hospital's' medical waste management practice and level of awareness related to impact of medical waste and its management. Moreover, to explore the factors affecting medical waste management practices and thus examines the applicability and limitations of the existing guidelines and legislations regarding medical waste management.

Methods:

Study was conducted at 'Jamalpur 250 Bed General Hospital' between January 2013 and December 2013. It was a descriptive cross sectional study. Information was collected about different aspects of existing medical wastes management system from the health care personnel. All the health care professionals who were willing to participate like doctors, nurses, laboratory technicians and sanitary staffs were included in the study. Total 185 healthcare personnel were purposively interviewed. Previous and existing knowledge, attitude and practices of health care personnel were assessed towards medical waste management by face to face interview. Informed written consent was taken from the study subjects before taking interview. Data was collected by a pretested semi-structured questionnaire. Questionnaire were developed after robust literature review to suite the study population and was pretested among health care personnel of 'Tongi 50 Bed General Hospital', Gazipur. Informal consultations, observations and a walk through survey were also done at the hospital.

The observations were made 7 consecutive days in the following ways. Observations were done 2 times in a day at 7:00 AM to 2:00 PM and at 5.30 PM. These two consecutive observations were made to assess the medical wastes related practices in the wards, outpatient departments (OPD), operation theatres (OT), emergency room, pathology laboratory and blood bank, kitchen and office. Observations were also made consecutive 3 days at 9:00 AM to follow the transport and the final disposal site of hospital wastes. On completion of above observation doctors, nurses, sweepers and member of the lower subordinate staff (MLSS) were interviewed to find out the factors associated with medical waste management practices.

Ethical Issue:

Permission was taken from the ethical committee of National Institute of Preventive and Social Medicine (NIPSOM) for this study title which was conducted at 'Jamalpur 250 Bed General Hospital' of Jamalpur. After explaining the process and purpose of the study, written consent was taken from the respondents. Respondents were allowed to withdraw their consent within one month of their data collection, without showing any cause. There was no benefit or penalty for respondents who decided to leave. The names of participating healthcare personals were kept confidential throughout the study. Further, all other information and data on respondents was also confidential.

Result:

This study was carried out among 185 healthcare personnel of 'Jamalpur 250 Bed General Hospital',

Jamalpur. After data collection, data was cleaned, consolidated, processed and reduced error. Descriptive and statistical methods were applied for analyzing the data. Analyzing the objectives of data was calculated, tabulated and analyzed with the help of statistical package for social science (SPSS, version 21).

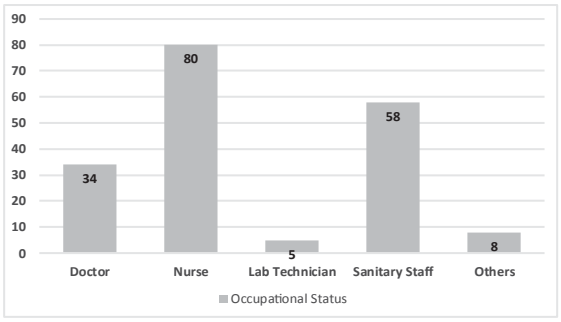
Table I: Distribution of respondent's demographic characteristics (n=185)

Characteristics	Number	Percentage
***Age Group**		
≤ 30 years	25	13.5
31-35 years	53	28.6
36-40 years	43	23.2
41-45 years	38	20.5
>45 years	26	14.1
Gender		
Male	77	41.6
Female	108	58.4
Education level		
≤5 years	53	28.7
>5 years	132	71.3
****Job experience**		
≤10 years job	97	52.4
>10 years job	88	47.6

*Mean = 38.14; (SD = ± 6.939), ** Mean = 13.75; (SD = ± 5.134)

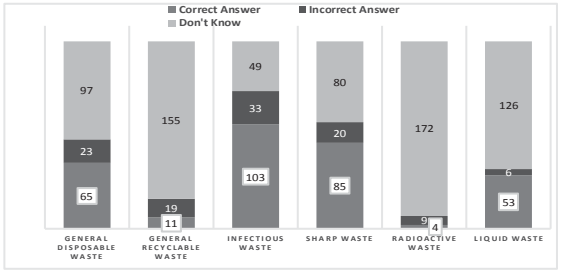
Table I shows, among 185 respondents, 108 (58.4%) were female and 53 (28.6%) respondents age group was between 31 and 35 year. Among all respondents, 132 (71.3%) respondent had >5 years education and 97 (52.4%) respondent's job experiences were below 10 years.

Figure I: Distribution of respondents by occupational status (n=185)



Above graph shows, out of 185, about 80 (43.0%) of the respondents were nurse.

Figure II: Respondent's knowledge regarding correct color coding for different types of waste disposal (n=185)



WHO recommends six color coded bins for medical waste disposal at hospital. In figure II shows, to assess knowledge among participants about the color coded bin, 185 respondents were asked types of waste to be disposed according to specific color coded bin. Infectious waste should be disposed in yellow bin; here 103 (56.0%) respondent could give correct answer. Whereas radioactive waste and liquid waste, four (2.0%) and 53 (29.0%) respondent could give correct answer respectively. In a nut shell, five among six color coded segregation system, beneath half of the respondent (50.0%) were answered correctly.

Table II. Respondents practice towards in-house medical waste management (n=185)

Variables	Yes		No		Don't know	
	n	%	n	%	n	%
Infectious wastes disinfected inside wards and moved to storage areas	-	-	103	55.7	82	44.3
Infectious waste labeled with biohazard symbol	1	0.5	114	61.6	70	37.8
Store house for collected medical waste of hospital	-	-	168	90.8	17	9.2

In table II, around 103 (55.7%) and 168 (90.8%) respondents were mentioned that disinfection and proper storage of in house medical waste management was not done at all at hospital respectively .

Table III. Respondents practice towards outhouse medical waste management (n=185)

Variables	Yes		No		Don't know	
	n	%	n	%	n	%
Municipal vehicle available for final disposal	78	42.2	2	1.1	105	56.8
Availability of equipment for medical waste management	1	0.5	87	47.0	97	52.4
Sufficient manpower to manage medical waste	149	80.5	36	19.5	-	-
Waste handler using any personal protective equipment (PPE)	44	23.8	141	76.2	-	-

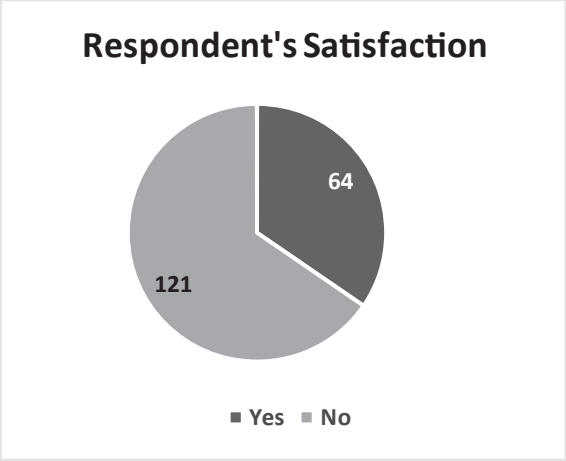
Table III shows, 141 (76.2%) respondents were identified that the waste handlers did not use any personal protective equipment (PPE) during waste handling.

Table IV. Respondent's attitude towards medical waste management (n = 185)

Variables (Statements)	Strongly Agree		Agree		Undecided	
	n	%	n	%	n	%
Safe medical waste management is an important concern	87	47.0	84	45.4	14	7.6
Medical waste going into a wrong bin is risky	86	46.5	88	47.6	11	5.9
Medical waste management is the responsible for both individual & institution	45	24.3	84	45.4	56	30.3
Inappropriate disposal of medical waste management results in environmental degradation	114	61.6	70	37.8	1	0.5
Occupational health hazards associated with improper management of medical waste	118	63.8	65	35.1	2	1.1

Table IV reveals, regarding attitude of respondent's towards medical waste management, regarding environmental degradation and improper management of medical waste management were strongly agreed by 114 (61.6%) and 118 (63.8%) respondent respectively.

Figure III: Respondent's satisfaction of current medical waste management at hospital



In figure III, respecting 121 (65.4%) respondent was found not satisfied with current medical waste management system of the hospital.

During study period, the existing system of disposal of medical waste at selected district hospital was not found satisfactory. The collected medical waste deposited in the dustbin of hospital area which was carried by the hospital sweeper and aya. Some of the wastes were used to burn in the dustbin. Finally, poor knowledge with favorable attitude and risky practice of this hospital's healthcare personnel were detected. This study might serve as the baseline information for those who are concerned with environment friendly hospital.

Discussion:

In our current study, out of 185 respondents, 10.0% were doctors and 43.0% were nurses. Study of Kumar showed in his study that 50.0% of the respondents were doctors and 38.0% were nurses and another study did survey on only five doctors and eight nurses which were not similar to our current study.[2, 11]

This present study, about five among six color coding segregation systems, below 50.0% of the respondent answered correctly. So most of the respondents found in inadequate knowledge about color coding segregation system of medical waste. Whereas, in a study of Sehgal at India, he showed 84.2% of respondents were mentioned correctly regarding color code of different waste disposals which was not similar to our current study findings.[12] Furthermore, study on 22 health care facilities of Jashore district, Bangladesh, showed 48.3%, 52.3% and 39.2% of sharp, infectious and recyclable general wastes respectively were not segregated at all in correct color coded bin.[13] So these risky practices were similar with our present study.

Only 23.8% respondents revealed that the waste handler use PPE properly. Study of Cameroon revealed that their 100.0% waste handlers use PPE which doesn't matches with our present study.[14] Elgitait found in his study that the protection of the personal working in the collection of medical waste was a fundamental issue. Moreover, the use of personal protective equipment had been taken to reduce the risk of exposure of staff that handle, transfer, transport, treat or dispose of medical waste.[15]

90.8% respondents were mentioned about the lack of storage place for hospital waste at hospital premise, whereas a study of Iran among 12 hospitals found 100.0% had proper storage place for medical waste.[16] This findings were not similar with our current study. 55.7% respondents didn't know about in house disinfection process, 56.8% respondents didn't know about the municipal vehicle support and 52.4% didn't know about the availability of waste management equipment. Whereas, on site availability of medical waste management could be an easy way to manage waste. Moreover, this would decrease the chance of medical waste spread.[17]

Respondent's attitude found towards safe and proper medical waste management was very positive in this study but they were needed more motivation to understand their own individual responsibility regarding this. Moreover, in two other studies of India showed that the most of the respondent's attitude were positive which was similar to our study result.[18, 19]

In our current study, municipal corporation vehicle of Jamalpur used to collect waste one or twice in a week and disposed by dumping by the side of river named Brahmaputra which was threat for the environment. In India's provincial hospital medical waste management plan, includes the process of combustion of hospital waste by incineration. Major factors responsible were lack of awareness about the hospital wastes, improper supervision by the authority, lack of training of the concerned staff, shortage of equipment and materials for disposal of the wastes.[20]

Conclusion:

This study were indicated that the majority of healthcare personnel did not apply the recommended medical waste management practice set by WHO.[21] Moreover, the current medical waste management

practice in selected district hospital was not managed properly and could pose a risk for human health and the environment. Segregation of wastes was not practiced in hospital premises. Lack of standard guideline or policy for medical waste management, and low commitment of healthcare personnel was observed.

Limitations:

Only one hospital doesn't represent the whole Bangladesh. Time and budget constraint is also concern.

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