Original Research Article

Knowledge, Attitude, and Practices about Biomedical Waste Management among Healthcare Personnel in Primary Healthcare Centers in Western Maharashtra

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Abstract

Background: The absence of proper waste management, lack of awareness about the health hazards of biomedical wastes, and poor control of waste disposal pose the most critical problems. It is essential for healthcare workers to have the knowledge, practice, and safe method for biomedical waste handling. Our objective is to assess the knowledge, Attitude, and Practices (KAP) about BMW management among healthcare workers working at PHC in rural health areas.

Methods: The present community-based cross-sectional study was carried out among the healthcare personnel in primary healthcare centers in randomly selected Taluka of Western Maharashtra. For this questionnaire-based cross-sectional study, a questionnaire was designed which includes,relevant aspects of BMW Management like knowledge about various types of biomedical waste, its disposal in various color-coded bags, and its transport. Through the one-to-one interview, information was obtained as per the questionnaire. Data entry was done in a Microsoft Excel sheet and analysis was done. Proportion & percentage were used to interpret the result.

Conclusions: There was a lack of knowledge regarding segregation & transmission of diseases through BMW among sanitary staff. It also shows that enough precautions were not being taken for preventing needle stick injuries among nurses and sanitary staff.

Keywords: Biomedical waste, Knowledge, attitude and practice, Healthcare workers.

Introduction

The World Health Organization (WHO) defines medical waste as waste generated by healthcare activities. A large amount of Biomedical waste (BMW) is generated during diagnosis, treatment, or immunization of human beings or animals in research activities, during the production and testing of biological.[1]

The absence of proper waste management, lack of awareness about the health hazards of biomedical wastes, and poor control of waste disposal pose the most critical problems. It is the duty of every healthcare person working in a healthcare institution to take all steps to ensure segregation, safe handling & disposal of biomedical waste, without causing any

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adverse effect on human health and the environment. It is estimated that 10-25% of the healthcare waste generated is hazardous & causes serious health problems.[2]

Health workers are directly involved in the collection, transport, and disposal of BMW and are at high risk of getting the infection. They are usually unskilled and have little knowledge about the segregation and disposal of biomedical waste.[3] Therefore excellent hygiene practices and continuous monitoring and training are important aspects ofthe hospital waste management system. Training programs must be developed for doctors, health assistants, nurses, paramedical staff, and other waste handlers periodic training programs should be implemented to refresh and update their knowledge and skills to ensure a sound waste management system.[4]

Duringthe covid-19 pandemic, increase biomedical waste generation and improper treatment have posed an alarming situation.[5]The waste is deposited either inside the hospital grounds or outside in the community bin for further transportation and disposal along with the municipal solid waste. The improper, Careless, and indiscriminate disposal of this biomedical waste by healthcare workerscan contribute to the mixing of infectious and noninfectious waste. These cause the spread of serious diseases such as hepatitis and AIDS (HIV) among healthcare workers and in the community.[6]

The Government of India released the first BMW management guidelines in the year 1998, which were subsequently amended from time to time, and the Latest guidelines were published in the year 201. Despite this, the majority of the health facilities in India fail to operationalize the existing BMW management guidelines.[7]

It is essential for healthcare workers to have the knowledge, practice, and safe method for biomedical waste handling. Hence this study was undertaken to assess the knowledge, Attitude, and Practices (KAP) about BMW management among healthcare workers working at PHC in rural health areas.

Objectives:

To assess the Knowledge, Attitude, and Practices (KAP) about BMW management among the healthcare personnel in primary healthcare centers in Western Maharashtra.

Material and Methods

The present community-based cross-sectional study was carried out among the healthcare personnel in primary healthcare centers in randomly selected Taluka of Western Maharashtra from 16 July to 15 August 2022. For the present study, one taluka from Western Maharashtra was purposively selected. There were 8 primary health centers in this taluka, and all these PHCs were considered for this study. There were a total of 72 medical personnel consisting of doctors 16, health assistants 16, nurses 8, lab technicians 8, and sanitary staff 24, all of are included in the present study. For thisquestionnaire-based cross-sectional study, a questionnaire was designed which includes,relevant aspects of BMW Management like knowledge about various types of biomedical waste, its disposal in various color-coded bags, and its transport. Their attitude about the proper disposal of BMW and practices they follow for BMW disposal. Information was also obtained about the various hazards due to improper BMW disposal. Through the one-to-one interview, information was obtained as per the questionnaire. Data entry was done in a Microsoft Excel sheet and analysis was done. Proportion & percentage were used to interpret the result. Verbalconsent was obtained from all the participants for participation in the study and Confidentiality was maintained throughout the study.

Observation and Result

Table 1: Basicscharacteristricsof study subject (n- 72)

Parameters	Frequency	Percentage
Working status		
Doctors	16	22.22
Health assistants & Nurses	24	33.34
Lab technicians	8	11.11
Sanitary staff	24	33.34
Sex		

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Male	33	45.83
Female	39	54.17
Working in the hospital since		
< 1 yrs	11	15.27
1 -5 Yrs	19	26.38
> 5yrs	42	58.34
Received any training for BMW management		
Yes	56	77.78
No	16	22.22
Nature of employment		
Temporary	19	26.3
Permanent	53	73.7

Table 1 shows the basic characteristics of the study participants. In the present study, 22.2% (16) were doctors, 33.3% (24) were health assistants, 11.1% (8) were lab technicians and 33.4% (24) were the sanitary staff.45.8% (33) were male and 54.1% (39) were female participants. 58.3% (42) of health workers were working in the hospital for more than 5 years. 77.7% (56) of health workers received training in biomedical waste management. The 26.3% (19) health workers were temporary,while 73.7% (53) were permanent.

Table 2: Knowledge among healthcare personnel regarding BMW (n-72)

Knowledge regarding BMW	**Doctors**	**HA and Nurses**	**Lab. Tech**	**Sanitary Staff**	**Total**
	Frequency (%)	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
Know about biomedical waste	14 (87)	19 (79)	3 (37)	23 (95)	59 (81.9)
Biomedical waste management rules	15 (93.75)	21 (87.5)	7 (87.5)	16 (66.67)	59 (81.9)
Biomedical coding of waste containers	16 (100)	22 (91)	8 (100)	17 (70.83)	63)87.5)
Number of color-coded bags	12 (75)	23 (95.8)	7 (87)	24 (100)	66 (91.7)
BMW storage	16 (100)	23 (95.8)	6 (75)	24 (100)	69 (95.8)
Sharpes, syringes disposal	9 (56.2)	21 (87.5)	4 (50)	21 (87.5)	55 (76)
Healthcare waste is hazardous	16 (100)	24 (100)	7 (87.5)	24 (100)	71 (98.6)
Transmission of diseases through biomedical waste	16 (100)	22 (91.66)	7 (87.5)	13 (54.16)	58 (80.5)

Table 2 shows, the knowledge of health personnel regarding BMW management. 59 (81.9%)of healthcare workers knew biomedical waste management. 15 (93.7%) doctors, 7 (87.5) Laboratory technicians, 21 (87.5%)HA and nurses, and 16 (66.6%) sanitary staff knew the biomedical waste management rules. 91.7% (66) of healthcare workers had good knowledge about color-coded bags. 100% of doctors and HA and nurses knew that healthcare waste is hazardous. All doctors and 91% of HA and nurses knew that biomedical waste is a source for the transmission of infectious.

Table 3: Attitude among healthcare personnel regarding BMW (n-72)

Attituderegarding BMW	Doctors	HA and Nurses	Lab. Tech	Sanitary Staff	Total
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
In favor of strict implem-entation	16 (100)	22 (91.6)	7 (87.5)	24 (100)	69 (95.8)
Waste management is a teamwork	11 (68.7)	19 (79.1)	4 (50)	23 (95.8)	57 (79.1)
Segregation of waste at the source	14 (87.5)	20 (83.3)	7 (87.5)	15 (62.5)	56 (77.7)
Disinfection of hospital waste before disposal	15 (93.7)	18 (75)	6 (75)	17 (70.8)	56 (77.7)
Waste management is a part of my responsibility	13 (81.2)	17 (70.8)	3 (37.5)	19 (79.1)	52 (72.2)
PPE is a must while handling biomedical waste	15 (93.7)	16 (66.7)	7 (87.5)	13 (54.1)	51 (70.8)
Upgradation BMW management knowledge is mandatory	16 (100)	20 (83.3)	6 75)	16 (100)	66 (91.7)

Table 3 shows, the attitude of health personnel regarding BMW management. The majority,>95.8%of healthcare personnel show a positive attitude and are in favor of strict implementation. 57 (79.1%) consideredthat biomedical waste management is teamwork. 7 (87.5% and 20 (83.3% of laboratory technicians and health assistants and nurse shows a positive attitude toward the segregation of waste at the source. 15 (93.7% doctors and 18 (75%) HA and nurses showed a positive attitude toward the disinfection of hospital waste before disposal. 51 (70.8%) of health workers were in favor of the use of PPE as a must while handling biomedical waste. All doctors and sanitary staff want the upgradation of biomedical waste management knowledge.

Table 4: Practice of healthcare personnel regarding BMW (n=72)

Practice regarding BMW	Doctors	HA and Nurses	Lab. Techni.	Sanitary Staff	Total
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Disposal in specified color-coded containers	16 (100)	19 (79.16)	6 (75)	13 (54.16)	54 (75)
Disposal of sharps in puncture-proof containers	15 (93.7)	18 (75)	7 (87.5)	12 (50)	52 (72.2)
Reporting of injuries due to improperly disposed sharps	3 (18.7)	4 (16.67)	2 (25)	5 (20.83)	14 (19.4)
Disposal of blood bags in an appropriate container	7 (43.7)	23 (95.8)	2 (25)	14 ((58.3)	46 (63.8)
Vaccinated against hepatitis-B	5 (31.2)	11 (45.8)	1 (12.5)	9 (37.5)	26 (36.1)
Disinfection before disposal	11 (68.7)	19 (79.1)	4 (50)	17 (70.8)	51 (70.8)
wear gloves while handling biomedical waste	16 (100)	24 (100)	7 (87.5)	21(87.5)	68 (94.4)
Maintaining BMW records	15 (93.7)	23 (95.8)	3 (37.5)	19 (79.1)	60 (83.3)

Table 4 shows, the practice of health personnel regarding BMW management. 54 (75%) out of 72healthcare workers practice disposal in specified color-coded containers. 93.7% of doctors practice disposal of sharp puncture-proof containers while only 12 (50%) of sanitary staff practiced it. Only 14 (19.4%) of healthcare workers report injuries due to improperly disposed sharps. 7 (43.7%) doctors, 2 (25%) laboratory technicians, and 14 (58%) sanitary staff practice the disposal of blood bags in an appropriate container. 68 (94.4%) of healthcare workers wear gloves while handling biomedical waste.

Discussion

The present study was conducted among healthcare personnel at primary health centers to study their knowledge, attitude, and practice about biomedical waste management. The total 72 study participants included doctors 22.2%, health assistants and nursing staff 33.3% laboratory technicians 11.1%, and sanitary staff 33.3%. 45.8% were male and 54.1% were female participants. 58.3% of health workers working in the hospital for more than 5 years. 77.7% of health workers received training in biomedical waste management. 26.3% and 73.7% of health workers were temporary and permanent respectively.

In the present study, 81.9%of healthcare workers knew about biomedical waste management. 93.7% of doctors, 87.5% of HA and nurses, and, 66.6% of sanitary staff knew the biomedical waste management rules. 91.7% of healthcare workers had good knowledge about color-coded bags. All doctors and HA and nurses knew that healthcare waste is hazardous. All doctors and 91% of HA and nurses knew that biomedical waste is a source for the transmission of diseases. VaneshM[3]In their study reported that 90.7% of doctors and 91.7% of nurses knew the knowledge of biomedical waste management rules. The study conducted by Pandave H[9] shows 70% and 77% of healthcare workers knew biomedical waste management and color-coded bags used in biomedical waste management respectively. Rajesh K in their study found, 89% of health care personnel knew that BMW is the cause for the transmission of infections.[10]

In the present study, The majority (>95.8%) of healthcare personnel show a positive attitude and are in favor of strict implementation. 79.1% of healthcare workers consider biomedical waste management to be teamwork. 87.5% and 83.3% of laboratory technicians and health assistants and nurse shows a positive attitude toward the segregation of waste at the source. 93.7% doctors and 75% HA and nurses show a positive attitude toward the disinfection of hospital waste before disposal. 81.2% and 70.8% doctors and HA and nurses consider waste management as a part of my responsibility. 70.8% of health workers were in favor of the use of PPE as a must while handling biomedical waste. All doctors and sanitary staff want the upgradation of biomedical waste management knowledge. Our findings are consistent with the study conducted by Malini A[2] 100% of doctors and 82.5% of nurses consider waste management as teamwork. 100% of doctors and 89.6% of nursing staff, and consider waste management to be a part of my responsibility. Arjun S[8] In their study shows, segregation of waste at source was practiced in 53.33% at phc, while in our study, it is 56%.

In our study, 54healthcare workers practice disposal in specified color-coded containers. 93.7% of doctors practice disposal of sharp puncture-proof containers while only 50% of sanitary staff practice it. Only 19.4% of healthcare workers report injuries due to improperly disposed sharps. 43.7% of doctors, 25% of laboratory technicians, and 58% of sanitary staff practice the disposal of blood bags in an appropriate container. 94.4% of healthcare workers wear gloves while handling biomedical waste. Anirban Din their study shows 39.8% of healthcare workers are in favor of using PPE while handling biomedical waste and 43.5% are in favor of maintaining BMW records[5]. Padave Hin their study reported that 100% of housekeeping staff were in favor of wearing gloves, following color coding for segregation of waste, and using puncture-proof plastic containers to collect shapes of biomedical waste.[9]

Conclusion

This study shows that there was a lack of knowledge regarding segregation & transmission of diseases through BMW among sanitary staff. It also shows that enough precautions were not being taken

for preventing needle stick injuries among nurses and sanitary staff. Lack of proper and complete knowledge about biomedical waste management impacts practices of appropriate waste disposal and prevention of diseases transmitted through it requiredstrict implementation of biomedical waste management rules in the health care setup and compulsory periodic training about the handling of BMW for health care workers.

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