

Research Article

A Descriptive Study to Assess the Knowledge and Practices Regarding Biomedical Waste Management among the Health Personnel Working at Community Health Centers in a Tribal District

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ABSTRACT

Aim: The aim of this descriptive study was to assess out the knowledge and practices of the health personnel regarding biomedical waste management (BMWM) working at Community Health Centers in the tribal district of Maharashtra state. **Research Methodology:** A descriptive cross-sectional community-based study was conducted in PHC, rural hospital, and subdistrict hospital in the tribal district in the state of Maharashtra. A total of 100 health personnel working in the government setup selected as a sample by simple random sampling. The data were collected using semi-structured questionnaire and self-reported observational checklist. The data were analyzed by applying descriptive and inferential statistics. **Results:** Among the 100 health personnel, majority (74%) were female and 26% were male health personnel. As far as their designation was concerned, majority (62%) were staff nurses, 18% were technicians, 15% were pharmacists, and few (5%) health personnel were multipurpose health workers (MPHWs). Work experience, 14% health personnel were having experience <2 years, 3–5 years (24%), 5–10 years (20%), and 42% were having work experience, more than 10 years. According to their age, 38% health personnel were in the age group of 20–30 years, 31–40 years (31%), 41–50 years (26%), and 5% were in the age group of 51–60 years. As far as their training on BMWM was concerned, majority (82%) undergone on the job formal training. The study findings indicated that 86% health personnel having good knowledge regarding BMWM and 14% reported average knowledge. As far as their BMWM practices are concerned, majority (94%) having good practice and 5% were having average practice. There was a significant association of knowledge with qualification and their designation as $P \leq 0.05$ at 0.05 level of statistical significance. **Conclusion:** From this study, it can be said that health personnel are aware of the BMWM and this is associated with the training programs attended and designation of them.

Keywords: Biomedical Waste Management, Health personnel, Knowledge, Practices Community Health Centers

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Introduction

According to the WHO, biomedical waste management (BMWM) means measures to ensure the safe and environmentally sound management of health-care wastes can prevent adverse health and environmental impacts from such waste including the unintended release of chemical or biological hazards, including drug-resistant microorganisms, into the environment, thus protecting the health of patients, health workers, and the general public.^[1]

BMWM is receiving greater attention due to recent regulations of the biomedical wastes (Management and Handling Rules,

1998). Inadequate management of biomedical waste can be associated with risks to health care workers, patients, communities, and their environment. Health care institutions and hospitals generate biomedical waste which can introduce various infections and injuries to the health care workers, patients, and harm the surrounding environment. Therefore, it is essential to have safe and reliable method for its handling. Inadequate and inappropriate handling of health-care waste may have serious public health consequences and a significant impact on the environment. Appropriate management of health-care waste is thus a crucial component of environmental health protection, and it should become an integral feature of health-care services.^[2]

The World Health Organization states that 85% of hospital wastes are actually non-hazardous, whereas 10% are infectious and 5% are non-infectious but they are included in hazardous wastes. About 15%–35% of hospital waste is regulated as infectious waste. This range is dependent on the total amount of waste generated (Glenn and Garwal, 1999). These wastes now threaten the public since the health-care foundations are situated in heart of city, and therefore, medical waste, if not properly managed, can cause dangerous infection and possess a potential threat to the surrounding environment, persons handling it and to the public. Health and environmental effects, uncertainty regarding regulations and negative perceptions by waste handlers, are some important concerns in health-care waste management in a country Global Journal of Health Science April 200983 (Freeman, 1998). Globally, this issue has been seriously considered and appropriate waste management systems are being developed and installed. A number of difficulties are being faced at many places in implementation of this plan in practice.

For proper management of biomedical waste, the Government of India has introduced the BMWM and Handling Rules in 1998; unfortunately, health care workers awareness regarding biomedical waste segregation, handling, and management is minimal. There are primarily four broad functions for BMWM at source of generation, namely, placement of waste receptacles or bins lined with waste bags at source of generation, segregation of waste, mutilation of recyclable waste, and disinfection of waste. Awareness of BMWM among health care workers and public is necessary and it is the responsibility of the health-care facility and health-care providers to safeguard the health of workers who are involved in handling, transportation, and disposal of biomedical waste.^[3]

Economic development of India in the past two decades has resulted in environmental pollution and waste generation in huge quantity in India. Today, waste management is a very big headache problem even for developed countries such as the USA, Japan, and Canada. BMWM has become one of major issues of concern in India taking into account the rate of growth of population. BMWM is receiving greater attention due to recent regulations of the biomedical wastes (Management

and Handling Rules, 1998). Inadequate management of biomedical waste can be associated with risks to health care workers, patients, communities, and their environment. The present paper is a review of BMWM practices in India and recommended few measures to minimize the impacts of hospital waste on people and surrounding environment.^[2]

Health is a social and biological issue and reflects the extent and distribution of resources in a society. Health care is one of the most important aspects of all human endeavors to improve the quality of life since sound health is essential for the strength and prosperity of a nation. Hence, health awareness among general population is necessary including various occupational areas of society. Among them are the health workers who are more prone to health hazards of their occupation in terms of physical, mental, and social aspects of health. Especially among health workers, the more likeable are the class four workers. Thus, efforts to be made to improve their knowledge and attitude with respect to BMWM by means of in-service education and refresher trainings by the hospital administration and various other sectors involved in waste management. Community engagement and use of IEC is the integral part of BMWM.^[4]

Objectives of study

The objectives of the study were as follows:

1. To assess the knowledge and practices about BMWM among the health personnel working at Community Health Centers.
2. To identify the correlation between the knowledge and practices about BMWM among the health personnel working at Community Health Centers.
3. To ascertain the association of knowledge and practices with demographic variables.

Research Methodology

A descriptive cross-sectional study was conducted with the aim to assess the knowledge and practices of the health personnel regarding BMWM in the tribal district of Maharashtra state. The setting of the study was selected PHCs, rural hospitals, and subdistrict hospitals. For this study, 100 health personnel such as nurses, pharmacist, laboratory technicians, and multipurpose health workers (MPHWs) who were working in government setup were selected as a sample by simple random sampling. The data were collected using semi-structured questionnaire and self-reported observational checklist.

Results

Section-1: Demographic variables

Among the 100 health personnel, majority (74%) were female and 26% were male health personnel. As far as

their designation was concerned, majority (62%) were staff nurses, 18% were technicians, 15% were pharmacists, and few (5%) health personnel were MPHs. Work experience, 14% health personnel were having experience <2 years, 3–5 years (24%), 5–10 years (20%), and 42% were having work experience, more than 10 years. According to their age, 38% of health personnel were in the age group of 20–30 years, 31–40 years (31%), 41–50 years (26%), and 5% were in the age group of 51–60 years. As far as their training on BMW was concerned, majority (82%) undergone on the job formal training.

Sources of information on BMW

According to the source of information, 45.12% health personnel reported formal lecture, 14.63% from the workshop, 26% from the infection control training, and 8.54% from the internet and social media.

Section-2: Knowledge and practices of the health personnel regarding BMW

The findings indicated that 86% health personnel having good knowledge regarding BMW and 14% reported average knowledge. As far as their BMW practices are concerned, majority (94%) having good practice and 5% were having average practices [Figure 1].

Section-3

The findings indicated that there was a significant association of knowledge with qualification and their designation as $P \leq 0.05$ at 0.05 level of significance, whereas there was no association of knowledge with other demographic variables. General qualifications along with the professional qualification are essential to understand and follow the BMW guidelines. These findings are significant for their designation, the reason is, roles and responsibilities of the health personnel with regards to their designation are differ. The findings showed, staff nurses have better knowledge comparing to others, as BMW is the important job description of the nurses [Table 1].

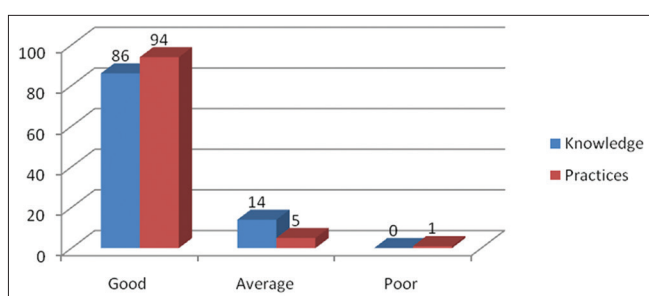


Figure 1: Knowledge and practices of the health personnel regarding biomedical waste management

Section-4

The findings suggest that as far as their BMW practices are concerned, majority (94%) having good practice and 5% were having average practice. There was a significant association of practices with qualification and their designation as $P \leq 0.05$ at 0.05 level of significance. The findings are significant for gender, educational qualification, designation, and in-service training, which play an important role in the improvement of practices [Table 2].

Section-5: Correlation between knowledge with practices regarding biomedical medical waste management

The above scattered diagram indicated that there is a correlation between the knowledge with practices with regard to the BMW among the health personnel working at Community Health Centers as $P \leq 0.05$ at 0.05 level of significance. If the knowledge improves, the practices also improve [Figure 2].

Discussion

For this cross-sectional study, design was selected as a similar design was adopted in other studies.^[5,6] The findings indicated that the knowledge about BMW is adequate among the technically qualified personnel such as the nurses and laboratory staff, this was similar to the findings from other studies.^[5,6] Similarly, knowledge about color coding of containers, and waste segregation which itself is probably the most important pivotal point and crucial for further waste management, was also found to be better among the technically qualified staff.

The part wise analysis of knowledge and practices showed that the health personnel have adequate knowledge in concept, knowledge and practices, related laws, and government initiatives guidelines regarding BMW. There was A correlation between the knowledge and the practices. The findings showed significant association of knowledge with their educational qualification and designation, which was attributed to their job description.

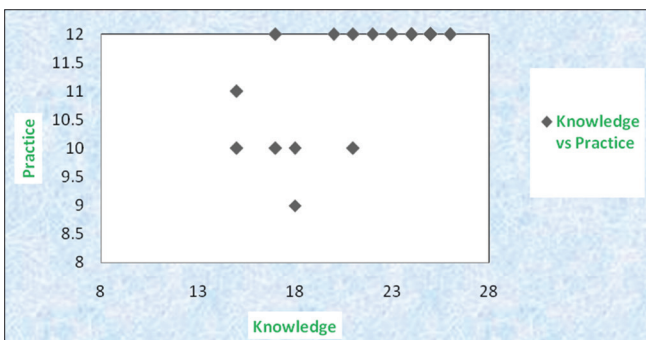
The practices regarding BMW found to be good as there is reporting of injuries resulting from improperly disposed biomedical waste which was found to be miserably low among the technical staff. The study reported that injury reporting was low across all the groups of health professionals.^[5] The study also stated that the low reporting of injuries may be attributed to the fact that most of the doctors and other technical and non-technical staff are unaware of a formal system of injury reporting which should be established within all the health facilities.

The education and designation play an important role in the improvement of knowledge. Thus, in-service education and refresher courses need to be organized for the health

Table 1: Association of knowledge on BMWM with the selected demographic variables of the health personnel working in Community Health Centers in tribal area, $n=100$

Variable	Groups	Knowledge		Chi-square cal.	Table value χ^2	d. f.	P value	Significance
		Average	Good					
Gender	Male	6	20	2.4	3.84	1	0.120	Not significant
	Female	8	66					
Age	20–30	4	34	2.79	7.81	3	0.425	Not significant
	31–40	3	28					
	41–50	6	20					
	51–60	1	4					
Qualification	SSC	2	2	13.75	7.81	3	0.003	Significant
	Graduate	8	19					
	Postgraduate	1	10					
	other	3	55					
Designation	MPHWs	3	2	29.29	5.99	2	0.000	Significant
	Staff nurses	2	60					
	Technicians	8	10					
	Pharmacists	1	14					
Work experience (years)	<2	1	13	1.74	7.81	3	0.620	Not significant
	3–5	3	21					
	5–10	2	18					
	More than 10	8	34					
In-service training	Yes	11	71	0.13	3.84	1	0.710	Not significant
	No	3	15					
Source of information	Formal lecture	5	32	2.55	7.81	3	0.466	Not significant
	Workshop	3	9					
	Infection control training	3	23					
	Internet and social media	0	7					

MPHW: Multipurpose health worker, BMWM: Biomedical waste management

**Figure 2:** Correlation between the knowledge and practices regarding biomedical waste management

personnel. Low level of knowledge is mainly attributed to poor training facilities and also to relatively low educational level of the staff. Training of both the technical staff and the non-technical staff is critical for the proper and appropriate management of biomedical waste. Similar recommendations of training aspects of health-care waste management should be strengthened so that the current, existing, and future regulations are practiced diligently and uniformly. Periodic evaluation and assessment should become routine to enforce adherence to waste management.^[6] However, the Government of India (notification, 1998) specifies that hospital waste management is a part of hospital hygiene and

maintenance activities. This involves the management of range of activities, which are mainly engineering functions, such as collection, transportation, operation or treatment of processing systems, disposal of wastes, and, furthermore, training with this aspect which are organized regularly. Unregulated BMWM is a public health problem. This has posed a grave threat to not only human health and safety but also to the environment for the current and future generations. Safe and reliable methods for handling of BMW are of paramount importance. Effective BMWM is not only a legal necessity but also a social responsibility. BMWM should ideally be the subject of a national strategy with dedicated infrastructure, cradle-to-grave legislation, competent regulatory authority, and trained personnel. Improving the management of biomedical waste begins with waste minimization. These standards, norms, and rules on BMWM in a country regulate the disposal of various categories of BMW to ensure the safety of the health care workers, patients, public, and environment. Furthermore, developing models for the monitoring of hospital health-care waste practices and research into non-burn eco-friendly sustainable technologies, recycling, and polyvinyl chloride-free devices will go in long way for safe carbon environment. Globally, greater research in BMWM is warranted to understand its growing field of public health importance.^[7]

Table 2: Association of practices on BMWW with the selected demographic variables of the health personnel working in Community Health Centers in tribal area, $n=100$

Variable	Groups	Practice			Chi-square cal.	Table value χ^2	d.f.	P value	Significance
		Poor	Average	Good					
Gender	Male	1	3	22	6.18	5.99	2	0.046	Significant
	Female	0	2	72					
Age	20–30	0	1	37	6.27	12.59	6	0.394	Not significant
	31–40	0	1	30					
	41–50	1	3	22					
	51–60	0	0	5					
	SSC	1	0	3					
Qualification	Graduate	0	3	24	27.35	12.59	6	0.000	Significant
	Postgraduate	0	0	11					
	Other	0	2	56					
	MPHW	1	3	1					
Designation	Staff nurse	0	1	61	54.76	12.59	6	0.000	Significant
	Technician	0	0	18					
	Pharmacist	0	1	14					
	<2	0	0	14					
Experience (years)	3–5	0	1	23	2.62	12.59	6	0.855	Not significant
	5–10	0	1	19					
	More than 10	1	3	38					
In-service training	Yes	0	3	79	6.46	5.99	2	0.040	Significant
	No	1	2	15					
Source of information	Formal lecture	0	1	36	1.1	7.81	3	0.777	Not significant
	Workshop	0	1	11					
	Infection control training	0	1	25					
	Internet and social media	0	0	7					

MPHW: Multipurpose health worker, BMWW: Biomedical waste management

Conclusion

It is concluded that even though the health personnel shown improved knowledge and practices with regard to BMWW, repeated and comprehensive training (starting with induction of all new appointees to once a year thereafter) by vertical and horizontal modes on BMWW is required.

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