

**A cross-sectional study on biomedical waste management in gadag district and sub-district hospitals, South India**

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**Abstract**

**Background:** Biomedical waste (BMW) means that the waste generated during diagnosis, treatment, surgical procedures, immunization, and other medical procedures on human beings, animals, or research activities or in the production or testing of biological. In this study, we have assessed the knowledge and practices of health personnel on biomedical waste management in various units in the district hospital and sub-district hospital

**Methodology:** A cross-sectional method study was conducted to assess the knowledge and practices of biomedical waste management in all government districts and sub-district hospitals of Gadag district. A universal sampling method has been used. The data were collected using a questionnaire and observation checklist from August 2019 to September 2019.

**Results:** Among 67 health personnel, More than half of staff nurses have poor knowledge (56%) and the x-ray technicians have had good knowledge (100%).lab technicians had adequate practices (60%) and X-ray

technicians had moderate practices (33.33%). On observation, most of the health centers maintained good biomedical waste management practices.

**Conclusion:** The study revealed that the X-ray technicians had good knowledge and laboratory technician have moderate knowledge. Continuous training is required on biomedical waste for health personnel.

**Keywords:** Biomedical waste management, BMW knowledge, BMW practices, biomedical hazards, BMW segregation

**Introduction**

BMW management is an integral part of an infection control program and if mismanaged, medical wastes can contaminate the entire environment of the hospital leading to environmental degradation. All individuals exposed to BMW are potentially at risk of being injured or infected if not managed appropriately(1).

There is also growing concern about the spread of HIV, Hepatitis, and other infectious diseases that can be caused by needle-stick injuries and other forms of

contagion that can result from the improper management of biomedical wastes by hospitals and other health care institutions (2).

Indiscriminate disposal of Biomedical or hospital waste and exposure to such waste poses a serious threat to the environment and human health(3) In the past, medical waste was often mixed with municipal solid waste and disposed of in nearby landfills. In recent years, many efforts have been made by environmental regulatory agencies to better manage(4).

World Health Organization states that 85% of hospital wastes are non-hazardous, whereas 10% are infectious and 5% are non-infectious but they are included in hazardous wastes. About 15% to 35% of hospital waste is regulated as infectious waste(5).

The immense waste where freelance workers or rag pickers scour the waste manually and sort for recyclable material. These workers then contact relevant industries, which acquire the waste from them. Since most of these rag pickers are women and children from the lowest socioeconomic strata, awareness of health risks, in general, is poor. As a result, many of them contract diseases from syringes and needles and other biomedical waste and become carriers of great health risk to the general populace (6). In this study, we are assessing the biomedical waste handler's knowledge and biomedical waste management practices in health centres of Gadag district, Karnataka.

### Materials and Methods

**Study settings:** The study was undertaken in the government district hospital and sub-district hospitals in Gadag, Karnataka State, South India from August 2019 to September 2019.

**Study design:** A cross-sectional study was conducted in the Gadag district. The unit of study was all Government sub-district hospitals and district hospitals,

which are there in Gadag district. Data was obtained by administering the questionnaire to health workers working in the biomedical waste management department and biomedical practices were observed by using an observation checklist at all five health facilities.

### Study participants

- For facility assessment: Government district and sub-district hospital, Gadag
- Health personnel involved biomedical waste management activity. Written consent was obtained from all study participants.

**Variables:** Variables assessed in these studies were knowledge and practices about biomedical waste collection, color containers, segregation, and storage.

**Data sources:** Primary data was obtained by administering the pre-tested questionnaire to biomedical waste management department works to assess their knowledge and an observation checklist was used to assess the practices regarding biomedical waste management.

**Sample Size:** By using universal sampling technique all sub-district hospitals and district hospital was included in the study which is there in the Gadag district.

### Statistical methods

Data were entered into an excel sheet and expressed in frequency and percentages by using SPSS v20.

**Ethical clearance:** Obtained from the Karnataka State Rural Development and Panchayat Raj University ethics committee.

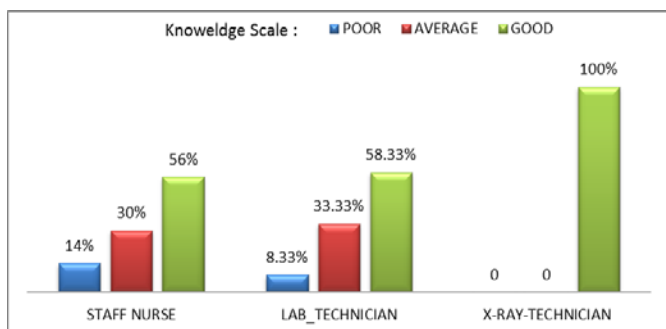
**Results**

Table 1: Distribution of the study places and participants

Health centers	Staff nurse	Lab technician	X-ray technician	Center wise Study Participants (%)
Mundaragi sub-district hospital	8	3	NA	11 (16.42)
Shirahatti sub-district hospital	5	3	1	9 (13.43)
Nargund sub-district hospital	7	2	1	10(14.92)
Ron sub-district hospital	4	3	2	9 (13.43)
Gadag district hospital	26	1	1	28 (41.80)
<b>Total no. of participants (%)</b>	50 (74.62)	12 (17.91)	5 (07.47)	67 (100%)

In the current study, nearly one-third of staff nurses have participated in the biomedical waste management department workers and nearly half of the study participants were from district hospitals.

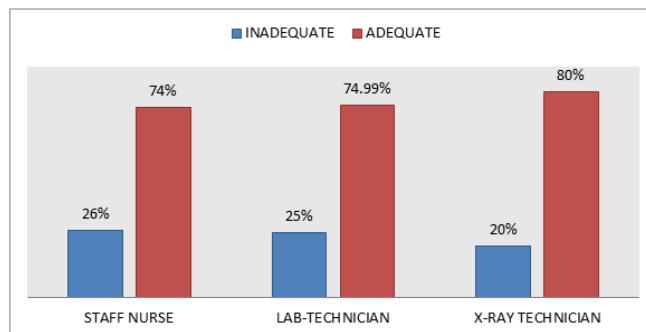
Fig. 1: Knowledge among study participants about the biomedical waste management



In our study, it's found out that the x-ray technicians had more knowledge of biomedical waste management when compared to nursing staff and laboratory technicians in all five health centres. Among the laboratory technicians and staff nurses, lab technicians

had more knowledge of biomedical waste management in the hospitals.

Fig 2: Practices among study participants regarding BMWM



In the current study, more than half of the x-ray technicians have best practices about biomedical waste collection, segregation, storage, and transportation compared to staff nurses and lab technicians in all five health centres.

Table 2: Distribution of biomedical waste management practices.

Variables	Healthcare Centres				
	Mundaragi	Shirahatti	Nargund	Ron	Gadag
Color-Coded bins at the site	Yes	Yes	Yes	Yes	Yes
4 color-coded buckets available at the site	Yes	Yes	Yes		Yes
Emptying of filled buckets	Yes	Yes	Yes	Yes	Yes
Segregation according to BMWM rules	Yes	Yes	Yes	Yes	Yes
Biohazard symbols at the site	Yes	No	Yes	Yes	Yes
Posters were available at the site.	Yes	Yes	Yes	Yes	Yes

In all the sub-district and district hospitals biomedical waste management rules are implemented only in the Shirahatti sub-district hospital biohazard symbol was not pasted.

### **Discussion**

**Knowledge about BMW:** In our study more than half of the staff nurses has good knowledge. A similar study conducted at a tertiary care hospital, Tripura in 2016, found out that 87.3% of nurses have good knowledge. (7) and A similar study conducted in the Ambala district, Haryana from December 2014 to January 2015, found that 63.6% of nurses have good knowledge(8). a similar study conducted at Oman in 2018, found that the nurses had 90.9% of good knowledge(9)

In the current study, all most all the Lab Technicians showed good knowledge, A similar findings found in a study conducted at Tamilnadu(10).

In our study, only a few of the staff nurses have average knowledge and 14% have poor knowledge, similar study conducted at a medical college hospital, Trivandrum in 2016, found out that 32% of staff nurses are had good,66% of average and 2% of poor knowledge (10).

**Practices regarding BMW:** In our study 74% of staff nurses are following adequate practices, a similar study conducted in Tripura 2016, found that nurses had 88.7% adequate practices(7).

In our study, the staff nurses are had 26% of adequate practices and 74% of inadequate practices. A similar study conducted at Odisha in 2014 the study shows that 36% of good practices, 59% of average practices, and 4% of poor practices (10).

In my study, the nurses having 74.99% of adequate practices, a similar study conducted in Oman, found

that 80% of staff nurses are practicing adequate practices(9).

**Biomedical waste segregation:** Among 67 participants 79% of participants segregate the waste at the point of generation .the similar study was conducted at western India in 2018, here they included 210 participants in that 40% of health care workers segregate the waste at the point of generation(11).

### **Conclusion**

The study concludes that most of the X-ray technicians have good knowledge and adequate practices. Most of the staff nurses and lab technicians have average knowledge and moderate practices. Regular training is needed to have adequate biomedical waste management practices at health centres.

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