ISSN- 0301-1216
Indian J. Prev. Soc. Med. Vol. 53, No.2, 2022

ORIGINAL ARTICLE

Biomedical Waste Management in Leh District

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ABSTRACT

The aim of this study was to find out how Biomedical Waste (BMW) is disposed of in the Leh district and whether the healthcare facilities are following BMWM Rules 2016. A total of 19 health care facilities from Leh district were selected for this study. The data were collected through a semi-structured questionnaire from June 2021-August 2021. After analysis, it was found that all the health care facilities are involved in the disposal of BMW inside their premises. There is no involvement of the municipality or CBMWTF in handling BMW in Leh district. All the healthcare facilities have adopted the BMWM Rules 2016 but only partially.

Keywords: Picky, Eating, Growth, Children

Introduction

Biomedical wastes usually contain infectious materials. As per BMWM Rule 2016, biomedical waste is defined as any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, or in the production or testing of biological material or in health camps.[1]

Biomedical waste is infectious and poses a big threat to humans and the environment, it is very important to manage these wastes correctly as per the Government of India guidelines BMW rules 2016 so that we can reduce their harmful affects as much as possible. The baseline for a good BMWM practice is based on the three Rs. These are: - reduce, recycle and reuse. The best BMWM methods aim at avoiding the generation of waste or recovering as much waste as possible, rather than disposing of.[2] If we can completely imbibe it in our management process it can make a lot of difference in the BMWM system as a whole.

The first biomedical waste management rules were published on 20 July 1998 by the Government of India by the erstwhile Ministry of Environment and Forest. The BMWM Rules of 1998 were later amended in the year 2000, 2003, and 2011. In the Ministry of Environment, Forest and Climate Change in March 2016 amended the BMWM rules and these rules are called the Biomedical Waste Management Rules 2016.

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Submission	19.04.2022	Revision	12.05.2022	Accepted	22.05.2022	Printing	29.06.2022

Prior Publication*: Nil*; Source of Funding:* Nil; *Conflicts of Interest*: None , *Article # 451/945

Methodology

This cross-sectional study was done to find out how BMW is managed in the Leh district and whether the healthcare facilities are following BMWM Rules 2016 in letter and spirit. The study was conducted between June 2021 and August 2021. Ladakh is known as the land of high passes. Its altitude ranges from 2300m-5000m from sea level. Leh district expands over an area of 45100sq. km.[3] The district is mountainous and the climatic condition is cold and dry. During the winter season, the airway is the only mode through which Ladakh is connected to the rest of the world. Leh has one district hospital located near the main town.

The study was conducted in (a) District Hospital, (b) Sub-district hospitals, (c) Primary Health Centers, (d) Sub Centers, (e) Army Hospital, (f) Private Hospital. There is 01 district hospital, 01 sub-district hospital, 14 primary health centers, 129 sub-centers, 01 army hospital, and 02 private hospitals. 10% of every healthcare facility has been selected for this study which results in a sample size consisting of 01 district hospital, 01 sub-district hospital, 02 PHCs, 13 sub-centers, 01 army hospital, and 01 private hospital. A semi-structured questionnaire was used to collect data. Convenient sampling was adopted for the selection of facilities due to the Covid-19 pandemic.

The data was collected using a questionnaire covering all different basic aspects of BMWM Rules 2016. The questionnaire consisted of 6 sections (a) Section 1- Basic information, (b) Section 2- Waste collection, (c) Section 3- COVID Waste collection, (d) Section 4- Disposal, (e) Section 5- Biomedical waste handlers, (f) Section 6- Biomedical waste disposal facility. Part 1 of the questionnaire was about the basic information about the health care facility. In Part-2 (Waste collection), 8 parameters were used to collect information about the types of waste generated and the different ways of waste collection. In Part 3(COVID waste collection), seven parameters were used to finalize the basic ways of handling COVID Waste. In Part 4(Disposal), nine parameters were used to collect information about the ways through which BMWs were treated or disposed of. In Part 5(Biomedical waste handlers), eight parameters were used to check whether the BMW handlers were educated about the waste handling methods and provided with necessary safety measures. In Part 6(Biomedical waste disposal facility), fourteen parameters were used to find the final disposal of BMW. A self-structured questionnaire was used to collect data through the in-person interview, telephonic interviews, and Google Forms. After the collection, the data were entered into MS Excel and evaluated further to draw the results.

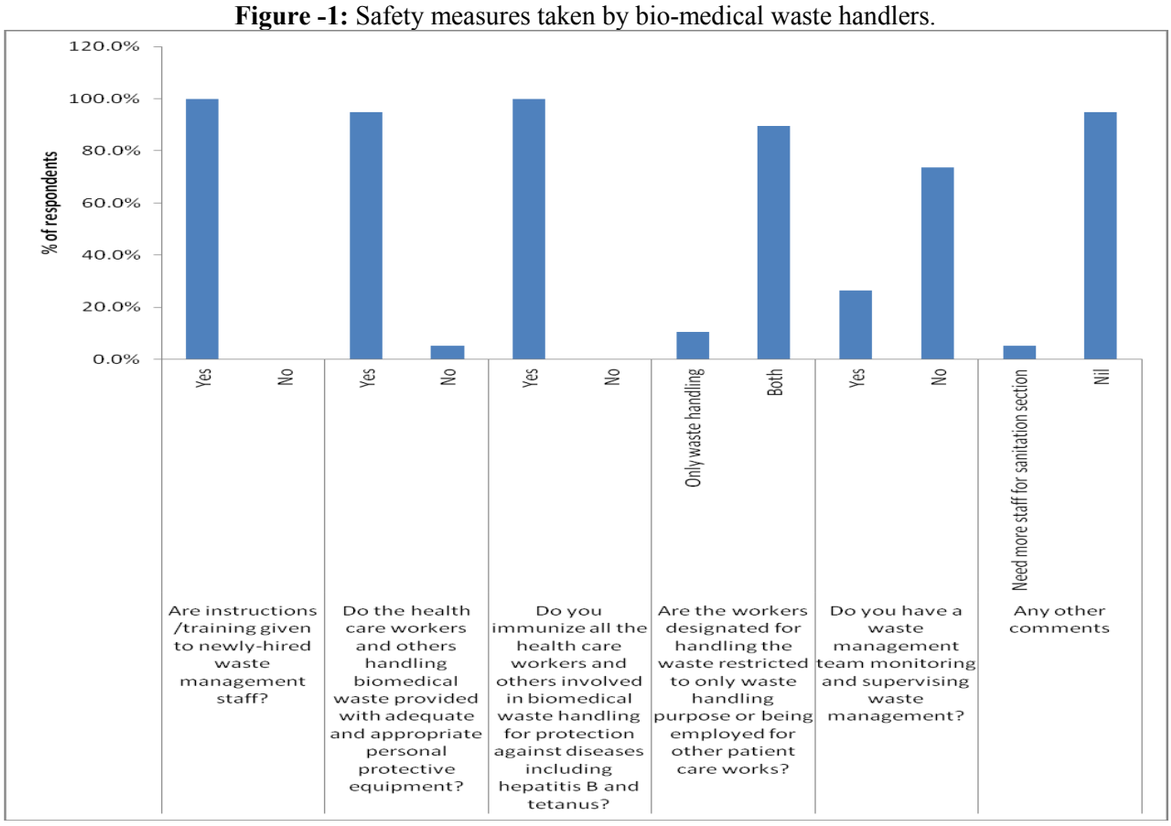
Result

A total of 19 health care facilities were included in the study out of which, 4 were hospitals, 2 were PHCs and 13 were sub-centers. BMW is completely segregated at the point of generation in all the health care facilities. The collection of BMW depends on the amount of waste generation. 73.7% of the health care facilities collect waste daily, 15.8% collected it weekly and the remaining 10.5% of their frequency of collection depends on the generation of BMW.

All the waste handlers received training regarding BMW handling and they are also given vaccines to protect them from infections. 89.5% of the waste handlers were also involved in patient care works. Only 26.3% of the health care facilities had BMWM supervising Teams.

There are 02 incinerators in Leh district; one is in the district hospital Leh and the other in the Army hospital Leh. They do not allow the BMW from outside for treatment. Most of the BMW is disposed of by sharp pits, burning (84.2%), and chemical disinfection (73.7%).

Figure -1: Safety measures taken by bio-medical waste handlers.



COVID waste collection is mostly done according to the rules.94.7% of the healthcare facilities collect COVID waste separately.68.4% use double-layered bags for COVID waste collection.52.6% maintain a separate register for COVID waste.63.2% used dedicated bins labeled as COVID-19 for waste collection.68.4% disinfects the COVID waste bins. All the healthcare facilities selected for this study have only partially adopted the BMW rules 2016 as these healthcare facilities follow a waste collection, but they cannot dispose of it according to BMW 2016 rules.

Army Hospital Leh: The hospital has a team that educates the staff about BMWM. They use color-coded bags, bins and cardboard boxes for waste collection. The Covid- 19 wastes are collected separately. A BMW register and a separate Covid waste register were maintained and updated daily. The area of waste disposal was a restricted area. Daily disposal was done inside the premises by using sharp pits, incinerator, shredder, autoclave and chemical disinfection methods. The BMW handlers are also involved in patient handling. The waste collection is done manually, no vehicles are used.

Leh District Hospital: There is one district hospital in Leh which is the Sonam Nurboo Memorial Hospital. The hospital used plastic bags and color-coded bins for waste collection. The Covid- 19 waste was collected separately. They have maintained separate registers for BMW and Covid waste. The final disposal of the BMW is done inside the hospital premises daily by using an incinerator, deep burial, chemical disinfection, placental pits, and sharp pits.

Wards were inspected by the sanitary inspector daily. The workers were trained and educated about BMW handling periodically. A designated team was in charge of monitoring the disposal of BMW.

The hospital is in dire need of a larger area for waste disposal. The sharp pit was found overflowing out of the walled mesh and there was no alternate area that can be used for waste disposal anywhere outside the hospital premises.

Figure 2: COVID waste management in Leh district

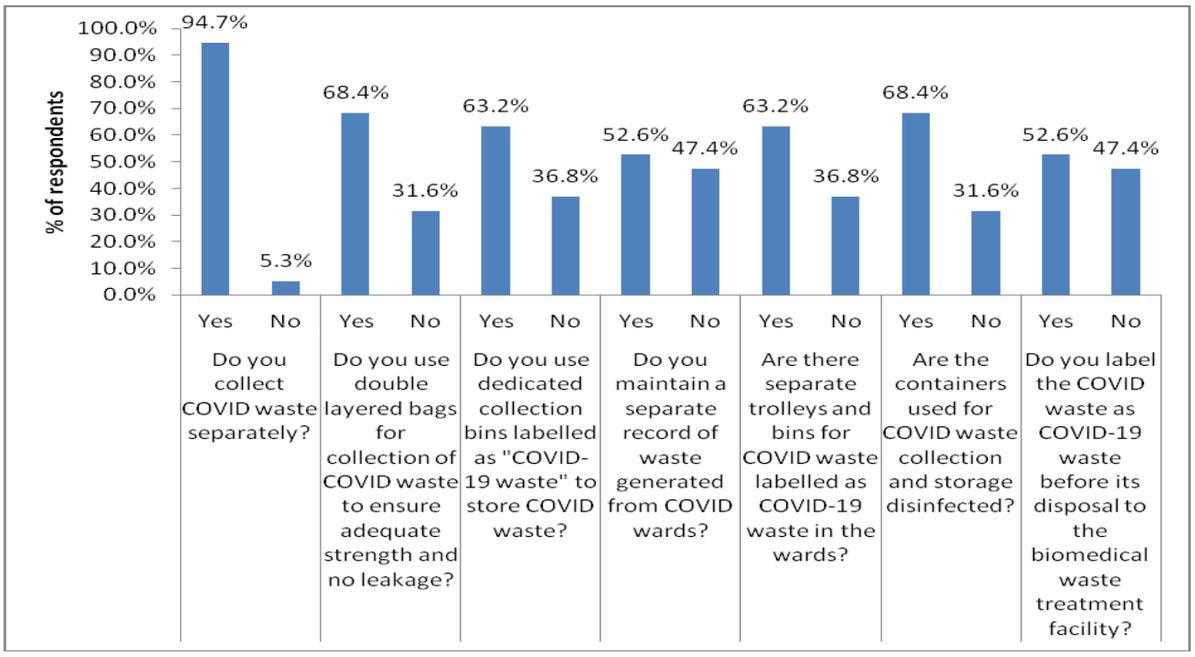
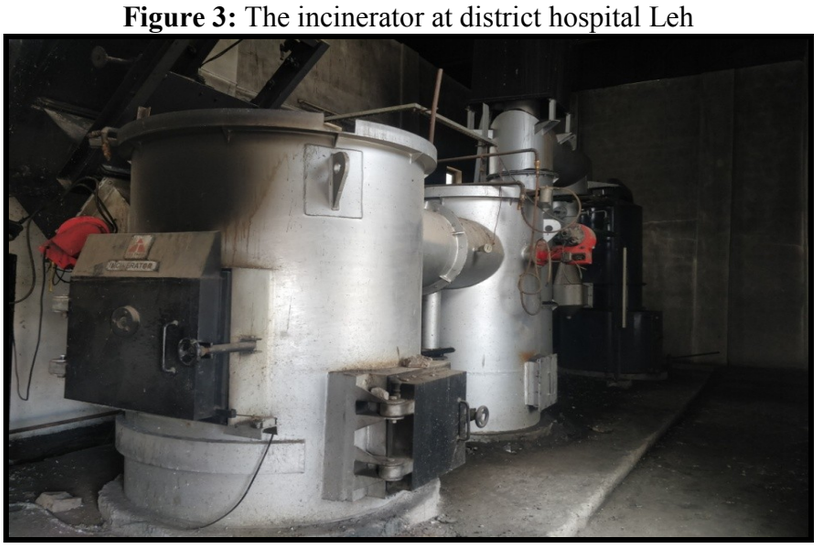


Figure 3: The incinerator at district hospital Leh



Sub-Centre: There were 129 sub-centres in the Leh district, 13 had been surveyed for this study. In these sub-centres, different colour-coded bins were used for waste collection. BMW records were not maintained but recently they have been directed to do so. When these sub-centres function as Covid testing centres, the generated waste is immediately taken by the Covid testing team for disposal. All the staffs are involved in the management of BMW.

Initial training was imparted to the medical staff regarding BMWM. There was no BMWM monitoring team. The BMW disposal was done inside the premises every week and the area was not a restricted zone due to lack of space. Burning, sharp pits, chemical disinfection and dumping are the methods of disposal. No vehicles are used for the collection of BMW.

Sub District Hospital: There was one sub-district hospital situated in Nubra. The hospital used colour-coded bins and plastic bags for waste collection. They also maintained separate registers for both BMW and Covid-19 waste. Separate labelled collection bins and double-layered bags were used for Covid waste collection. BMW handlers were involved in both patient care as well as waste handling. Training about BMWM was imparted to the medical staff periodically. Waste was disposed of inside the hospital premises daily. Deep burial, chemical disinfection and pits were the BMW disposal methods used.

Private Hospital: The Mahabodhi Karuna Charitable Hospital Leh is acting as a Covid hospital. The hospital used colour-coded bins as per the BMWM rules 2016. They maintained the register for Covid waste and updated it daily. They used double-layered bags for the collection of Covid waste. The bins used for collection and storage were disinfected regularly. The waste handlers were involved in patient care as well. The training was imparted to the BMW handlers. There was no BMWM monitoring team in the hospital. The BMW storage area was a restricted area. Autoclaving, deep burial and burning were the methods used for disposal of the waste. The collection of waste was done manually, no vehicles were used.

Primary Health Centre (PHC): The PHCs used colour-coded bins and plastic bags for the collection of BMW. They also maintained a BMWM register. Covid waste was collected separately in double-layered bags. The containers used for collection and storage were disinfected regularly. The waste handlers were also involved in patient care works. The final disposal was done daily inside the premises. Deep burial, chemical disinfection, burning and pits were the common methods used. In most of the PHCs, no vehicles were used; the collection of waste was done manually.

Figure 4: PHC Khaltsi Biomedical waste area

Figure 5: Sharp pit (PHC Khaltsi).

Discussion

When the findings of the army hospital were compared with a study conducted by Dilip Markandey et al. 2012, in which the author found that the hospital followed strict segregation packaging, labeling and disposal rules as per

BMWM Rules 1998. Treatment techniques included autoclaving, microwave treatment, incinerator and land filling. Arrangements for liquid waste, incineration ash and chemical waste requires up-gradation.[4]

Regarding district hospital finding when compared to the study done by Sonam Angmo et al., 2017 in the same health facility. The waste collection was almost proper and waste was segregated at the point of generation according to the BMWM Rules 2016. Needles, sharps were placed in bleaching powder in translucent containers, but waste was manually handled. No incinerator was in use and even the autoclave was non-functional. All the biomedical wastes was picked up by the municipality trucks from the hospital and were dumped in the open area where other types pf waste was also dumped like construction waste, household waste, municipal waste, etc. Overall the study revealed that the BMWM Rules 2016 were partially adopted because waste segregation and collection was according to BMWM Rules 2016 whereas the disposal of BMW was not.[5]

For the sub-centre when the study was compared to the study conducted by Varun Dhiman et al. 2020, the author found that the segregation process was adopted at the source level. BMW register was maintained daily. No facility of the incinerator was available in the surrounding area. So, all the BMWs was picked up by a company vehicle situated in Pathankot, Punjab for incineration.[6]

In the sub-district hospital, when the study was compared to the study conducted by Ashiq Hussain Bhat et al. 2018, the author found that in the sub-district hospital Pattan, no waste segregation was done and waste was burnt openly. In sub-district hospital Kreeri and Sub District hospital Tangmarg, waste was stored in open dustbins and disposed ofinsensitively.[7]

For disposal of BMW by the private hospitals,when compared to the study done by Sumi Nandwani et al.2010 it was found that the waste generated in a private hospital in Delhi was being disinfected properly before disposal but the segregation was not done properly. The hospital had its incinerator but it was underutilized. The hospital staff was not given adequate training regarding the handling and management of BMW.[8]

For comparing the BMW of the primary health centre, when the study was compared to a study conducted by G. Poyyamoli et al. 2013, the author found that the BMWM practices observed in all PHCs were not in line with government recommended practices. The segregation of the BMW did not occur at the point of generation. There were no specific containers for the collection of BMW and also the containers were not disinfected. There were no designated BMW handlers and the workers assigned with the BMW handling were not given adequate training and protection according to BMWM Rules. There was no monitoring of the BMW disposal. The BMW was transported to the final site by municipal trucks every day. Some PHCs disposed of BMW inside the hospital grounds using open disposal.[9]

Limitation: The limitation of the study is that due to the COVID-19 pandemic and limited period, the sample size was limited and a convenient sampling methodology was adopted. The health care facilities in Leh district are scattered over a large area, which is also one of the reasons for the small sample size.

Conclusion and Recommendation

It was found that there is a dire need for identifying a site for BMW disposal for district hospital Leh. All the health care facilities need a larger land area to have adequate waste disposal facilities. There is a need to set up a CBMWTF so that other smaller health care facilities can correctly dispose their BMW sanitarily. It is also recommended that training and reorientations regarding BMWM Rules 2016 should be done for healthcare workers. Though waste collection is done as per the BMWM rules 2016 but at the same time, the disposal of the BMW is not done entirely according to the BMWM rules 2016. Since many healthcare facilities still practiced manual handling of biomedical waste, it should be ensured that vehicles for BMW should be provided to manage the waste sanitarily. Waste should be disposed

of daily irrespective of the quantity produced. Materials and equipment needed for handling the BMW should be available throughout the year to these health facilities.

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Citation: Rauf Tasneem, Goel NK, Prashar Savita, Kaur Ravneet, Sharma Deepak. Biomedical Waste Management in Leh District. Indian J Prev Soc Med, **2022; 53 (2): 128-134.**