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EVALUATING THE ROLE AND IMPACT OF COMMON BIOMEDICAL WASTE TREATMENT FACILITIES IN PUNJAB

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Abstract: Punjab is a house to around 14000 healthcare facilities which produce more than 20 tonnes/day of Bio Medical Waste (BMW). BMW, if not managed properly can cause infections and lead to severe environmental hazards. Punjab State Pollution Control Board, which is responsible for monitoring and management of BMW submits Annual Report to Central govt on 31 July, every year regarding implementation of BMW Rules 2016 and the mitigation measures taken to combat BMW in the state. The objective of this research is to find the adequacy and efficacy of Common Biomedical Waste Treatment Facilities (CBWTFs) in the state as laid down in the Revised Guidelines for establishing CBWTFs 2016, in the country. The research concludes with highlighting the adequacy of CBWTFs in the state with few shortcomings in their infrastructure, and make suggestions for the future.

Keywords: *Healthcare Facilities, BMW, CBWTFs*

1.0 Introduction

The issue of BMW can not be taken lightly at any point of time. If not managed correctly, it can leash havoc on the society, at par with any pandemic. Even though only 15% of the of the total BMW produced is hazardous *(WHO, 2022)*, but has enormous potential in ripping off the healthcare system, if ignored for long. It thus became prudent at global, national and state levels to frame the guidelines and rules to tackle with this issue, and it actually paid off during COVID pandemic when the production of BMW rose multiple times. Apart from framing Biomedical Waste Management Rules in 2016, the government of India keeps updating its directions on the subject keeping itself at par with the global sustainable development goals. At central level Central Pollution Control Board *(CPCB, 2022)* and at state level State Pollution Control Boards (SPCB) monitor the management of BMW in their respective areas with the hierarchy of institutions under them. Every SPCB has to submit an annual report on the subject to CPCB. This research has been carried out on annual reports submitted for the year 2022, beyond which reports are awaited to be submitted by the SPCBs. Every state is supposed to create Common BMW Treatment Facilities (CBWTFs) and monitor their functioning *(CPCB, 2022).* The SPCB also monitors the BMW waste treatment facilities in Hospitals and Clinics as authorization to run the healthcare facility (HCF) also depends upon the measures it shall be taking in future in management of BMW at their place.

2.0 Status of HCFs in Punjab 2022

In 2022, Punjab generated approximately 20 tonnes of biomedical waste per day and it is disposed of through Common Biomedical Waste Treatment Facilities (CBWTFs) in the state. The state has 13649 HCFS , out of which 3998 are bedded. There are 79954 hospital beds in the state. There are 6 CBWTFs in the state and no HCF has Captive Treatment Facilities (CTF). Though there has been continuous increase in the No of HCFs in the state but there are certain HCFs which are running without authorization *(CPCB, 2022)*. Figures 1 & 2 provide detailed information on status of HCFs in the State.

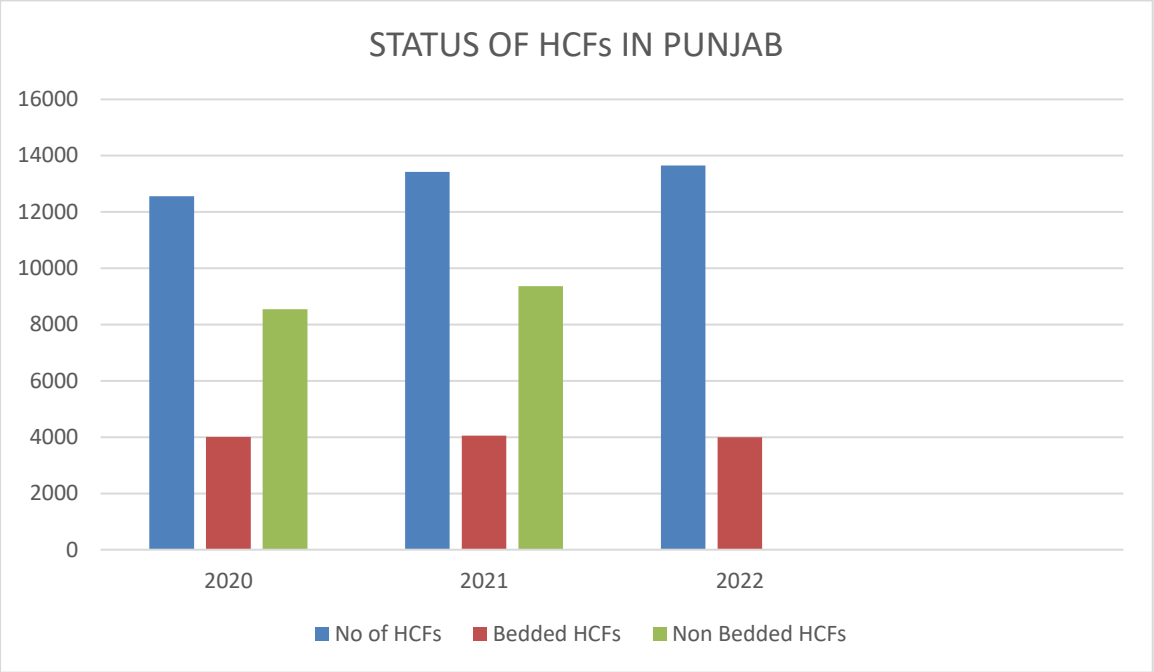

Figure1: Status of HCFs in Punjab

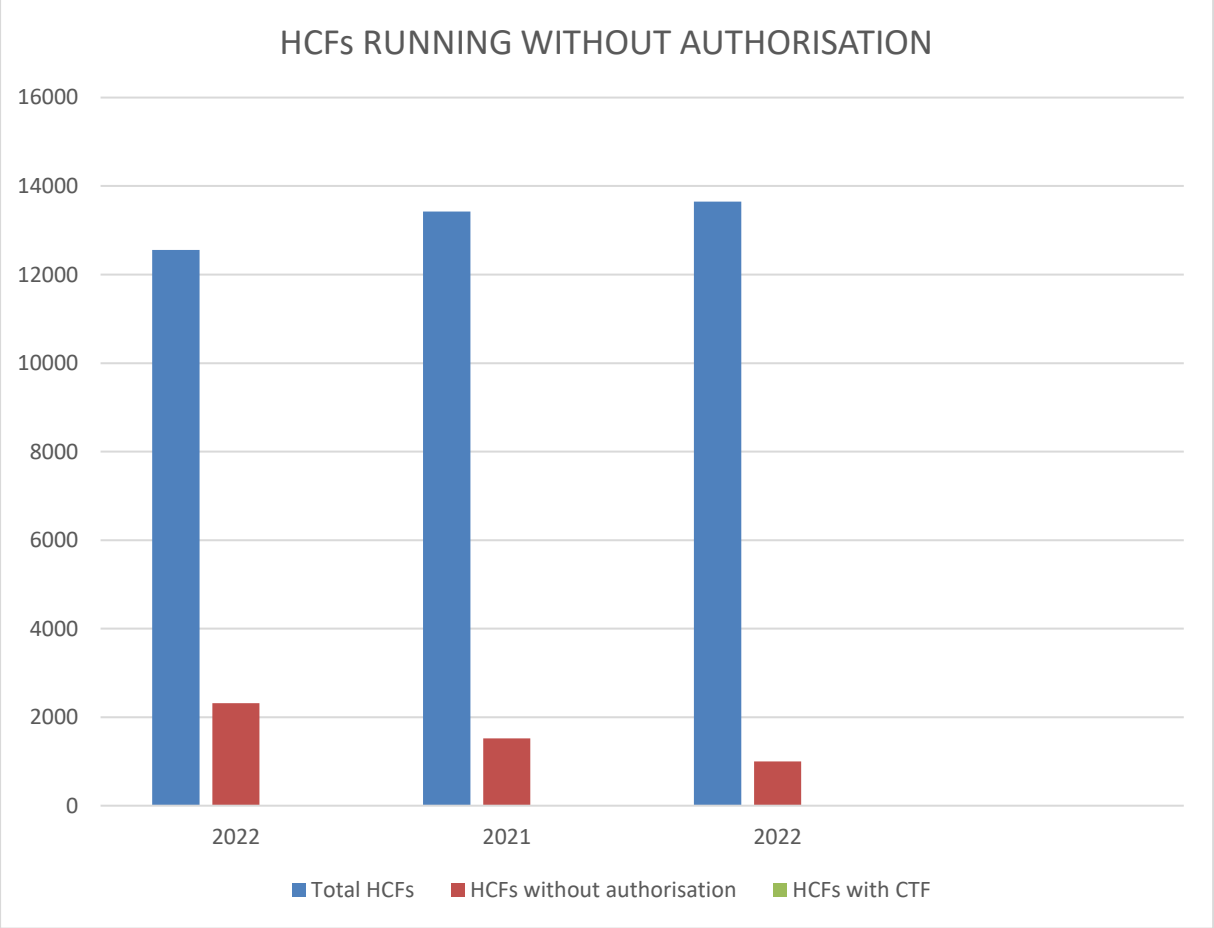

Figure 2: HCFs running without authorization

3.0 Gaps identified

To regulate the Biomedical Waste Management, the Central Pollution Control Board (CPCB) shortlisted nine important indicators to assess and monitor the efficiency, compliance, and implementation of the rules, by the state. The shortcomings in the monitored indicators, along with suggested improvements are communicated to State Pollution Control. The indicators are as follows:-

- How many CBWTFs are available in the state.
- How much capacity of these CBWTFs is being utilized.
- How much is the capacity of CBWTFs.
- Are there any CTFs available.
- Is deep burial being practiced.
- Deep burial pits utilized by CBWTFs
- Is Online Continuous Emission Monitoring System being incorporated.
- Have Waste Water Treatment Facilities been installed.
- Has Barcode and Unique Identification Number for (HCFs) being implemented.

4.0 Problem statement and objectives

Since the second wave of the pandemic, there has been continuous increase in the generation of BMW due to continuous increase in the HCFs in the state . The new guidelines for establishing of CBWTFs mandate one to cover 75 KMs of area, which falls quite short as per the area of the state, which is 50362 Sq Kms. The situation further worsens when the HCFs don't have the CTFs. Therefore, this conceptual study shall highlight the efficacy and adequacy of facilities to combat BMW in the state and suggest improvements.

5.0 Materials and methods

The following materials and methods were employed for the study:-

a. Materials

This study is based on a comprehensive survey of existing literature, news stories, and reports from both public and official sources, including government and non-government agencies. The information presented is drawn from various sources, including the World Health Organization (WHO) and the Ministry of Health and Family Welfare (MoHFW) websites, as well as reputable databases such as Springer, ResearchGate, and Google Scholar. The literature was obtained electronically, and no systematic sequence was followed for the selection of sources.

b. Method

To highlight the shortcomings in the application of Biomedical Waste (BMW) guidelines, researchers gathered data from government publications, specifically Central Pollution Control Board (CPCB) reports since 2019. These reports clearly noted disparities in BMW regulation compliance among India's States and Union Territories by examining important indicators and data was available for the state. All the charts and tables have been prepared by the authors with data sourced from CPCB website.

6.0 Findings

6.1 Guidelines for management of BMW

According to the BMWM Rules, 2016, HCFs are required to adopt a color-coded waste segregation system where it is required to be segregated into different categories and transported to treatment facilities within 48 hours of generation. The Red Container is used for disposing of infectious or microbiological waste and includes items like swabs, cultures, and disposable medical equipment contaminated with blood or body fluids. The Blue Container is designated for disposing of sharp waste items, such as needles, syringes, scalpels, and broken glass. The Yellow Container is used for disposing of anatomical waste, including body parts, tissues, organs, and animal carcasses. The White Container is used for disposing of general non-hazardous and non-infectious waste, such as paper, packaging materials, and food waste. And the Black Container: Black is used for pharmaceutical waste, including expired or unused medications *(Data et al, 2018).* This criteria ensures that BMW is handled safely and appropriately throughout its disposal process, reducing the risk of contamination and environmental hazards. The same is depicted in Figure 3. After segregation in different containers, BMW can be treated at CTFs of the HCFs or it can be transported to CBWTFs for final treatment and disposal.

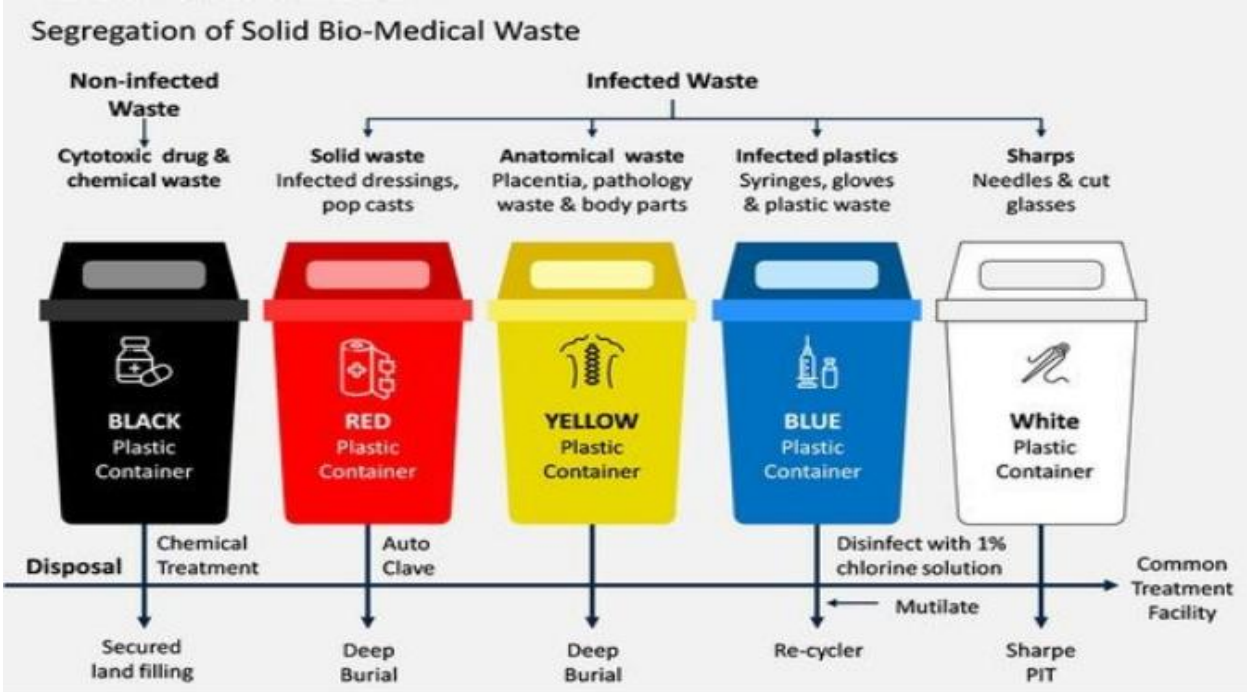

Figure3 : Segregation of BMW in coloured bins

6.2 Guidelines on CBWTFs in Punjab

Also, as per the BMWM Rules, 2016, every occupier or operator of CBWTFs is required to submit an annual report to the prescribed authority (SPCBs/PCCs) by June 30th each year. The prescribed authority then compiles, reviews, and analyzes this information and submits it to the Central Pollution Control Board by July 31st annually. These annual reports are also made available online on the websites of occupiers, SPCB/PCCs, and CPCB. The reports contain details such as the amount of biomedical waste generated, collected, treated, and disposed of at the facility, the facilities utilized for disposal, amount of waste sent for recycling, number of vehicles used for waste collection, training programs conducted, incidents, violations of BMWM Rules, 2016, etc *(MoHFW, 2021)*. The CBWTFs are mandated to have certain laid down infrastructure to get approval. There are 6 CBWTFs in the state as per following details in Table 1.

Name of CBWTFs	Incinerator (No.)	Autoclave (No.)	Shredder (No.)	Deep Burial (No.)	Incinerator (kg/day)	Autoclave (kg/day)	Shredder (kg/day)	Deep Burial (kg/day)
M/s. Rainbow Environment (A unit of M/s. Raidal Buldcon (I) Ltd., Village Balyali, Mohali, Punjab)	2	1	3	Nil	3096	2925	8928	Nil
M/s. Amritsar Enviro Care System (P) Ltd., Village Ibbankalan, Chabhai Road,	1	2	4	Nil	2000	6400	6400	Nil

Amritsar, Punjab								
M/s. BMWT Trust, Vill. Pangoli, Defence Road, Pathankot Dist., Pathankot, Punjab	1	2	2	Nil	3600	4800	6400	Nil
M/s. Medicare Environmental Management Pvt. Ltd., Opp. Central Jail, Ludhiana, Punjab	1	2	3	Nil	4800	4000	15200	Nil
M/s. Meridian Mileu Care Pvt. Ltd., Village Bir Pind, Nakodar Dist., Jalandhar	1	1	1	Nil	5000	2400	4000	Nil
M/s. Med Waste Solutions Pvt. Ltd., Village Bidowali, Tehsil Gidderbaha, District Punjab	1	1	1	Nil	5000	2400	4000	Nil

Table 1: CBWTFs in Punjab

6.3 Status of CBWTFs in Punjab

Approximately 20 tonnes of BMW is generated in the state and the it is highlighted that the entire quantity produced is treated and disposed off through CBWTFs, which is a great positive for the state. However, none of the HCFs has the CTF. Even the mandated Deep Burial and Water Treatment Infrastructure has not been installed by the CBWTFs. The CBWTFs are not utilizing their full capacity. One more positive is that all the CBWTFs have introduced the Barcode system and have installed OCEMs which are connected with the server *(CPCB, 2022)*. It helps SPCB to monitor the CBWTFs in a transparent manner. Figures 4 to 7 shall explain the status of the CBWTFs graphically.

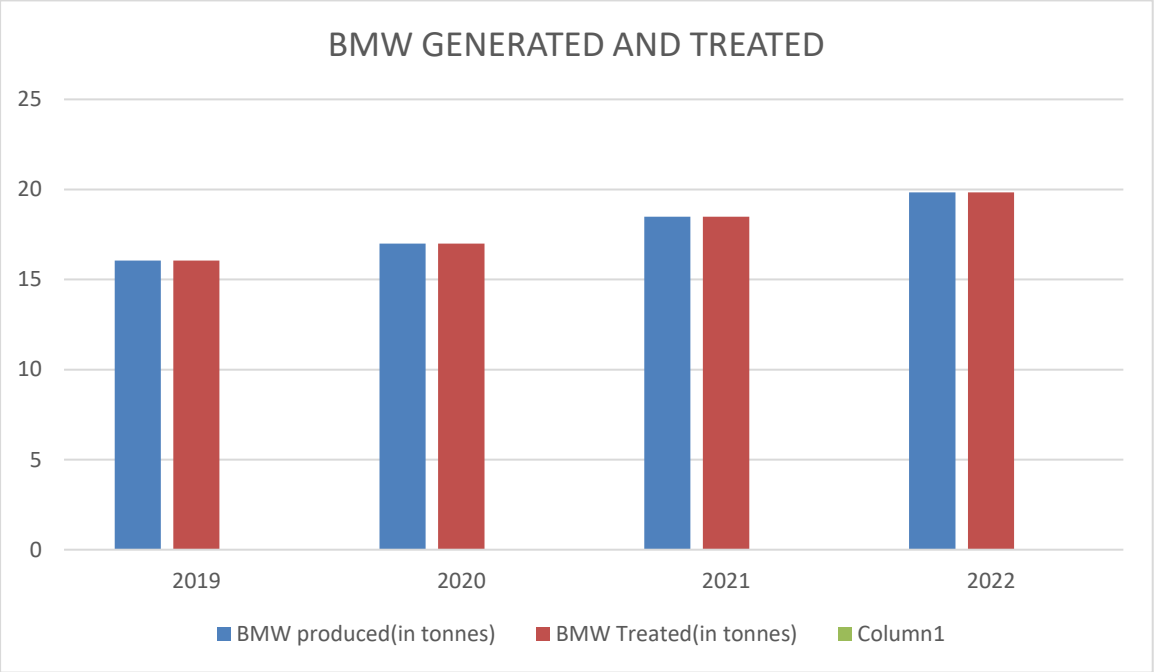

Figure 4: BMW generated and treated in the state

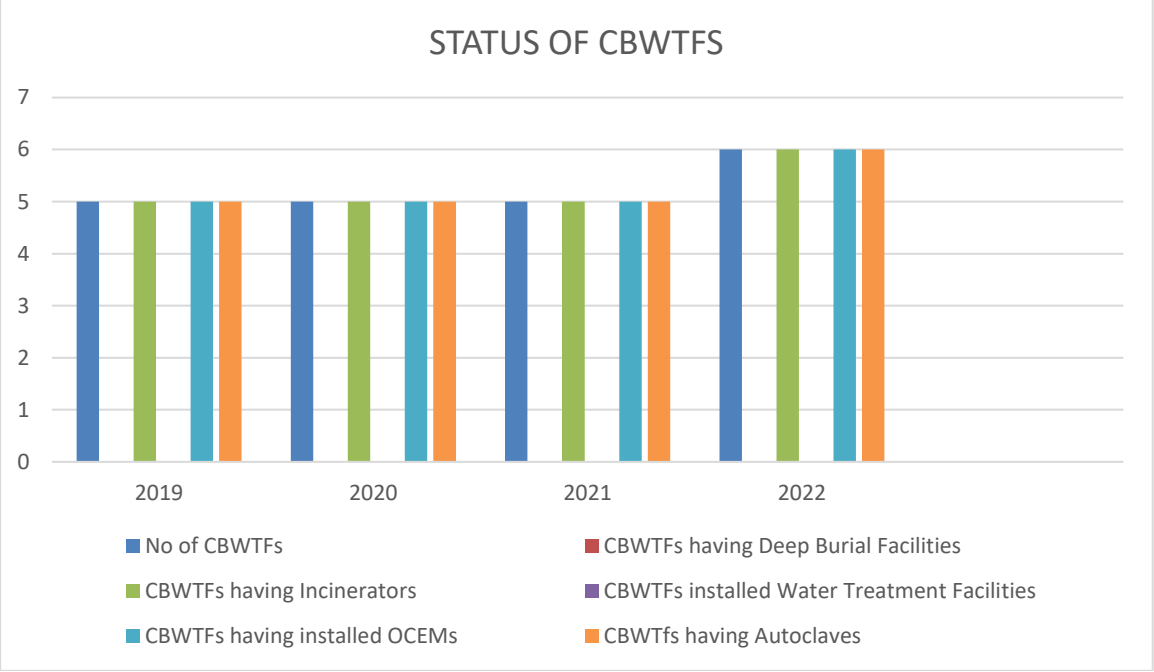

Figure 5: Status of CBWTFs in the state

7.0 Conclusion

After going through the entire data of the state as per the BMW annual reports submitted by the SPCB to the CBCB, since 2019,it has emerged that there has been continuous increase in the number of HCFs in the state and the quantities of BMW over the years. The number of unauthorized HCFs has decreased. The BMW generated in the state is fully treated. The 6 CBWTFs are not adequate as per the area of the state but seem adequate with respect to the quantity of BMW generated and treated in the state. All CBWTFs have Barcode system and Hve connected OCEMs to the servers for monitoring. All have the required Autoclaves, Incinerators and Shredders, however they are not running upto their full capacity. The grey areas are that none of the HCFs has got CTF and

none of the CBWTFs has got Deep Burial and Water Treatment Facility infrastructure installed. It is suggested that we should not wait for the doom's day and keep increasing our capacity and infrastructure to tackle and control the nuisance of BMW.

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