

## A Study of Health Profile of Sanitary Staff, Hazards Sustained and their Practice in Handling Biomedical Waste

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### Abstract

The proper handling and disposal of Bio-medical waste (BMW) is very imperative. There are well defined set of rules for handling BMW worldwide. In this descriptive observational cross-sectional study, 78 sanitary staff handling BMW participated. Maximum number of study participants (29.48%) belonged to age group of 41-45 years. 65.38% BMW handling workers were addicted to tobacco either in the form of smoking/chewing/misery/gutkha chewing while 34.61% male workers were alcoholic. 60.25% staff suffered needle stick injuries (NSI) and 19.23% staff were injured while handling sharp objects. It was observed that one worker was HIV positive and has given history of needle stick injury while one worker was found to be Hepatitis B positive. 65.38% study participants had complains of lower backache while 34.61% workers were emotionally disturbed and they were not satisfied with their job. After training the use of Personal Protective Equipments (PPE) like gloves, mask and goggles improved to 93.59%, 83.33% and 12.82% respectively. Training also was fruitful where the participants got themselves vaccinated 100% and 79.48% for Tetanus and Hepatitis B respectively.

**Keywords:** Bio-Medical Waste; Sanitary Staff; Needle Sticks Injuries; Personal Protective Equipments; Vaccination.

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### Introduction

Biomedical waste (BMW) is a term which means “any waste that is generated during diagnosis, treatment, or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biological products and includes ten categories mentioned in Schedule I of the Government of India’s BMW (management and handling) rules 1998”[1].

In the persuasion of the aim of reducing health problems, eliminating potential risks, and treating sick people, healthcare services inevitably create

waste which itself may be hazardous to health. On an average about 0.33 million tons of hospital waste is generated in India annually and the waste generation rate ranges from 0.5 to 2.0 kg/bed/day [2]. The growth of BMW is expected at around eight per cent annually [3]. This BMW includes human tissues, body fluids, blood, excreta, unused drugs, cotton, swabs, disposable syringes, needles, I.V. tubes, blood bags and sticky bandages contaminated by blood and pus etc [4]. The MBW should be segregated at source into color coded bags or containers and its collection and proper disposal should be a significant concern for both medical personnel and general community [5].

Indiscriminate segregation, storage, transport, treatment, disposal and exposure to BMW pose a serious threat not only to environment but also to human health. The spectrum of hazards due to BMW can range from injuries and diseases like gastroenteritis, tuberculosis, septicemia, tetanus and skin infectious to more deadly disease such as HIV/AIDS and Hepatitis [6,7]. Although, there is an increased global awareness among health professionals about the hazards and also appropriate management techniques but the level of awareness in India is found to be unsatisfactory [7, 8]. With this background the present study was

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conducted with objectives to know the health status, occupational hazards and awareness of the sanitary staff handling BMW.

### Material and Methods

The descriptive observational cross-sectional study was carried out for a period of one year in a tertiary care hospital with prior approval of institutional ethics committee. It included details of various socio-demographic variables like age, sex, working experience, type of work, occupational hazards (injuries) and other details regarding attitude and practice for bio medical waste handling and its management. All the sanitary staff handling BMW was approached individually and was briefed about the study and informed consent was taken, to participate in the study. They were assured about their confidentiality and anonymity. Total 78 sanitary staff participated in the present study. A detailed model questionnaire was prepared and filled for each participant which included:

1. History and general health parameters.
2. Enquiry about the exposure & history of vaccination.
3. Training given or not.

### 4. Use of Personal Protective Equipments (PPE).

The data was collected, compiled, systematized, tabulated and analyzed by using SPSS version 14.0 software (Statistical Package for Social Sciences) and results expressed in percentages.

### Results

As depicted in Table 1; 78 sanitary staff handling BMW was successfully enrolled in the study. Majority (29.48%) of study participants belonged to age group of 41- 45 years, of which 15 were male and 8 were female. Minimum number of staff was in the age group of 56-60 years out of which 2 were male and 3 were female. More than two third staff in the study group was working in the hospital from 11 to 15 years.

It was found that 65.38% BMW handling workers were addicted to tobacco either in the form of smoking/chewing/misery/gutkha chewing while 34.61% male workers were alcoholic. Very less number of workers was addicted to some drugs. Most of the workers were known cases of either of Diabetes mellitus, Hypertension, Ischaemic heart disease (IHD) or Bronchial Asthma (BA) and receiving treatment for the same.

**Table 1:** Basic profile of sanitary staff handling BMW (n=78)

Characteristics	Male n=48	Female n=30	n=78	%
<b>Age</b>				
20-25	04(8.33%)	02(6.66%)	06	07.69
26-30	05(10.41%)	04(13.33%)	09	11.53
31-35	04(8.33%)	04(13.33%)	08	10.25
36-40	06(12.50%)	03(10.00%)	09	11.53
41-45	15(31.25%)	08(26.66%)	23	29.48
46-50	05(10.41%)	02(6.66%)	07	08.97
51-55	07(14.58%)	04(13.33%)	11	14.10
56-60	02(4.16%)	03(10.00%)	05	06.41
<b>Duration of work</b>				
1-5 Yrs	05(10.41%)	02(6.66%)	07	08.97
6-10 Yrs	06(12.50%)	04(13.33%)	10	12.82
11-15 Yrs	21(43.75%)	10(33.33%)	31	39.74
16-20 Yrs	09(18.75%)	09(30.00%)	18	23.09
>20 Yrs	07(14.58%)	05(16.66%)	12	15.38
<b>Habits</b>				
Tobacco/Gutkha	33(68.75%)	18 (60%)	51	65.38
Alcoholic	27(56.25%)	00	27	34.61
Drugs	3(6.25%)	00	3	3.84
<b>Chronic disease</b>				
DM	08(16.66%)	06(20.00%)	14	17.94
HTN	07(14.58%)	04(13.33%)	11	14.10
IHD	05(10.41%)	03(10.00%)	8	10.25
BA	05(10.41%)	02(6.66%)	7	08.97

**Table 2:** Distribution of hazards sustained while handling BMW

Characteristics	Male n=48	Female n=30	n=78	%
<b>Physical Hazards</b>				
Needle stick injuries (NSI)	28(58.33%)	19(63.33%)	47	60.25
Electric shock due to faulty instruments	00	03(10.00%)	03	03.84
Burns, Scalds	09(18.75%)	05(16.66%)	14	17.94
Cuts with sharp objects	10(20.83%)	05(16.66%)	15	19.23
<b>Chemical Hazards</b>				
Irritation of eyes	15(31.25%)	10(33.33%)	25	32.05
Latex allergy	08(16.66%)	05(16.66%)	13	16.66
Eczema & related skin lesion due to excessive use soap/detergent	17(35.41%)	10(33.33%)	27	34.61
<b>Biological Hazards</b>				
Tuberculosis	06(12.50%)	02(06.66%)	8	10.25
HIV	01(02.08%)	00	1	01.28
HBV	01(02.08%)	00	1	01.28
<b>Psychosocial &amp; other hazards</b>				
Low back pain	28(58.33%)	23(76.66%)	51	65.38
Neck Pain	14(29.16%)	10(33.33%)	24	30.76
Muscle sprain	13(27.08%)	11(36.66%)	24	30.76
Headache	12(25.00%)	11(36.66%)	23	29.48
Mental stress due to work	13(27.08%)	10(33.33%)	23	29.48
Emotional abuse by patient's relatives or staff	17(35.41%)	10(33.33%)	27	34.61
Acidity	22(45.83%)	09(30.00%)	31	39.74
Varicosity	05(10.41%)	00	05	06.41

**Table 3:** Impact of training & change in attitude regarding use of preventive measures

Preventive measures	Males N=48		Females N=30		Total N=78	
	Before	After	Before	After	Before	After
Gloves	38(79.16%)	46(95.83%)	22(73.33%)	27(90%)	60(76.92%)	73(93.59%)
Mask	30(62.50%)	41(85.41%)	20(66.66%)	24(80%)	50(64.10%)	65(83.33%)
Goggles	00	07(14.58%)	00	03(10%)	00	10(12.82%)
Washing hands with soap	48(100%)	48(100%)	30(100%)	30(100%)	78(100%)	78(100%)
TT vaccination	40(83.33%)	48(100%)	25(83.33%)	30(100%)	65(83.33%)	78(100%)
HBV vaccination	35(72.91%)	38(79.16%)	20(66.66%)	24(80.00%)	55(70.51%)	62(79.48%)

As per Table 2 depicting distribution of hazards sustained while handling BMW; 60.25% staff suffered needle stick injuries (NSI), 3.84% (females) were affected with electric shock due to handling of faulty instruments, 17.94% had burns/scalds and 19.23% staff were injured while handling sharp objects.

Considering chemical hazards 32.05% and 16.66% of sanitary staff suffered with irritation of eyes and latex allergy respectively.

Eczema and related skin lesions due to excessive use of soap/detergent were the most commonly (34.61%) encountered chemical hazard observed in the participants.

8 workers had a history of Pulmonary Koch's out of which 3 were suffering from active tuberculosis and receiving Anti Koch treatment and remaining five was asymptomatic.

It was observed that one worker was HIV positive

and has given history of needle stick injury while one worker was found to be Hepatitis B positive.

Less than one third of the participants suffered from neck pain, muscle sprain, headache, varicosity, acidity and mental stress due to work. 65.38% of them had complains of lower backache while 34.61% workers were emotionally disturbed and they were not satisfied with their job due to repeated humiliation by other staff and patient's relatives.

As per Table 3 the use of Personal Protective Equipments (PPE) like gloves, mask and goggles while handling and disposing biomedical waste by health care workers was 76.92%, 64.10% and 0% respectively before training and after training it was improved to 93.59%, 83.33% and 12.82% respectively. 83.33% workers received TT vaccination before training, whereas it was 100% after training. Similarly 70.51% of them received HBV vaccination before training, while it increased to 79.48% after training.

## Discussion

There is no doubt that, given the diversity of material coming under the heading of biomedical waste, there is considerable potential for hazardous exposure to occur through this waste management. NSIs are an important and common occupational injury amongst healthcare workers and have a significant impact on the morbidity and mortality of these workers through the transmission of Blood borne pathogens (BBP) [9,10].

The World Health Organization has estimated that exposure to sharps in the workplace accounts for 40% of infections with HBV and HCV and 2-3 % of HIV infections among health care workers [11]. In our study it was found that 60.25% of workers suffered from NSI and 19.23% with cuts from sharp objects. Consequently 1.28% workers were infected with HIV and HBV each. Musa et al reported 66.1% workers were affected with NSI and 11.3% with sharp objects [12].

There are different strategies to prevent infections due to NSI, including training health care workers (HCWs) and a reduction in unnecessary invasive procedures. Vaccination is one of the best ways to protect HCWs from infection, but vaccination is only available for HBV and Tetanus.

In our study 83.33% workers received TT vaccination before training, whereas it was 100% after training. Similarly 70.51% of them received HBV vaccination before training, while it increased to 79.48% after training. In Lakbala P et al. study, the number of vaccinated workers was 92.4% [13]. While in Musa et al study only 12.6% HCW had completed the hepatitis B vaccination course [12].

Use of PPE is one of the important measures to safeguard health care workers from exposure to occupational hazards, especially in developing countries where conventional occupational safety control principles remain a challenge to implement. Our study showed that use of PPE like gloves, mask and goggles while handling and disposing biomedical waste by health care workers was 76.92%, 64.10% and 0% respectively before training and after training it was improved to 93.59%, 83.33% and 12.82% respectively. The study by Chudasama et al. reported that use of PPE by sanitary staff was 74.1% [14].

Continuing training programs and awareness workshops on importance of Personal Protective Equipments to prevent cross infection and biomedical waste related physical hazards and diseases is necessary to safeguard the health of workers.

## Conclusion and Recommendations

Study results demonstrated a lack of awareness in several aspects of BMW management among study participants. In addition it was observed that the awareness and practices of biomedical waste management was increased evidently after the training.

*Based on the Study Findings, the Following Supportive Measures are Recommended*

- Planning of systematic educational programs targeted at using PPE, as well as refreshing training programs in order to promote organized and systematic disposal of BMW.
- Provision of an adequate number of safety facilities such as puncture-resistant disposal containers (safety boxes) and new needle devices with safety features.
- Stressing the importance of reporting accidents like NSIs and cuts with sharp objects and the development of a defined system aimed at the registration of needle stick and sharps injuries in order to achieve higher safety.
- Development of safety management systems, and training on workplace safety.
- Awareness regarding risk factors in handling BMW, proper immunization and post exposure prophylaxis for health care workers.

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