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# BIO MEDICAL WASTE AWARENESS IN HEALTH CARE PROFESSIONALS: CASE STUDY OF PRIVATE HOSPITALS & NURSING HOMES IN RANCHI

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**ABSTRACT**

*There are multiple wastes generated in the world. Few are deadly and needs awareness of utmost level. The Bio Medical Waste is one among such. The contamination and affects are deadly for these. The select group of persons is more prone to come in contact. These contact group needs to be highly alert and aware about the deadly contamination. The study reveals that the best know how group i.e. Doctors level of awareness is high but need careful handling from them also. The least aware group are Ward boys and Sanitary group persons who are more likely to get contamination. Extensive need of making them knowledgeable is need of hour.*

***Keywords: Biomedical Waste, Hazards, Awareness, Medicos, Health Professionals,***

## I. INTRODUCTION

Waste is a generic term which is outcome of materials , things and products which when used or stored lose their usefulness and become unwanted thing is termed as waste. Waste is a major environmental issue everywhere since the evolution of mankind and development in industrial and social spheres. Wastes are created at home, school and other public places, industries etc. The wastes produced only vary as per source and place they are generated. The major question is not generation of waste but is where and how it ends up. Every person is responsible for waste generation; some people are environmentally conscious and generate less waste. If thought in terms of countries, some countries create less waste and manage elongation of lifecycle by recycle, reuse and other techniques. The game of passing bug is also very well evident from have ones to have not ones in name of technology transfer and help. Best way of handling waste is to limit its generation.

The age old generation of typical waste coming out of Hospitals and Nursing Homes has to be categories as different types. These are Hazardous and deadly in nature beyond any ones expectations. The select group is likely being affected from these most deadly contaminations. A study for awareness about the different aspects of such is need of hour for making associated persons aware about their getting affected and getting prey to such situation.

The situation obtained from the survey shows the level of awareness as alarming in the lower and section of involved persons who are less educated and less prepared and able to get cured if affected by these. Awareness camps for such persons are of prime importance so that they are able to protect themselves and work carefully.

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## II. TYPES OF WASTES IN GENERAL

Different types of wastes can be classified as:-

**Municipal Waste :** These are wastes or garbage from households, schools, offices, market places, restaurants, other public places which can be everyday items like food debris, used plastic bags, soda cans , plastic bottles, broken furniture, grass clippings, product packaging, broken home appliances and waste clothing. The composition in percentage and existence of Municipal wastes are as

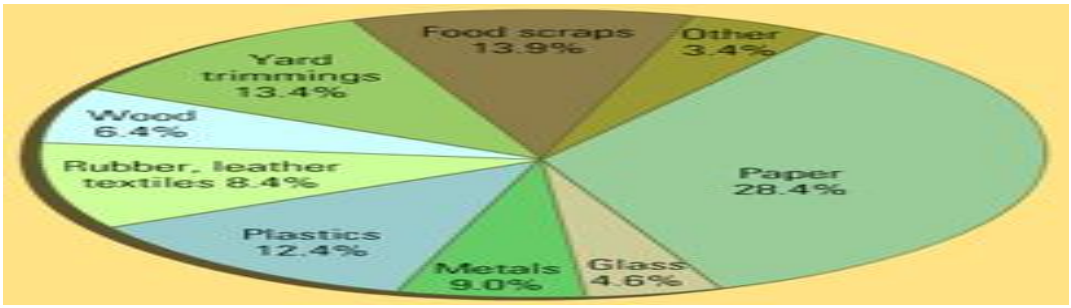


**Figure 1**

### 2.1 Agricultural Waste

These are waste generated by agricultural activities. It includes waste from horticulture, fruit growing, seed growing, livestock breeding, market gardens ,seedling nurseries, etc. Empty pesticide containers, old silage wrap, out dated chemicals & medicines and wormers, used tires, surplus milk, cocoa pods, corn husks etc are classified in it.

### 2.2 Industrial Wastes

Industrial revolution and industrial growth has led to typical types of waste generations. The wastes due to this are categorized in it.

**Civil Constructions & Demolition Wastes** : Wastes generated out of the rest out materials of the building constructions or the waste materials left out from the debris of demolition comes under this category.

**Electronic Wastes:** Waste arising out of electronic and electrical devices which are often called e-waste, e-scrap, or waste electrical and electronic equipment (WEEE). Most of the waste materials contains hazardous lead, mercury, cadmium, and brominated flame retardants which are harmful to living beings and equally to environment.

## III. BIOMEDICAL WASTE & ITS TYPES

It is the waste coming from health care facilities, such as hospitals, clinics, surgical theaters, veterinary hospitals and labs. Items in this group include surgical items, pharmaceuticals, blood, body parts, wound dressing materials, needles and syringes. These can be further classified as hazardous waste rather than general waste.

Definition of Bio medical waste as per “Bio-Medical Waste (Management & Handling) Rules, 1998” is "Bio-medical waste" means 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, and including categories mentioned in Schedule I; [1] It has been categorized in 10 categories namely

Cat 1 **Human Anatomical Waste** includes human tissues, organs, body parts.

Cat 2 **Animal Waste** : animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals colleges, discharge from hospitals, animal.

Cat 3 **Microbiology & Biotechnology Waste :**wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures.

Cat 4 **Waste sharps :**needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps.

Cat 5 **Discarded Medicines and Cytotoxic drugs :**wastes comprising of outdated, contaminated and discarded medicines.

Cat 6 **Solid Waste :**Items contaminated with blood, and body fluids including cotton dressings, soiled plaster casts, lines, beddings, other material contaminated with blood.

Cat 7 **Solid Waste** "wastes generated from disposable items other than the waste shaprs such as tubings, catheters, intravenous sets etc..

Cat 8 **Liquid Waste** : waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities.

Cat 9 **Incineration Ash** : ash from incineration of any bio-medical waste.

Cat 10 **Chemical Waste** (chemicals used in production of biologicals, chemicals used in disinfection, as insecticides, etc.. [1]

Out of these categories the cat 3, 4 and 5 are deadly ones and needs utmost care and awareness by the handlers.

On an average 1.45 kg BMW is generated per patient per day in Indian hospitals compared to 4.5 kg in developed countries. As per western figures, approximately 15- 20% of this total BMW waste is hazardous. The percentage in case of India would be much higher because proper waste segregation and waste disposal methods either does not exist or not practiced. [2]

## IV. PRESENT STUDY ON AWARENESS & DISCUSSION

A questioners was developed to know the awareness level of Doctors, Para medical staffs and other staff members who are involved in the BMW. A cross sectional study was conducted in ten leading private hospital and nursing homes in Ranchi in Jharkhand capital. About 100 doctors, 100 Nurse,100 Lab Technicians, 100 Ward Boys / Women and 100 Sanitary Workers engaged in Hospitals and clinics were given the designed questioners and collected.

The study was conducted during May – June of 2015. Leading 10 Hospitals and Nursing Homes having bed capacity of minimum 50 were considered for survey. Questioner were distributed, interviews were conducted. The participation of various groups was voluntary. A pretested knowledge based questionnaire on biomedical wastes handling, was first provide in terms of handouts. Details were collected by data collection and interview

method. The questionnaire was such framed that it had questions regarding general awareness, biomedical wastes(BMWs), knowledge regarding biomedical hazard, its representation by symbol, the storage time after collection, its disposal techniques, collection details regarding container for needle syringe, typical internationally accepted colour coding of bags used for storage and disposal, details about hazards due to exposure of BMWs. Statistical methods were applied to get graphical representations of correct responses was assessed and analyzed. The study group was after the collection of data provided with proper information about the correct handling of these BMWs. Techniques of proper handling for health education on safe biomedical waste handling was provided.

The data obtained from the samples were as follows:

**Table 1 Knowledge about General Awareness of BMW**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Known | 89 | 64 | 62 | 55 | 44 |
| Unknown | 11 | 36 | 38 | 45 | 56 |

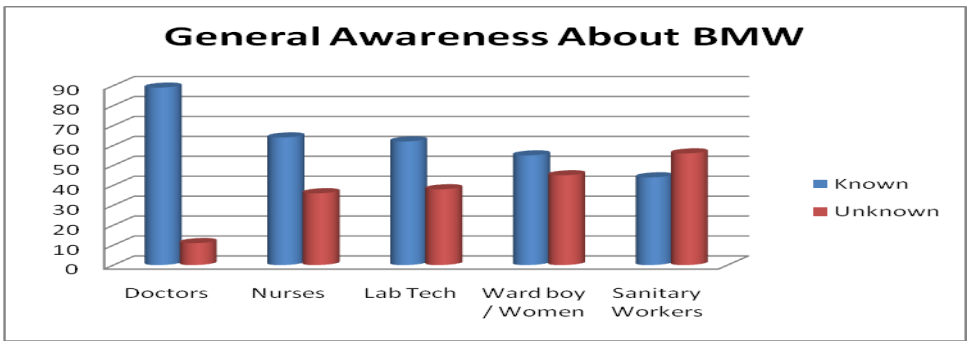


**Figure 2**

Analysis shows that he known group of Doctors is very high. Level of Sanitary workers is below average and needs more alertness.

**Table 2 Knowledge about Bio Medical Symbols**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Yes | 92 | 83 | 88 | 72 | 38 |
| No | 08 | 17 | 12 | 28 | 62 |

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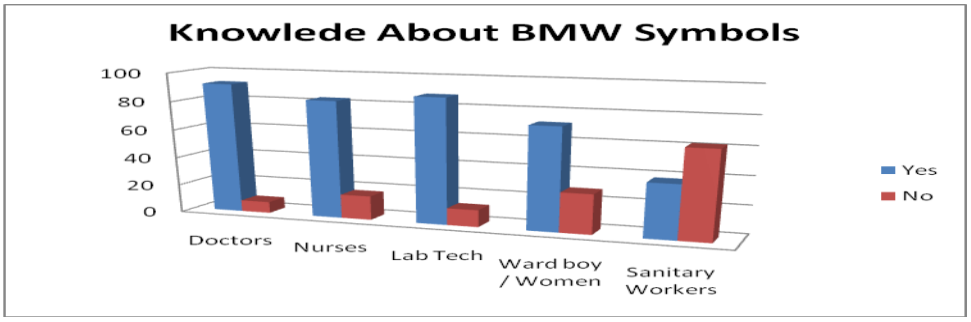


**Figure 3**

As usual the elite group of Doctors is high. The worst effected group of Sanitary workers is least knowledgeable in this case also.

**Table 3 Knowledge about Disposal Techniques of sharp items among BMW**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Yes | 92 | 71 | 79 | 36 | 16 |
| No | 6 | 18 | 11 | 28 | 67 |
| Do not care | 2 | 11 | 10 | 36 | 17 |

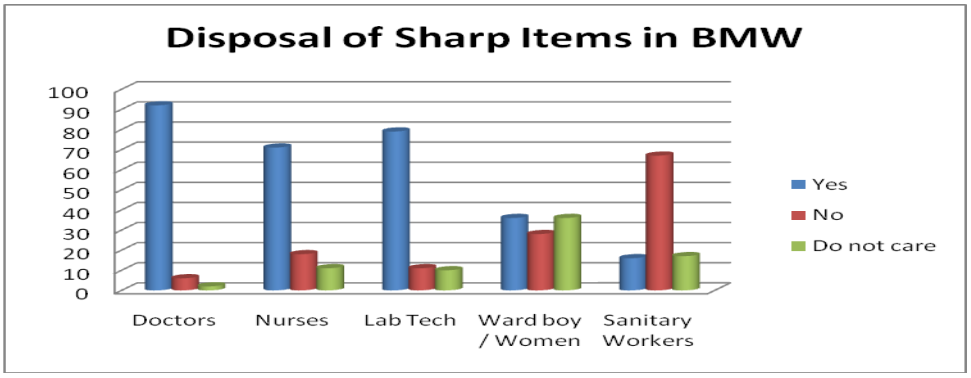


**Figure 4**

The disposable technique among sanitary group is high. The group of ward boys and nurses and Lab Technicians who are responsible for segregation and disposal are fairly knowledgeable.. Doctors are the masters in this case also.

**Table 4 Knowledge about Disposal of Hazardous and contaminated items of BMW**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Sensitive | 87 | 76 | 60 | 34 | 21 |
| Careless | 10 | 18 | 29 | 56 | 53 |
| Donot know | 03 | 6 | 11 | 10 | 26 |

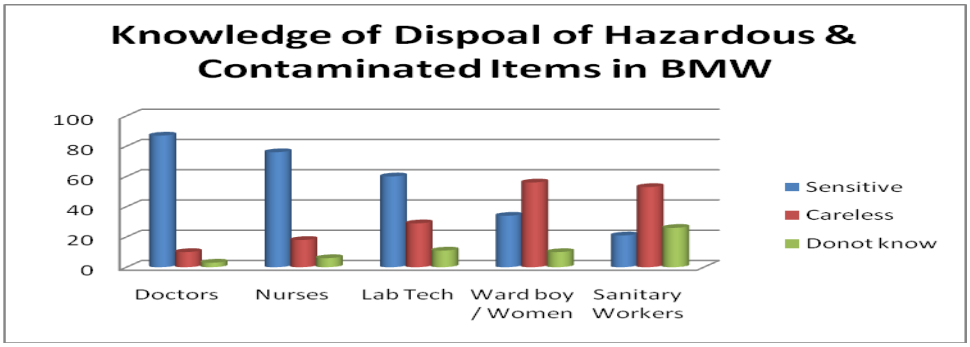


**Figure 5**

The pattern is similar to the above discussion.

**Table 5 Knowledge about Maximum Storage Time of collected BMW**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| More than 48 hrs | 67 | 43 | 31 | 11 | 5 |
| Less than 48 hrs | 34 | 46 | 43 | 11 | 8 |
| No idea | 9 | 11 | 29 | 78 | 87 |

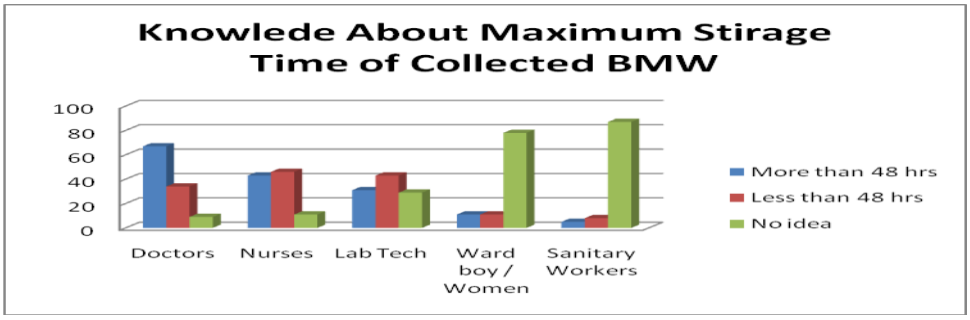


**Figure 6**

The analysis shows the very high ignorance in the Lab ward and Sanitary group. The condition of Lab Technician is also not good.

**Table 6 Knowledge about Disposal Methods of collected BMW**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Correctly known | 38 | 22 | 18 | 8 | 2 |
| No Idea | 9 | 16 | 12 | 12 | 11 |
| Follow others | 53 | 62 | 70 | 80 | 87 |

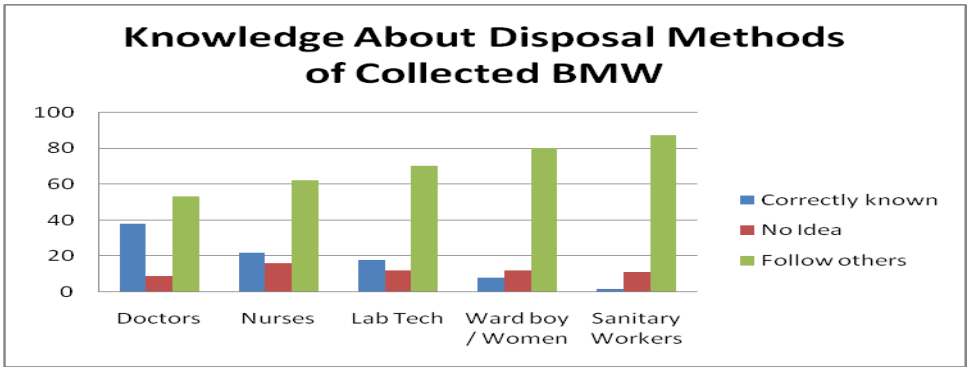


**Figure 7**

The situation is alarming in this case. The disposal methods scenario of knowledgeable to less ones is in increasing order only. The aspect requires a high training need.

**Table 7 Knowledge about Types of Hazards that can affect exposer of BMW**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Correctly known | 92 | 46 | 31 | 6 | 2 |
| No Idea | 4 | 32 | 23 | 4 | 72 |
| Follow others | 4 | 22 | 46 | 90 | 26 |

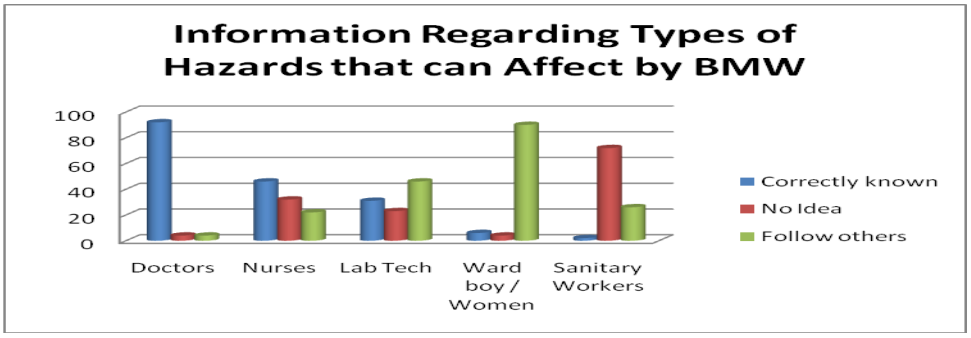


**Figure 8**

In this case the Doctors are the only group who have adequate know how. The group of Nurses is less known whereas the group of Ward Boy and Sanitary workers is almost non knowledgeable. The Lab Technicians are also shaky group.

**Table 8 Knowledge about Types of Colour Codes for bags of BMW**

| Knowledge parameter | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Correctly known | 67 | 81 | 79 | 67 | 41 |
| No Idea | 23 | 3 | 11 | 23 | 36 |
| Follow others | 10 | 16 | 10 | 10 | 23 |

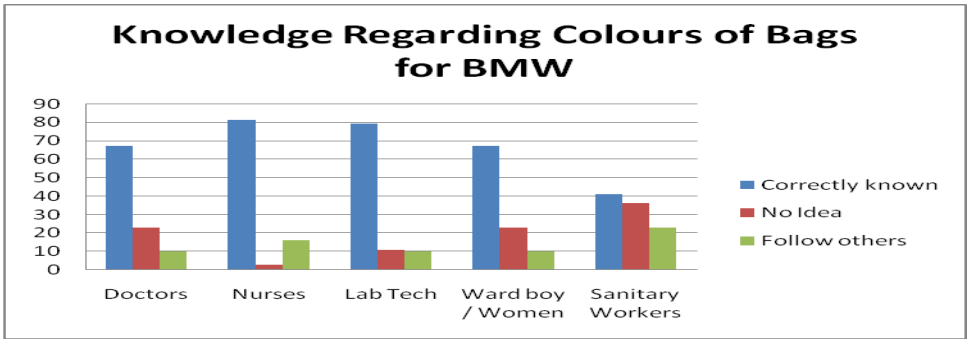


**Figure 09**

The pattern shows the group responsible for handling is knowledgeable. The need for training requirement is high in the lesser qualified vernable group of sanitary workers.

**Table 8 Knowledge about Acts , Rules & Provisions regarding BMW**

| Knowledge attainment | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| Complete | 54 | 23 | 28 | 11 | 3 |
| Partial | 46 | 56 | 61 | 26 | 16 |
| No Idea | 0 | 21 | 11 | 63 | 81 |

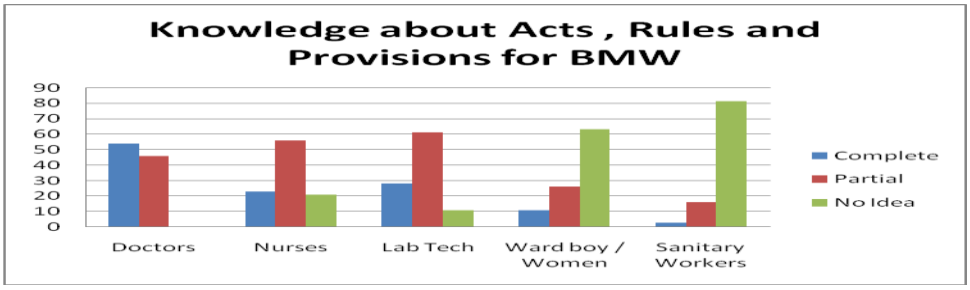


**Figure 10**

The situation of ignorance about the Knowledgeable of Acts, Rules in the elite group is also low. There is need for inclusion in training and extensive inclusion in course curricula of the course. The distribution of leaflets and dos and don'ts among the concerned can help to increase the level of knowledge.

**Table 9 Information about Diseases spread by BMW**

| Diseases | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| HIV | 89 | 76 | 65 | 45 | 11 |
| Hep B | 87 | 68 | 59 | 23 | 13 |
| Hep C | 89 | 69 | 61 | 32 | 14 |
| TB | 91 | 91 | 73 | 21 | 65 |
| Tetanus | 99 | 92 | 81 | 34 | 54 |
| Syphilis | 78 | 65 | 75 | 41 | 32 |
| Leprosy | 78 | 66 | 78 | 42 | 21 |

| | | | | | |
|---|---|---|---|---|---|
| **DM** | **81** | **43** | **83** | **21** | **21** |
| **RHD** | **69** | **68** | **45** | **23** | **12** |
| **Others** | **81** | **66** | **71** | **31** | **14** |

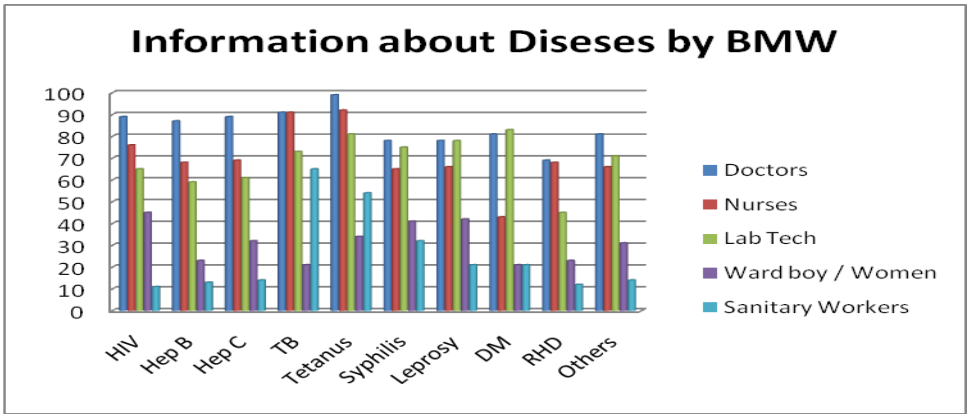


**Figure 10**

The result is as per knowledge and need only. The training need for lower group will make them enable to go for work in protective manner. The affect of handling will not see the group but will affect the persons who mostly come in contact. The group of Lab Ward boys and Sanitary persons need effective training in this aspect.

**Table 10 Need of Training for awareness of BMW**

| Training Need | Doctors | Nurses | Lab Tech | Ward boy / Women | Sanitary Workers |
|---|---|---|---|---|---|
| **Yes** | **12** | **76** | **65** | **75** | **91** |
| **No** | **88** | **24** | **35** | **25** | **08** |

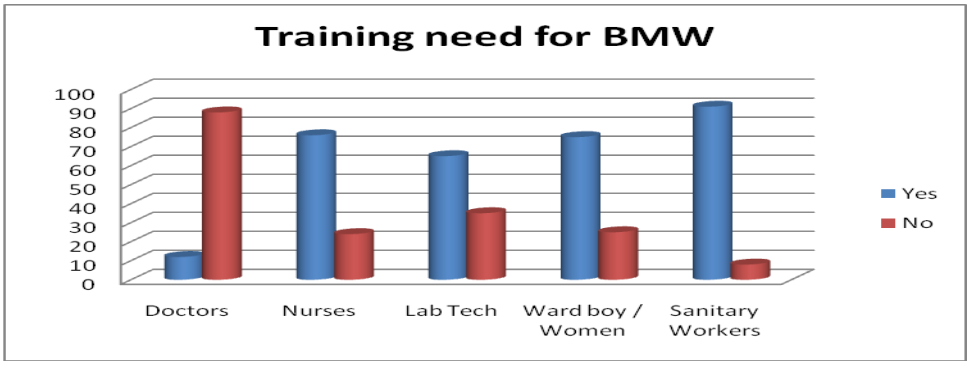


**Figure 11**

The need for training is in line of the analysis of the previous sections. The level of need for training among Doctors perhaps is as refresher courses. IN case of Nurses and Lab Technicians is need and to keep them aware. The sanitary workers group is a volatile group and its training will be difficult task. The select group is engaged as per need and strata are varied one.

## V. CONCLUSION

The study and discussion of the various group finding show that the group as per their level of education and training. The best group is of Doctors who are highly educated but are less prone to getting affected with this type of deadly waste. The group of Nurses and Lab Technicians who are handling the patients of having affection of contaminable disease are prone to get affected during the acts of vaccination and or actions when the wastes are getting generated. Here the multiple injection case for getting other patients affecting can also be the case. In case of Lab Ward boys / women and Sanitary workers thee are the least educated persons and have very less affordability for bearing the medical expenses if they get affected are the most vernable persons . These groups have very less knowhow and are groups who for want of employment keep changing their place of working also.

The situation of awareness is poor to worse and need extensive training among classes of most vernable to least vernable ones. Extensive awareness and training camps are required.

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