

# Study of Bio-Medical Waste Management and Handling

*By*

*Swati Saini*

*Dissertation submitted for the partial fulfillment of the  
MBA Hospital and Health Management*

*Academic year, 2015-2017*



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**To whomsoever it may concern**

This is to certify that Dr. Swati Saini student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at Shalby hospital Mohali from 6<sup>th</sup> February 2017 to 6<sup>th</sup> May 2017.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

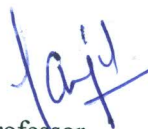
The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Professor

The IIHMR University, Jaipur



The certificate is awarded to

**Dr. Swati Saini**

In recognition of having successfully completed her  
Internship in the department of

**OPERATIONS**

and has successfully completed her Project on

**A STUDY ON BIO-MEDICAL WASTE MANAGEMENT AND  
HANDLING**

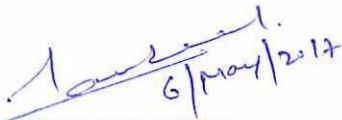
From February 6<sup>th</sup> to May 6<sup>th</sup> 2017

**At**

**SHALBY HOSPITALS, MOHALI**

She comes across as a committed, sincere & diligent  
person who has a strong drive and zeal for learning

We wish him/her all the best for future endeavors

  
**HR MANAGER**

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**CERTIFICATE BY SCHOLAR**

This is to certify that the dissertation titled **A STUDY ON BIOMEDICAL WASTE MANAGEMENT AT SHALBY HOSPITAL MOHALI** and submitted by (Name) **Dr SWATI SAINI** Enrollment No **IIHMR-U/01/2015-17/0358** under the supervision of **Dr SEEMA MEHTA** for award of MBA in HEALTH AND HOSPITAL MANAGEMENT of the University carried out during the period from **February 06, 2017 to May 05, 2017** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

**THE IIHMR UNIVERSITY, JAIPUR**

**CERTIFICATE BY SCHOLAR**

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled : **A STUDY ON BIOMEDICAL WASTE MANAGEMENT AND HANDLING.**

A handwritten signature in blue ink, appearing to read 'Anita Sami', written over a horizontal line.

Signature of student

## **ABSTRACT**

**TITLE: A Study of bio-medical waste management and handling**

**Author: Swati Saini**

### **Background**

Medical care is a vital for our life and health, but the waste generated from medical activities represents a real problem of nature and human world. Improper management of waste generated in health care facilities causes a direct health impact on the community, the health care workers and on the environment every day, relatively large amount of potentially infectious and hazardous waste are generated in the health care hospitals and facilities around the world .Indiscriminate disposal of BMW or hospital waste and exposure to such waste possess serious threat to environment and to human health and requires specific treatment and management prior to its final disposal.

This report was made as a dissertation project in Shalby Hospital Mohali, Punjab. Many issues related with the mismanagement of bio-medical waste were observed in the hospital, like

- Proper segregation of waste is not satisfactory in the hospital.
- Colour coding for different categories of waste is not properly maintained.
- Personal protective equipment and accessories are provided in very less amount.
- Waste treatment and disposal facilities are not sufficient.

### **Objective:**

- To determine knowledge regarding awareness of bio-medical waste management rules, policy & practices in healthcare workers.
- To assess attitude towards the criticality and importance of bio-medical waste management

**Methodology:**

- Study Design

Cross -sectional study was conducted.

- Study Area

Data had been collected from Blood bank, Heart station, Laboratories, Emergency room, OT, ICU.

- Sample size

60

- The study was conducted on the total of sixty healthcare staff

- Study duration

February to May

**Conclusion**

- In India ever increasing environmental pollution has become a menace.
- Strict rules for ICUs, OTs and blood banks recommended.
- Technological driven advancements in treatment and disposal of wastes
- While lots of steps have been taken towards the BMW management, a lot more is still required for this alarmingly increasing problem of society.

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## **INTRODUCTION**

### **Background**

Hospital is a place of almighty, a place to serve the patient. Since ages, the hospitals are known for the treating the sick people but we are not aware regarding the adverse effects of the toxic waste and filth generated by them on human body and surroundings. Now it is a well established fact that there are many adverse and harmful effects to the environment including human beings which are caused by the “Hospital waste” generated during the patient care. The waste produced by the hospital is a health hazard to the health care workers, public and environment of that area. Hospital acquired infection, blood transfusion, sexually transmitted diseases, increased rate of Hepatitis B, and HIV, high rate of land and water pollution lead to many diseases. Air pollution due to emission of toxic gases by incinerator such as Furan, Dioxin, Hydrochloric acid etc. have compelled the authorities to think seriously about hospital waste and the diseases transmitted through improper disposal of hospital waste. Then ultimately, the Central Government had to intervene for enforcing proper handling and disposal of hospital waste and an act was passed in July 1996 and a bio-medical waste (handling and management) rule was introduced in 1998 and then again revised in 2016.(<http://hspcb.gov.in/BMW%20Rules.pdf>)

### **History of Hospital Waste Management**

#### **Introduction**

Waste management is an important aspect of health care measures. If we go into past that is before discovery of bacteria as cause of disease, the main concern regarding public health had been on sanitation. The availability of potable water, disposal of odour from sewage were considered the important factors in causing epidemics. The invention of water closet by John Harrington (1561-1612) facilitated flushing away human waste.

## LITERATURE REVIEW

A survey by B. Ramesh Babu, A.K. Parande, R. Rajalakshmi, P. Suriyakala, M. Volga [18] 2001 was carried out to review biomedical waste management in India in order to improve waste management. The main purpose of study was to classify the types of waste and design the implementation structures and accordingly different methods are used for proper disposal of bio medical waste. The research was conducted to find proper management of Bio medical waste. They also survey for treatment technologies for medical wastes. Various factors like type of hospital, specialities, proportion of reusable items, and waste management plan were investigated in waste generation assessment in India specially in Delhi. Dr.C.Periya Ganesh 2015 [2] implemented various terminologies regarding biomedical waste management in private hospitals in India which also include transportation of waste, storage, waste minimization techniques. A main problem related to present situation of Bio-Medical waste management in various hospitals is that the implementation of Bio-Waste regulation is not up to the mark as some hospitals are disposing of waste in a haphazard, improper and indiscriminate manner. There is also no training programme for the sanitary workers. Also he suggested the segregation of bio-medical waste. The data was collected from about the average quantity of biomedical waste generated by all ten hospitals. The result shows that the waste generated by ten hospitals was approximately 4330 kg of medical waste per month, from which only about 35% is non-infectious, and rest 65% of biomedical waste generated by hospitals is infectious and harmful to the patients as well hospital staff. S.B.Abitha, R.Dhanapal [5] 2014, published a paper on Biomedical waste management in rural areas using solar powered thermal autoclave techniques. Different methods regarding segregation of bio-medical wastes are surveyed and then found proper segregation & awareness about medical waste regarding. The most widely used method in the final disposal of infectious waste is incineration. Non-infectious waste is disposed by land disposal method. The waste produced by the hospitals are not properly segregated, collected and disposed which results into negative impact on people health and environment. This paper presented an assessment of biomedical waste management. Authors suggested that

comprehensive training programs regarding Bio-Medical waste management are highly recommended to all hospital staff. In the study of Dr. D. Rama Mohan, Dr. M. Veera Prasad, Dr. Kanagaluru Sai Kumar [8] 2012, medical waste management status was analyzed. A survey was conducted to evaluate International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 4 Issue: 6 66 - 70

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medical waste management aspects in selected hospitals. The effectiveness of the training was also measured and rated. Nearly 33.33 percent of staff acquired knowledge on what is biomedical waste, 89.74 percent of the respondents acquired knowledge on the categories of biomedical waste management, 69.23 percent have acquired knowledge on categories of animal waste and 69.23 percent have acquired knowledge on category of human anatomical waste. Author recommended that the need for reinforcement with continuous nursing education programme on critical topics like generation, segregation is required, so that their behavior practices will change for better self-care as well as patient care and also to prevent transmission of diseases. A study was conducted by Dr. Sushma Rudraswamy, Dr. Naganandini Sampath, Dr. Nagabhushana Doggalli [9] 2013, to determine the amount of different kinds of solid wastes and assess the obstacles in the existing hospital's solid waste management system in hospitals of various countries worldwide.. The waste generation rates depend on several factors such as established waste management methods, type of health-care establishment, hospital specializations, proportion of reusable items employed in health care and proportion of patients treated on a day-care basis. The proper training of the hospital staff for segregation of the waste and by training the municipal staff regarding the disposal of such waste should be made mandatory. A research was carried out by Dhruv P. Hirani, Krish R. Villaitramani, Snehlit J. Kumbhar [10] 2014, on management of biomedical waste.. Numerous factors such as type of hospital, specialization, proportion of reusable items, and waste. Biomedical waste should be identified, segregated, stored, transported and

disposed after appropriate treatment. Its effective implementation in our community is of prime importance to protect public health and environment. The purpose of this article is to discuss about various types of biomedical waste produced in the hospitals, different waste management practices, the hazards of indiscriminate disposal of biomedical waste and to create awareness among the medical profession, regarding minimizing the production of biomedical waste and doctors are encouraged to follow the best management practices, while disposing hazardous wastes. The present study is to survey the practice of biomedical waste such as collection, storage, transportation and disposal along with the amount of generated biomedical waste in various healthcare units in Eluru city, and create awareness among the staff and patient about biomedical wastes. In the study of Deborah, J. M., M.N. Dammo., Hanatu, J. T., Gambo, Zubairu., Fanna, Kyari and Zara, Kolo [15] 2014, Current Solid Waste Disposal Practice In University Of Maiduguri Teaching Hospital was analyzed in Nigeria. A survey was conducted to evaluate solid waste management aspects. The study aims to examine data regarding the hospital waste generated, collection system, process or form of treatment, transportation and disposal system. Various factors such as hospital size, hospital location, beds occupancy percentage, medical waste segregation program, type of hospital and type of services were investigated in order to calculate medical waste generation rate. The disposal option is open dump and burial in secured landfill which is safe and environmental friendly.

([https://www.innovativepublication.com/admin/uploaded\\_files/IJFCM\\_3\(2\)\\_110-120.pdf](https://www.innovativepublication.com/admin/uploaded_files/IJFCM_3(2)_110-120.pdf) )

## **GENERAL DEFINITIONS**

### **What is hospital waste?**

Hospital waste is defined as any waste which is generated, discarded and not intended for use in the hospital. It is classified into the following types :

1. General Waste
2. Anatomical Waste
3. Infectious Waste
4. Sharps
5. Pharmaceutical Waste
6. Chemical Waste
7. Radioactive Waste

This material is taken from ([www.aboutcivil.org](http://www.aboutcivil.org)) link.

### **Bio-medical waste**

Any solid, fluid and liquid or liquid waste, including its container and any intermediate product, which is generated during the diagnosis, treatment or immunization of human being or animals, in research pertaining thereto, or in the production or testing of biological and the animal waste from slaughter houses or any other similar establishment. All biomedical wastes are hazardous. In hospital it comprises of 15% of total hospital waste.

This definition is taken from below mention link.

<http://legalindia.in/bio-medical-waste-management-and-handling-rule-1998>

### **Aim of the study**

The study aims at whether practices adapted for bio-medical waste management complies with the National guidelines especially in the light of honorable supreme court judgment and notification of **Bio-medical Waste (Management and Handling )Rules , 2016** & recommendations would be based on the analysis of the study so that standards of quality of care can be improved

### **Hypothesis**

- Healthcare personnel will show positive attitude towards bio-medical waste management policy & practices.
- The development and implementation of a hygiene & bio-medical waste management plan for a hospital setting will reduce the rate of spread of healthcare associated infections.

### **Objective of the study**

1. To determine the awareness of healthcare personnel regarding bio-medical waste management policy & practices.
2. To access attitude regarding disposal of bio-medical waste.

### **Methodology**

The survey using questionnaire is designed to suite doctors, nurses, paramedical staff and auxiliary staff.

- a) Interview to assess the general view regarding the functioning and effectiveness bio-medical management department.

- b) Directly observing the activities of BMW department & how training procedure is carried out.

### **Subjects chosen for the study**

The subjects of the survey are chosen keeping in consideration the extent of involvement, accountability in segregation, handling etc of bio-medical waste & vulnerability of getting the infection or needle stick injury.

The study is conducted on the total of sixty healthcare personnel. The exact numbers are given as follows:

**Table No. 1**

| <b>Designation</b>       | <b>Number</b> |
|--------------------------|---------------|
| <i>Doctors</i>           | <b>10</b>     |
| <i>Nurse</i>             | <b>25</b>     |
| <i>Paramedical staff</i> | <b>15</b>     |
| <i>Auxiliary staff</i>   | <b>10</b>     |
| <b>Total number</b>      | <b>60</b>     |

### **Tools used for the study**

Tools to be used for the purpose of analyzing the collected data are:

- Percentage.
- Graphical representation.

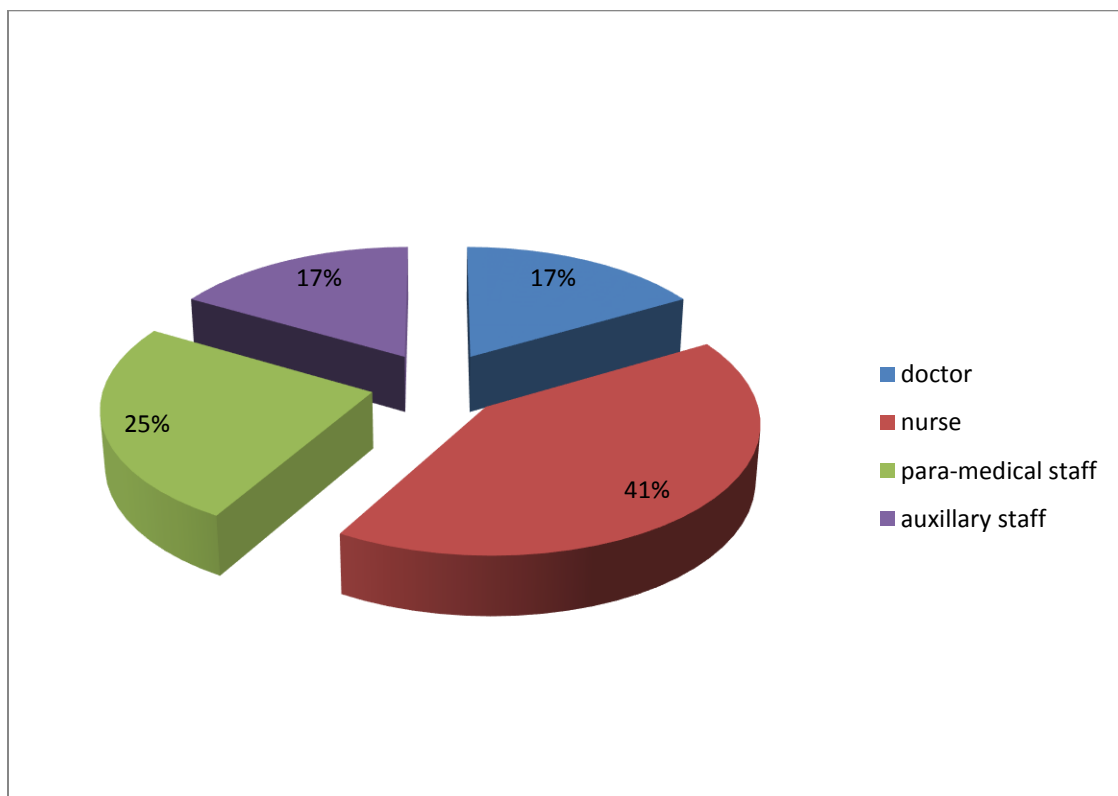
### **Scope of the study**

The study will be useful in determining the cognizance level of healthcare work force towards bio-medical waste management activities, functioning and proficiency. Also it

would be helpful in evaluating the cognition towards need of the department. This study can eventually be useful in designing the plan of action or standard operating procedure for bio-medical waste management and for development of safe or hygienic healthcare environment and also would helpful in reducing the healthcare associated infections.

\*\*\*\*\*

**Graph No. 1**

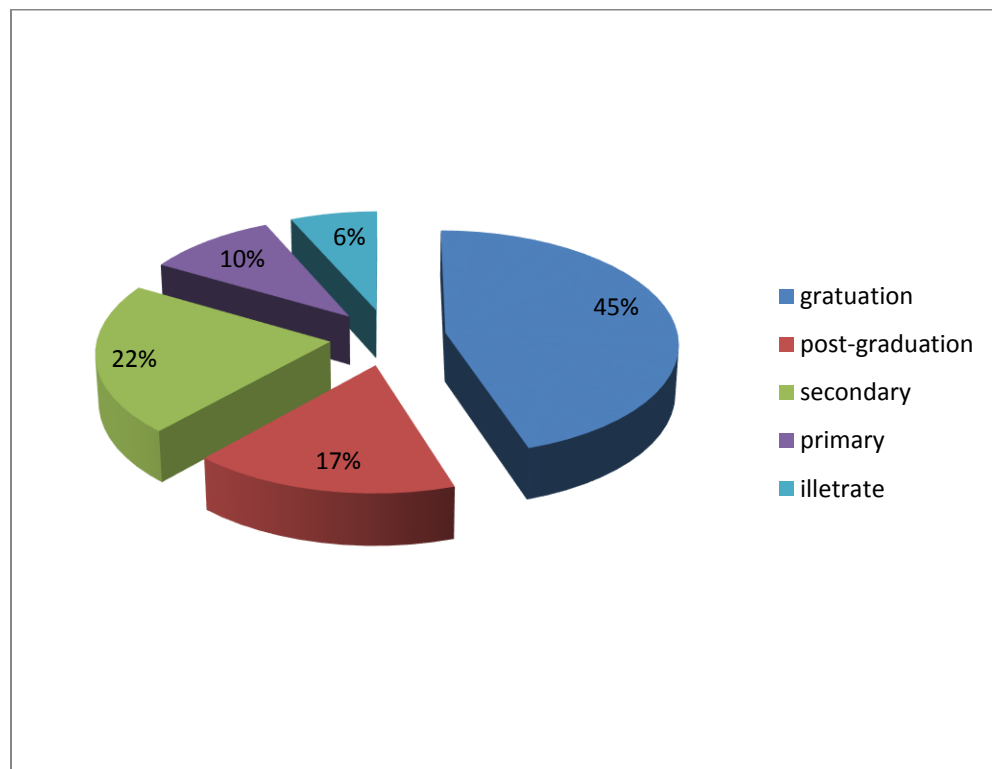


**Graph no. 1 represents the distribution of people of different category of workers taken as subjects of survey**

The survey was conducted in different departments of Shalby hospital Mohali. The subjects were chosen from different departments of hospital e.g. Blood bank, Heart station, Laboratories, Emergency room which are always the main source of bio-medical waste in any hospital settings. Out of 60 respondents 17% are doctor equal percentage is of auxiliary staff (housekeeping), 25% are Para-medical staff and 41% are nurse.

This fraction has been chosen keeping in consideration the extent of involvement in segregation, handling of bio-medical waste & their vulnerability to get injury or infection.

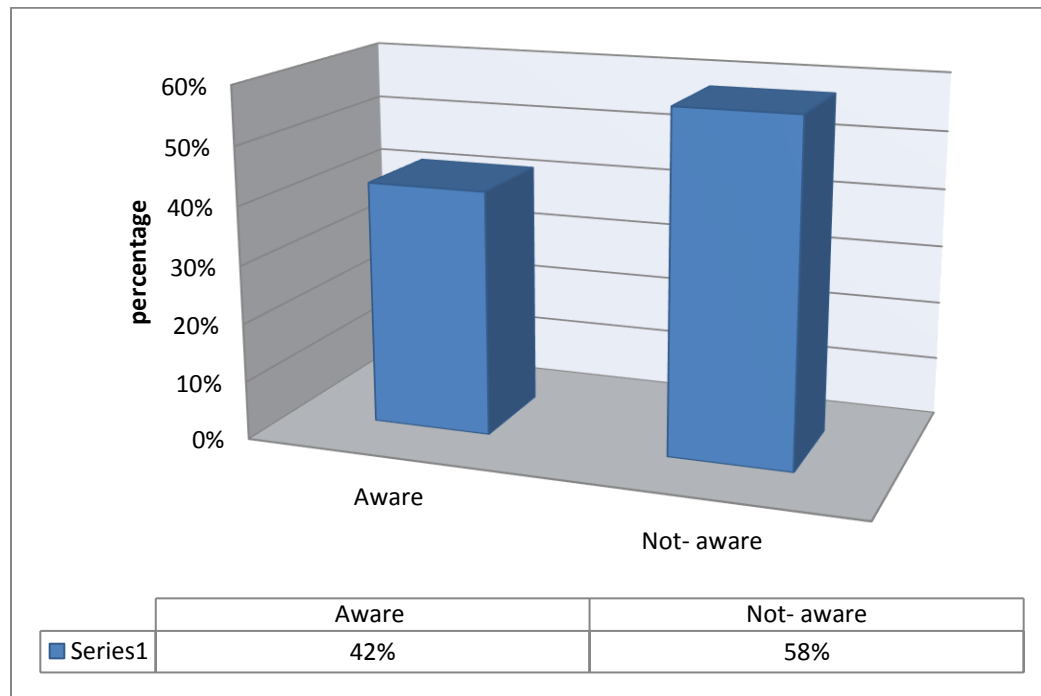
**Graph No. 2**



**Graph No. 2 represents the education and qualification level of the staff taken as subjects of the study**

The subjects taken for the study include nearly all categories of healthcare workers who are involved in bio-medical waste management directly or indirectly e.g. doctors, laboratory technicians, nursing staff and house keeping people, because no separate department can perform all the activities involved in hospital waste management. So it is assumed to be a team work, where all the workers of different job profile of various departments in a hospital corporate with each other in handling and managing the hospital waste. Because healthcare is a very sensitive issue which require highly educated and skilled people even in handling the healthcare waste. So during this study the education level of respondents is also considered deeply. As graph no. 2 shows that most population surveyed is graduate which mostly include doctors, nursing staff and technicians and very few people (17%) are post graduate which mostly included the house surgeons and rest (38%) fraction of subjects have reached up to primary and secondary education level which constitutes some nurses and housekeeping staff and rest small fraction of these 38% people also include the illiterate people which mostly belong to housekeeping category

**Graph No. 3**



**Graph no. 3 represents the respondents' awareness about the legislation applicable to hospital waste management**

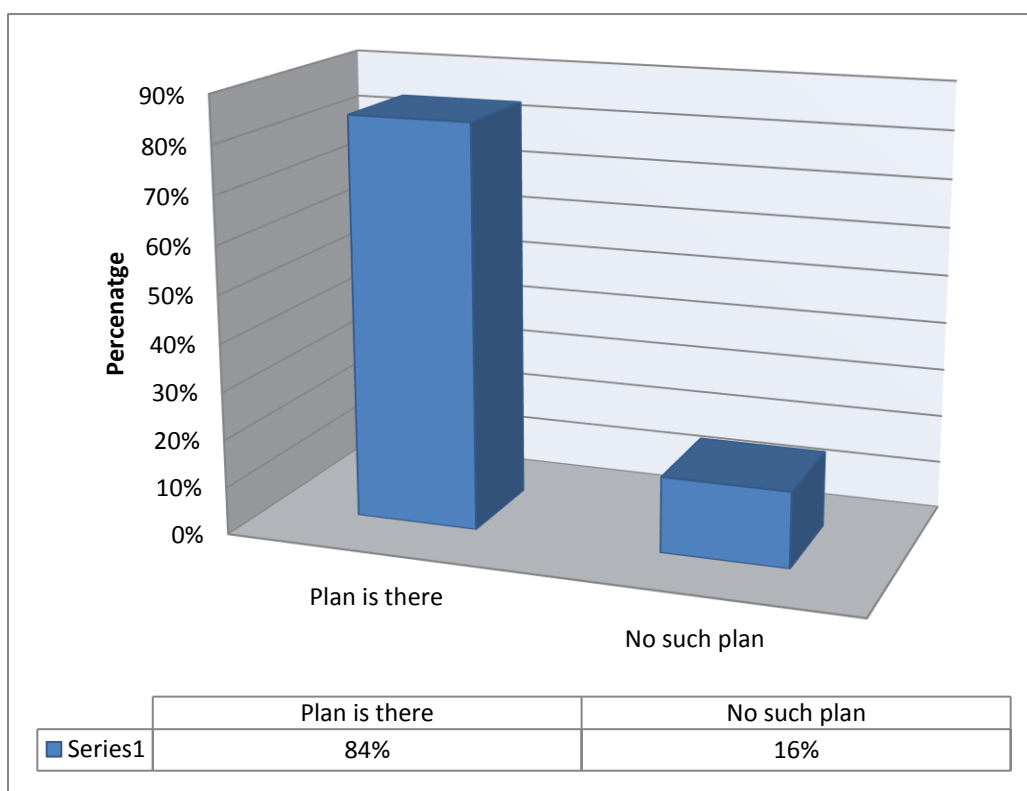
### Analysis

During survey it was observed that when subjects were asked whether they do have knowledge of any legislation applicable to Hospital waste management only 1/4<sup>th</sup> of the respondents reacted positively but rest didn't have any idea about any such rules or legislation and out of those 42% of respondents who claimed to be aware of legislation very few were able name them all.

### Inference:

- It may be due to lack of detailed training being given.
- Healthcare worker are taking the training casually.
- Workers are not attending the training sessions.
- Training department is not evaluating the performance of the workers.

**Graph No.4**



**Graph no. 4 represents the percentage of subjects aware of Hospital Waste Management plan**

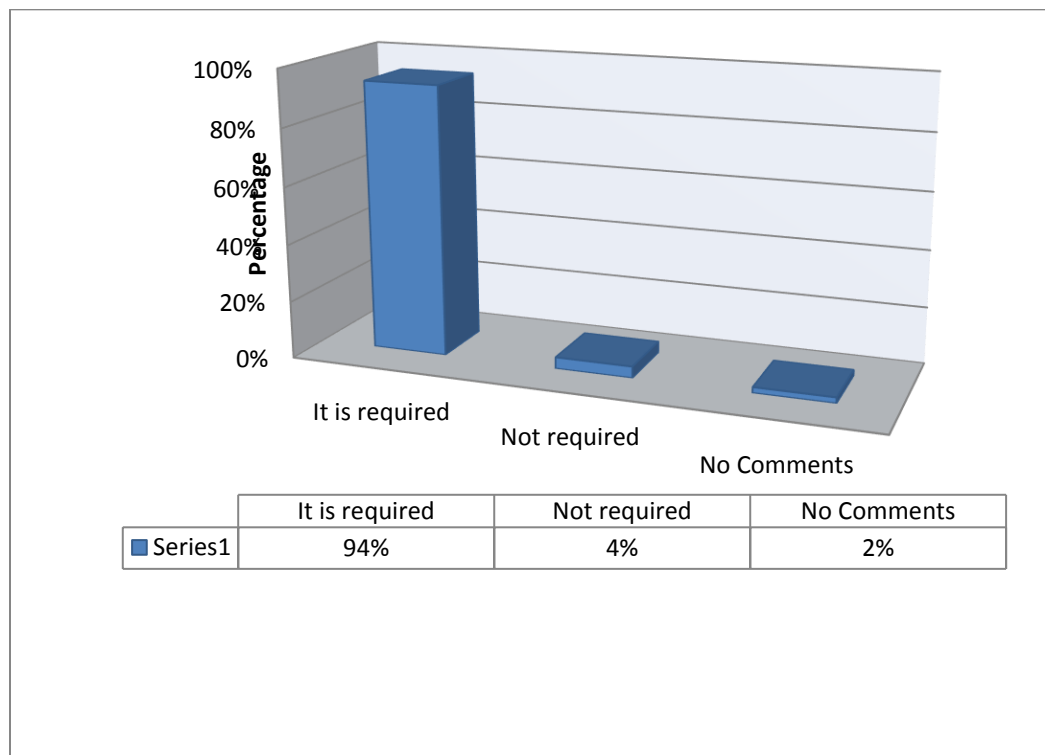
### **Analysis**

When the subjects were asked how the hospital waste is managed to know if there is any kind of such plan in the hospital It is found that 84% of the respondents were aware of hospital waste management plan but still 16% of the subjects are unaware of any such kind of plan.

### **Inference:**

- They are new joiner and might not have given relevant training.
- They might not be attending the training classes because of lack of compulsion.
- They might not be contributing in hospital waste management.

**Graph No.5**



**Graph no. 5 represents the responses on requirement of segregation of hospital waste in to different categories**

**Analysis**

The above graph convincingly shows that more than 90% of the respondents think that it is a sensitive issue & different type of waste should be kept in different color coded bins. But in contrast to this it is observed that on asking the reason for this only a few were able to give the convincing answer.

**Inference:**

- It is not appropriately told in the training the reasons for the segregation that how it can result in hazardous consequences in the community or in the population if not properly segregated.
- Or there is attitude problem among the workers and they don't want to learn because may be they are more concerned for their job only.
- They think it is not their job to do the segregation.

**Match the following table**

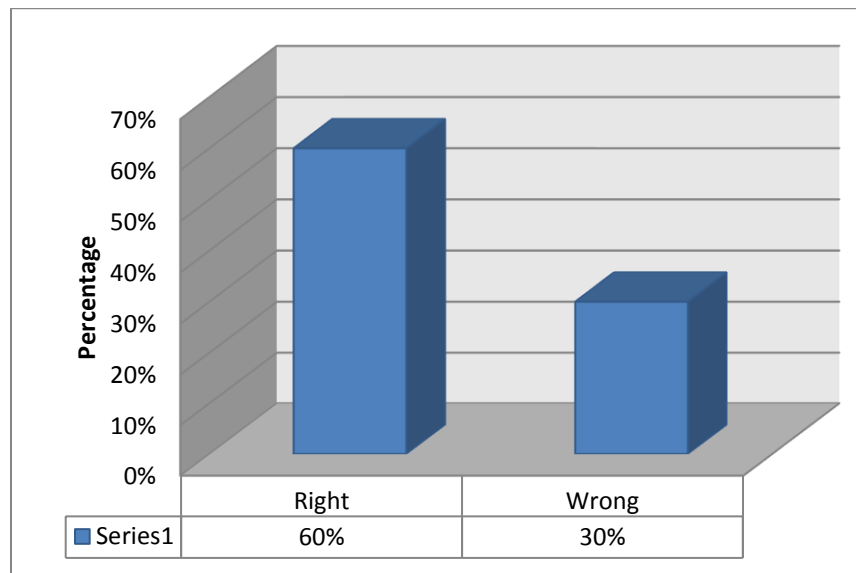
**Table No. 2**

| <b>Colour code( A)</b> | <b>Type of waste(B)</b>                                                                                                                    |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>White</b>           | <b>Human Anatomical Waste, Animal Waste, chemical waste, soiled waste(blood&amp; body fluids, expired /discarded medicines, lab waste.</b> |
| <b>Red</b>             | <b>Sharp Waste including metals.</b>                                                                                                       |
| <b>Yellow</b>          | <b>Contaminated waste(recyclable)</b>                                                                                                      |
| <b>Blue</b>            | <b>Glassware broken or discarded &amp; contaminated glass ampoules, metallic body implants.</b>                                            |

## Analysis

When the respondents were asked to match the color code column with type of material column, in the form above table. It has been shown in the graph no. 8 that no doubt 60% of the respondents match the table correctly but still nearly 1/3rd of the subjects were not able to match in right manner. So it can easily be assumed that they might be putting the waste in the wrong colored bins.

**Graph No. 6**

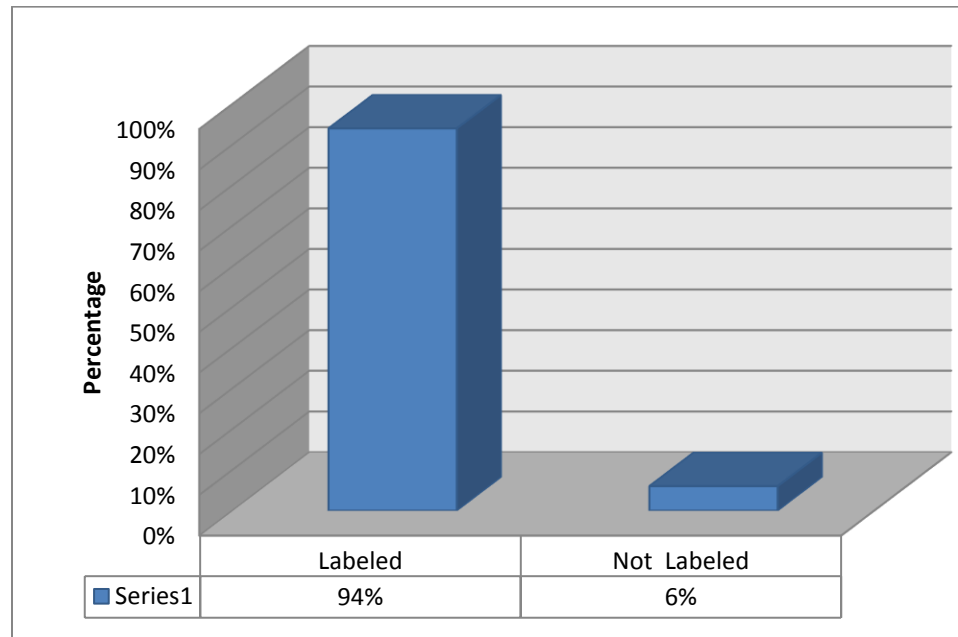


**Graph no.6 represents the respondents result when asked to match column A to column B in table no. 1**

## Inference

- Either they are not properly or periodically trained.
- They don't attend the training sessions.
- The training is not given in a comprehensive way.
- The staff is not appropriately supervised.

**Graph No. 7**



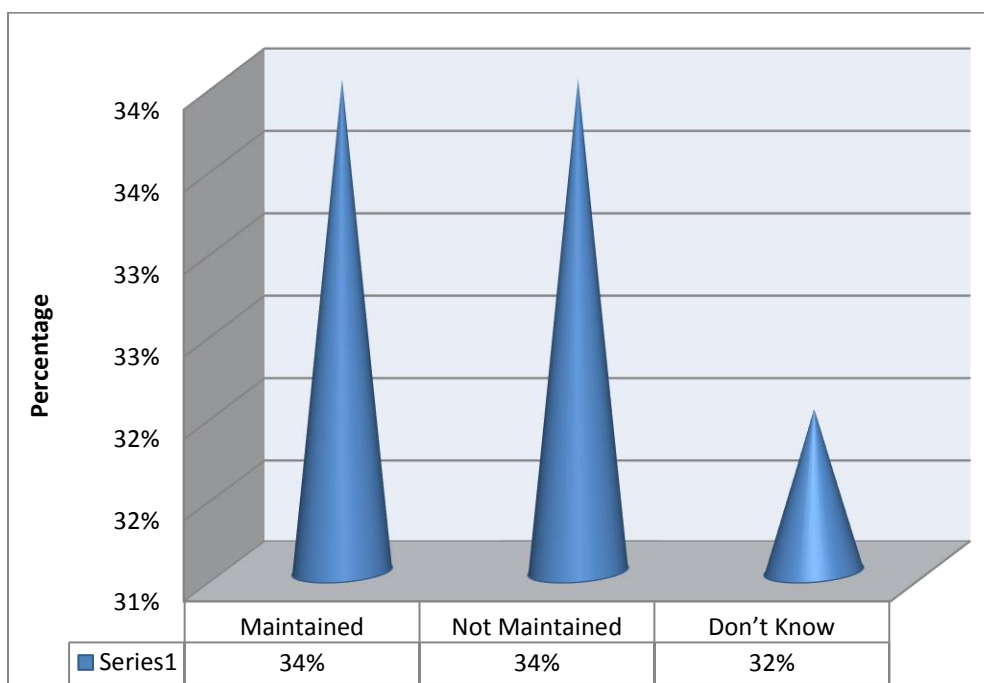
**Graph no. 7 represents the responses about labeling the infectious waste with bio-hazard symbol**

### **Findings:**

On asking are these colored bins are labeled with the bio-hazard symbol it is evident from the above graph that nearly 95% people respond positively which is a good practice being exercised in the hospital. This symbol is put on the bins so that:

- The personnel responsible for internal & external transportation of the bio-medical waste should not touch the bin without wearing the personal protective equipments.
- The patients and other staff would know that on touching the bins with bare hands could be health hazard as it can lead to infection and needle stick injuries.

**Graph No.8**



**Graph no. 8 reflects the responses about maintenance of waste disposal register**

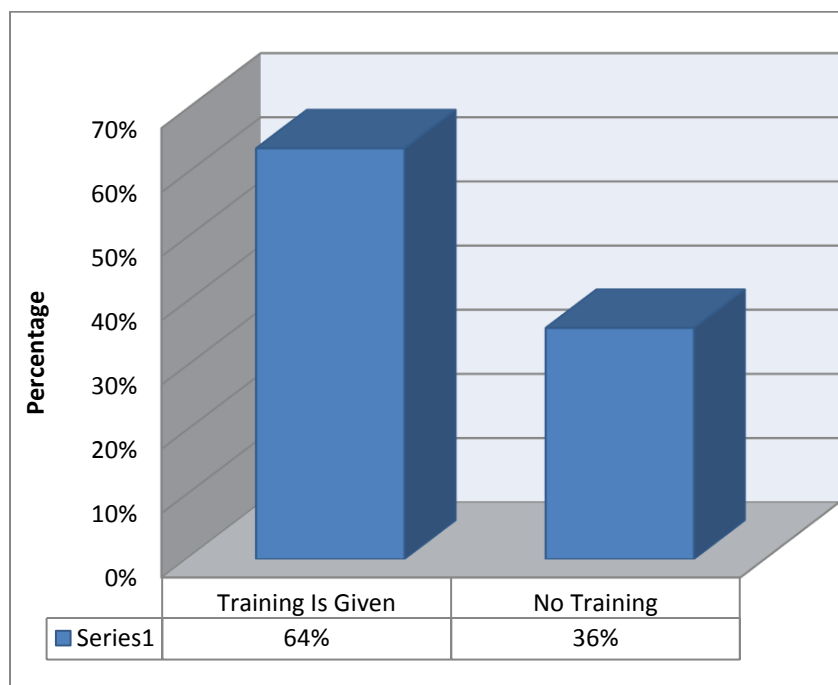
### **Analysis**

From the survey it has been found that no register is maintained for the amount of bio-medical waste disposed / day by the different departments from where hospital waste is generated.

### **Inference:**

So waste minimization can't be done until we know from where maximum amount of waste is generated so that alternate ways can be acquired to reduce this amount which would eventually alleviate the financial burden for the hospital and it would also a constructive step towards conservation of environment.

**Graph No. 9**



**Graph no. 9 represents responses of subjects about training programme on hospital waste management**

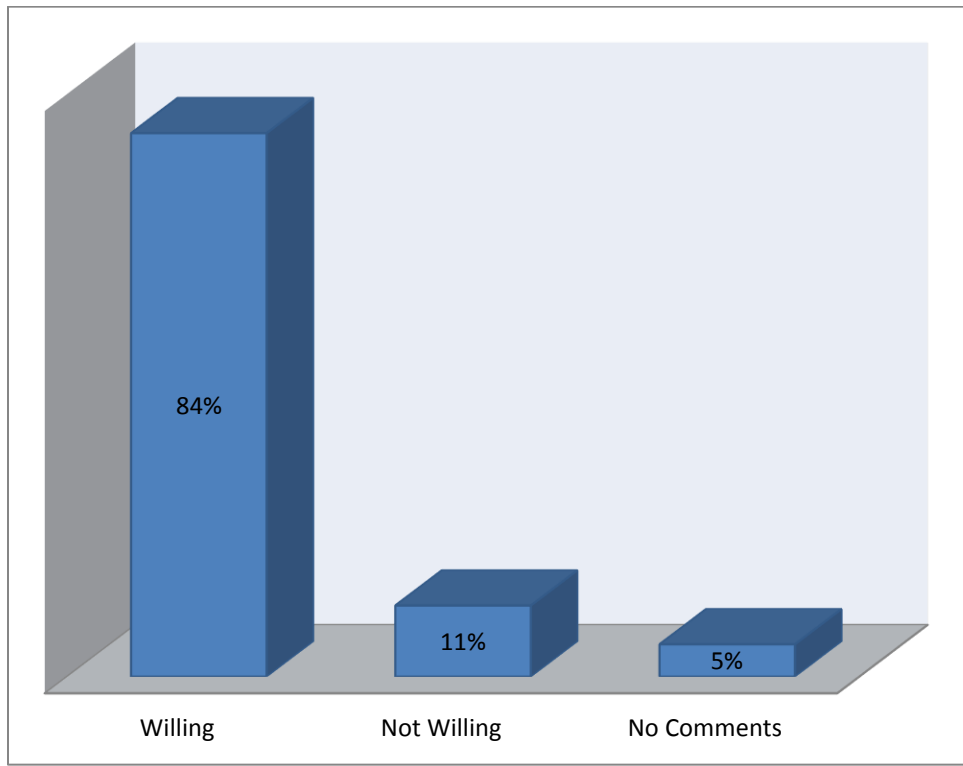
### **Analysis**

From the graph it can clearly be seen that although majority( 64%) of the respondents said that they have gone through training sessions on the hospital waste management but still accountable portion of the respondents denied , if they have got any king of training concerning hospital waste management.

### **Inference**

So it can be inferred that this segment of the health work force would be unaware of how the hospital waste is handled & what precautions they should acquire while handling the waste which ultimately can result in hospital acquired infection or injuries not only to the house keeping people who collects these waste but also to the community. Apart from that it conveys the wrong message to the co-workers.

**Graph No. 10**



**Graph no. 10 represents the willingness to attend the training sessions on Bio-medical Waste Management**

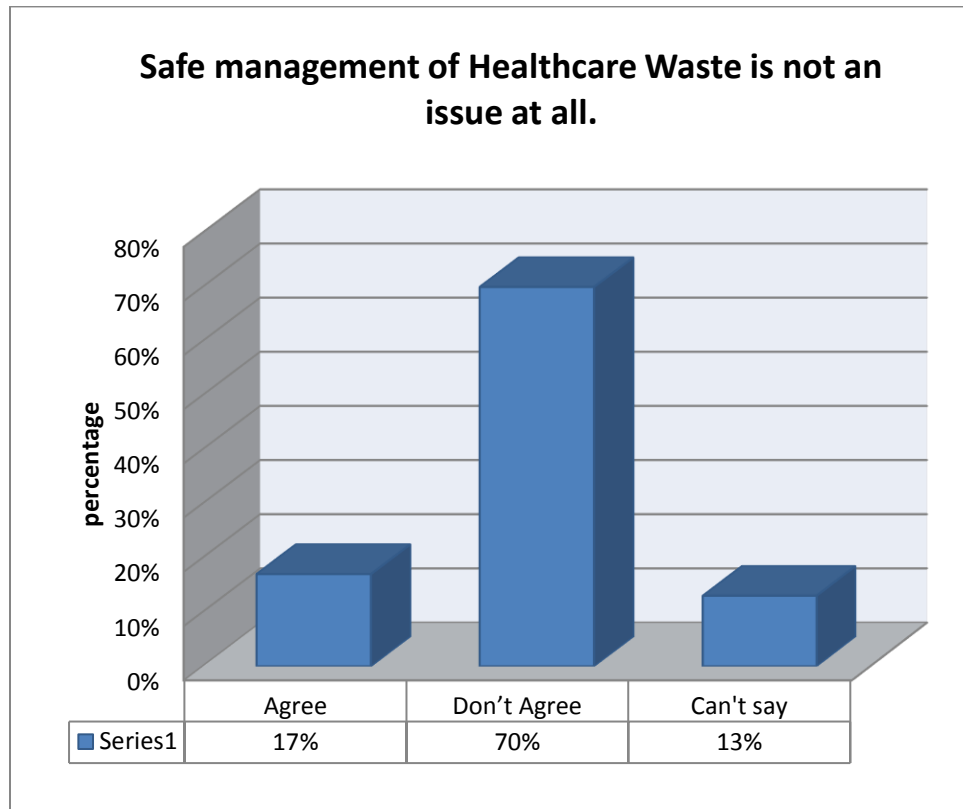
### **Inference Analysis**

On asking the respondents whether they are willing to attend any kind of program on hospital waste management, it can clearly be observed from the graph that 84% of respondents find it useful and they want these kind of programmes to happen in future.

Attitude of majority of the people is positive so training would result in constructive outcome

## Attitude Assessment

Graph No. 11



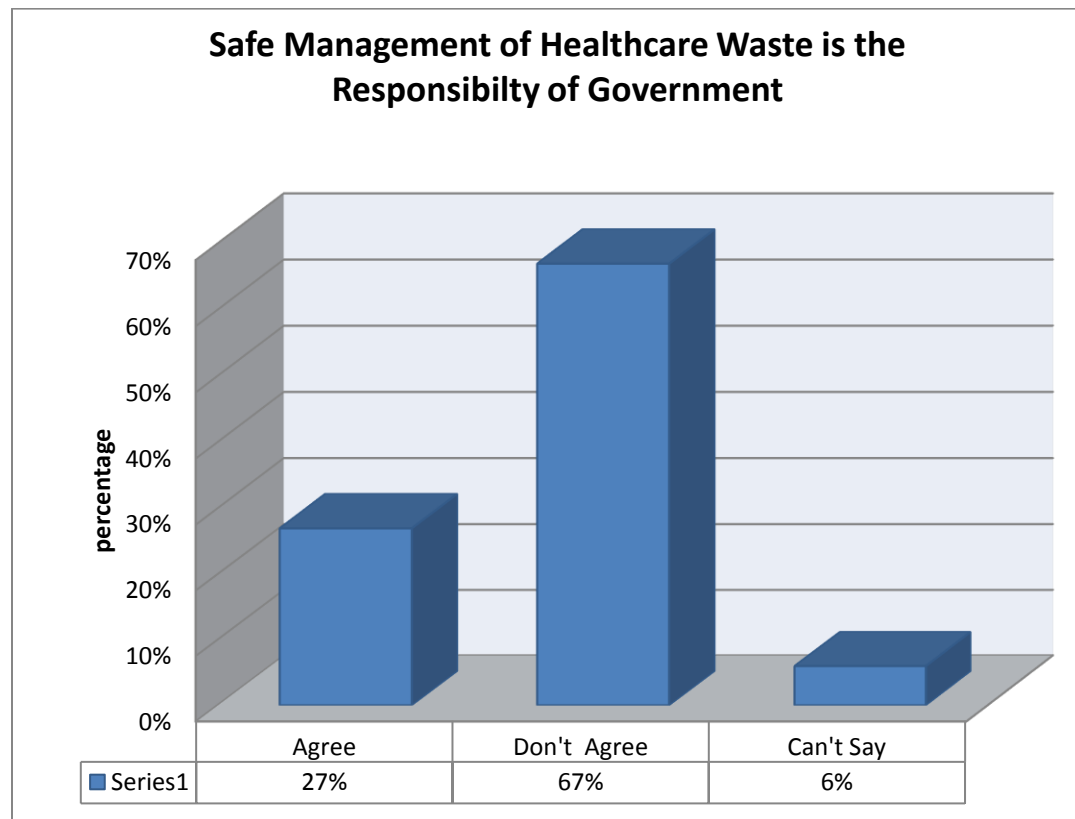
### **Analysis**

From the above graph it is very much evident that 70% of the respondents understand that hospital waste management is a serious issue and it should be handled carefully but still 3 out of 10 persons are either insensitive or don't understand the criticality of the matter.

### **Inference**

Subjects who didn't come up with any answer/ reacted negatively lack the knowledge of bad effects of hospital waste mismanagement or don't care about anything due to attitude problem.

Graph No. 12



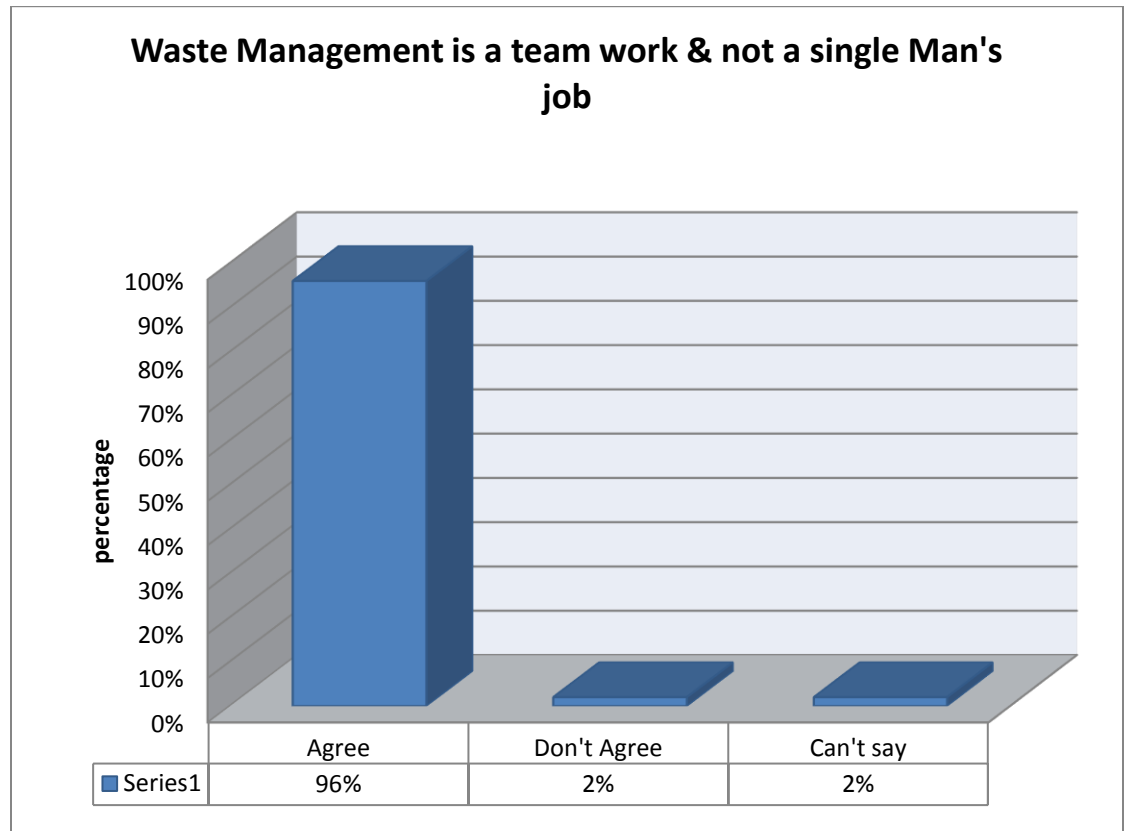
### Analysis

When healthcare workers were asked the above question 6% respondents refused to answer but 27% people said hospital waste management should be the responsibility of the government. Yet majority of workers didn't agree from the statement.

### Inference

The subjects, who agreed, might be taking the responsibility of segregating and handling of hospital waste as extra load on their work.

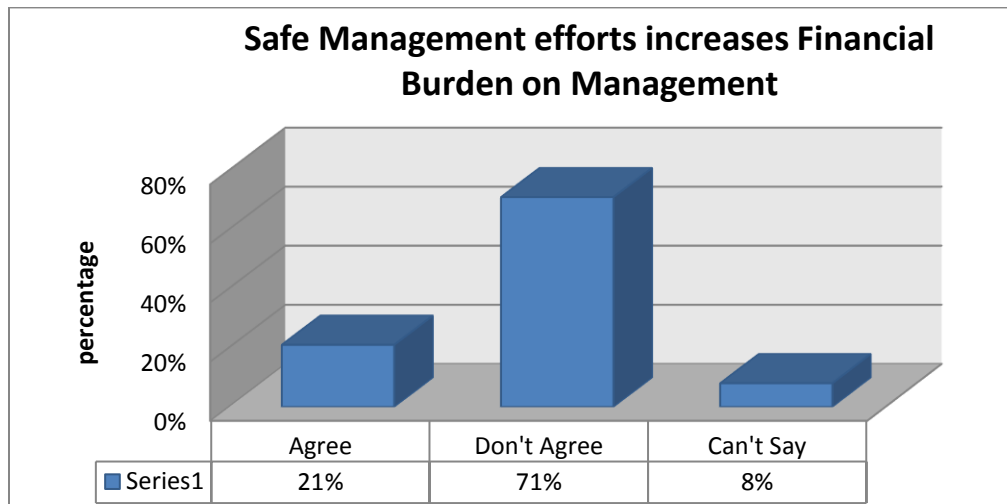
Graph No. 13



### Analysis

Approximately 95% of the health-workers agreed to the statement that hospital waste management is a team work not a single man or department can handle this job. So it requires a coordinated action from all the concerned departments to perform it effectively.

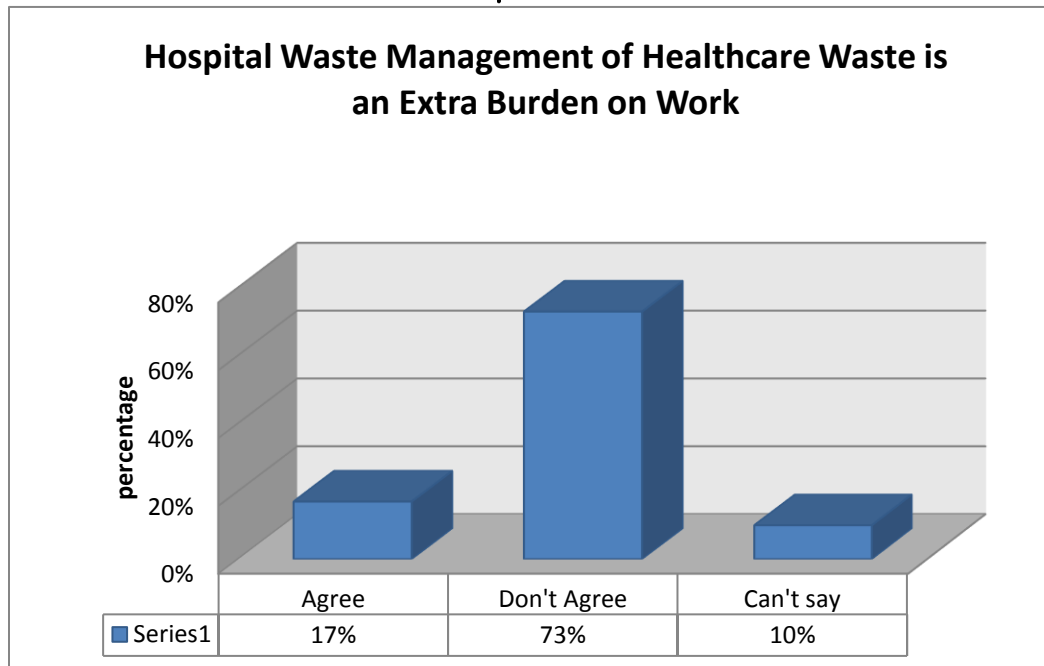
**Graph No. 14**



### **Analysis**

Nearly 70% of the respondents don't think bio-medical waste management increases the financial burden on the management because this is not a burden but a responsibility of a health-care institution because it may not result in financial out comes but by doing this a institute can provide a healthy environment to the society. But still there is need to correct the misconception of 21% of the health workers.

**Graph No. 15**



### **Analysis**

It is evident from the above graph that although 73% of the respondents don't take hospital waste management an extra burden on their work but still nearly 20% of the respondents clearly agreed to the point.

### **Inference:**

- Most of the people find it their responsibility.
- Fraction of respondents who find it as a burden may be due to deficiency of right attitude.
- But the respondents, who didn't answer, may be unaware of the practices of hospital waste management.

## Data collection by General observations & Interviews on Bio-medical Waste Management from different Departments.

### 1. Medical Intensive Care Areas

- ✚ Bins are not functioning properly.



Lid of bin is not opening even on pressing the foot

**Image No.1**

- ✚ In Medical Intensive Areas big garbage bins are placed in open just adjacent to the isolation room.
- ✚ Cardboard boxes with blue tape should be placed instead of Bins
- ✚ In emergency room bins are not properly placed. It is difficult for the nursing staff or doctor to put waste in respective bin because they are placed at uncomfortable distance.

## 2. Laboratory Hematology

- ✚ Bins are not opening properly.

Lid of the bin don't get closed even on putting pressure on lid (yellow



**Image No. 2**

- ✚ Bins are always open, lids not get close.



Open lid of red bag.

**Image No .3**

- ✚ House keeping people most often don't wear personal protective equipments (PPE).
- ✚ Corridor is narrow so it becomes difficult to carry garbage through blood bank waiting area.

### 3. Laboratory Bio-Chemistry

- ✚ Bins are not properly placed.
- ✚ Bins are without cover.

Bin has been placed  
away from the place of  
generation.



**Image No. 3**

- ✚ House keeping people put all kind of garbage in one bag (untrained).
- ✚ Housekeeping staff don't have personal protective equipments. They ask the department people for the gloves.
- ✚ They work wearing plastic gloves which are not safe

#### 4. Blood Bank

- ✚ Housekeeping staff is not equipped with PPE.

Overloading of bins.



Solid waste is spilling out of the bin.

Image No. 5

- ✚ Donor put swabs in wrong bin as shown in fig-6

Yellow bin is non- functional so donors put swab in black bin.



Image No. 6

- ✚ In refreshment room bins are not working properly functioning.



Don't get open even on pressing the foot opener.

## Analysis of Findings

After analyzing the responses of healthcare workers to the questions asked in questionnaire, direct observations and from interviews it can be easily assumed that although various departments like housekeeping, heart station 1, emergency room, wards, blood bank and all the laboratories are coordinating well enough to handle the hospital waste appropriately but still there are some pitfalls which any state of art healthcare institution would like to eradicate by taking the early progressive steps. Because perfection is achieved, not when there is nothing more to add but when there is nothing left to take away. And these pitfalls are:

- All categories of health workers are not getting the regular training regarding hospital waste management.
- Some workers are not able to attend the training sessions because of odd working hours.
- It has also been found some housekeeping people who are not able to understand routine English language for e.g. color in English accurately while training.
- The nursing staff was not confident enough to answer the questions asked in questionnaire.
- Departments don't maintain the register for the amount of waste produced each shift or day.
- The housekeeping people have shortage of personal protective equipments.
- Not all the newly joined nurses are getting the hospital waste management training.
- Most of the time registered is not maintained at the garbage room by a single person but waste is weighed and entry is made by the housekeeping person themselves. So in case of any problem not a single person can be held responsible.
- Many of the bins are not in functional state, which may lead to mishandling of the bio-medical waste.
- In blood bank wrong color coded bins are placed near the donor room. And if they are rightly placed they are not in working position.
- Because bins are not functioning well healthcare workers tend to put the waste in wrong bin because nobody wants to touch the bin bare handedly.
- In wards patient tend to spit or throw the soiled waste on floor because either the bins are not in working condition or patient don't want to step down from the bed to open the lid.

## Recommendations

- a) Hospital waste management training should be given to all categories of healthcare workers because this is not a job of single department but it should be joint effort of healthcare workers of all the departments.
- b) Hospital waste management classes, behavioral modification programme should also be started so as to improve attitude towards bio-medical waste management.
- c) The language used during training classes should be easily understandable by all specially for house keeping people because it has been observed that they often confuse even in English and Hindi name of the same color.
- d) Along with teaching, demonstration should also be given in the form of play which help in minimizing any kind of confusion and also it develop the interest of the workers.
- e) Periodic evaluation programme should also be started in the form of test or oral viva so the knowledge of workers can easily be assessed and also the one who outperforms should be acknowledged so that other gets the motivation.
- f) Attendance in the training session must be made compulsory.
- g) The house keeping people should be equipped with sufficient amount of personal protective equipments to minimize the risk of getting infection.
- h) It should be mandatory for all the new joiner to attend the BMW training sessions because it has been observed that new joiner were finding it very difficult to fill the questionnaire.

- i) While collecting the waste from different departments name of the later should be mentioned on the bag so that the one who weigh would know from where waste has come and log book should be maintained accordingly.
- j) The security person should be weigh and maintain the log book of waste coming out from different departments so that alternate methods can be acquired for minimizing the waste which eventually would minimize the waste disposal cost.
- k) Waste bins should be periodically checked for the proper functioning and should be replaced when required to minimize the chances of infection.
- l) Positioning of waste bins should be accurate to minimize the risk of mixing of infectious waste with non infectious waste.

## CONCLUSION

In Indian scenario, ever increasing environmental pollution has become a menace.

As the medical practitioners, we are very sincere to fight out the effects through administration of vaccination, but we do lack in sincerity to fight out the cause.

Strict rules for ICUs, OTs and blood banks recommended.

Technological driven advancements in treatment and disposal of wastes

While lots of steps have been taken towards the BMW management, a lot more is still required for this alarmingly increasing problem of society.

*“Let the waste of sick not contaminate the life of healthy”*

## REFERENCES

**“Biomedical waste management- Burgeoning Issue”, Webmaster,**  
**<http://ceeindia.org/modules/news/article.php?storyid=40>**

<http://www.iwma.in/BMW%20Rules,%202016.pdf>

<https://www.slideshare.net/gunijo/new-bio-medical-waste-management-rules-2016>

Neupane Samrioah, Nalsar University Of Law, Hyderabad, **”Bio-Medical Waste Management in India,** <http://legalindia.in/Bio-medical-waste-management-in-hospital>

<http://www.indiaenvironmentportal.org.in/content/426952/bio-medical-waste-management-rules-2016>

**www.google.com**

Kothari,C.R, Research Methodology Method & Techniques, New Age International Publishers

<http://www.biomedwastedisposal.com>/Govt. of India, Ministry of Environment and Forests Gazette notification No 460 dated July 27, New Delhi: 1998: 10-20

Glenn, Mc.R & Garwal, R. Clinical waste in Developing Countries. An analysis with a Case Study of India, and a Critique of the BasleTWG Guidelines (1999)

CEET: Biomedical Waste Management-Burgeoning issue (2008)

Gravers PD. Management of Hospital Wastes- An overview. Proceedings of National workshop on Management of Hospital Waste,(1998)

Thornton J., Tally MC, Orris P., Wentreg J. Hospitals and plastics Dioxin prevention and Medical Waste Incineration; Public Health Reports. 1996; 1:299- 313.

Surjit S. Katoch Biomedical Waste Classification and Prevailing Management Strategies, Proceedings of the International Conference on Sustainable Solid Waste Management, p. p.169-175 (2007).

The Bio Medical Waste (Management and Handling) Rules, (1998& 2016).