Awareness and Knowledge Practices about the Bio Medical Waste Management at Tertiary Care Teaching Hospital

Bhavanam Srinivas Reddy [*], **Dr.J.N.Rao** [**], **Dr.B.V.Subrahmanyam** [***]

[*] MHM Course Co-ordinator , Department of Hospital Administration Narayana Medical College & Hospital, Nellore, AP, India.
[**] MD (Hospital Administrator), Professor, Department of Hospital Administration
[***] Professor & HOD, Department of Forensic Medicine

Let the wastes of "the sick" not contaminated the lives of "the healthy"

"Medical waste disposal in a mess" "The problem with bio medical waste". Such headlines screaming out of the national dailies regularly must have caugh your attention lately.

 "Prevention is better than cure".

I. INTRODUCTION

In the present scenario the management of bio medical waste is becoming a major problem in most of the countries. Medical waste pose numerous potential health and safety hazards. In addition to their infectious and toxic characteristics, the highly variable and inconsistent nature of medical waste streams has increased public concern about storage, treatment, transportation and ultimate disposal. Inadequate management of bio-medical waste can be associated with risks to health care workers, patients, communities and their environment[1]

A Waste Management System is a structured process for monitoring, collecting, sorting, storing, transporting, and disposing of waste generated by an organization. A key ingredient to the overall success of such a system is that it must be approached with the emphasis on waste minimization rather than what has been termed "end-of-pipe" controls. This has many benefits to the organization, as well as to the community and the environment. One of the more obvious benefits is the reduction in costs associated with waste disposal.

Hospital is a place of almighty a place to serve the patient. Since beginning the hospital are known for the treatment of sick persons but we are unaware about the environment. Now it is well established fact that there are many adverse and harmful effects to the environment include human beings which are caused by the biomedical waste generated during patient care[2].

 Biomedical waste means any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to or in the production or testing of biological and including categories mentioned in the schedule one of biomedical waste rules 2000 by Ministry of environment and forest notification[2].

The hospital waste like body parts, organ, tissue, blood and body fluids along with solid linens, cotton bandages and plaster from infected and contaminated areas are very essential to be properly collected, segregated, stored, transported, treated and disposed of in a safe manner to prevent nasocomial or hospital acquired infections.

According to bio-medical waste rules,1998 of India, bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or in a research activities pertaining thereto, or in the production or testing of biologicals, and including human anatomical waste ,animal waste, microbiology and biotechnology waste, waste sharps, discarded medicines and cytotoxic drugs, soiled waste, solid waste, liquid waste, incineration ash, chemicals used in production of biological, chemicals used in disinfection, as insecticides,etc[2].

Health care waste refers to all the waste generated by a health care establishment. It is estimated that 10-25% of health care waste is hazardous, with the potential for creating variety of health problems. Bio-medical waste collection and proper disposal has become a significant concern for both the medical and the general community. Since the implementation of the bio-medical waste management and handling rules every concerned health personal is expected to have proper knowledge, practice, and capacity to guide others for waste collection and management and proper handling techniques. There is an urgent

need to improve upon the medical waste management practices in the country based on systematic and scientific planning of medical waste disposal[3].

Between 75-90% of the waste produced by the health care providers is non risk or "general health" care waste comparable to domestic waste. Awareness regarding bio-medical waste management is very less among health care personal. The health workers play a very important role in bio-medical waste management; hence they should have thorough knowledge and practice to provide safety and safe environment including protection. A clear and safe environment will attract clients by building up public confidence[4].

Hospital waste management has been brought in to focus in India recently with the notification of the Bio-medical Management and Handling rules, 1998.The rule makes it mandatory for the health care establishments to segregate, disinfect and dispose their waste in an eco-friendly manner.

Health care waste is a special category of waste, which needs to be handled appropriately with precautions because it carries a higher potential for infection and injury than any other type of waste. Currently it is being managed casually. The crux to all of this may be due to a lack of awareness and appreciation amongst medical staff and residents as well as the public, inadequate existing facilities, and lack of strict enforcement of the rules in light of the enormous population of the country[5].

According to WHO (2000), almost 80% of health care waste is comparable to domestic waste, the remaining approximately 20% is considered hazardous, as it may be infectious, toxic and/or radioactive. Improper disposal of waste generated in health care establishments can have direct and indirect health impacts on those who work in the health care establishment, the general public and on the environment. Such practices may contribute to the spread of diseases, as well as pollution of water, soil and air. Untreated infectious wastes dumped on the land can contaminate surface and ground water supplies and even incomplete combustion of health care waste can lead to toxic emissions, thus exposing the entire population to the risk of diseases[6].

II. OBJECTIVES OF THE STUDY

To assess the level of Awareness, knowledge & Practices of staff nurses and lab technicians regarding biomedical waste management at tertiary care teaching Hospital at Nellore.

III. LIMITATIONS OF THE STUDY

1. The study is limited to staff nurses and lab technicians those who are present at the time of data collection.
2. Data will be collected within 4 weeks of period (Short Duration)
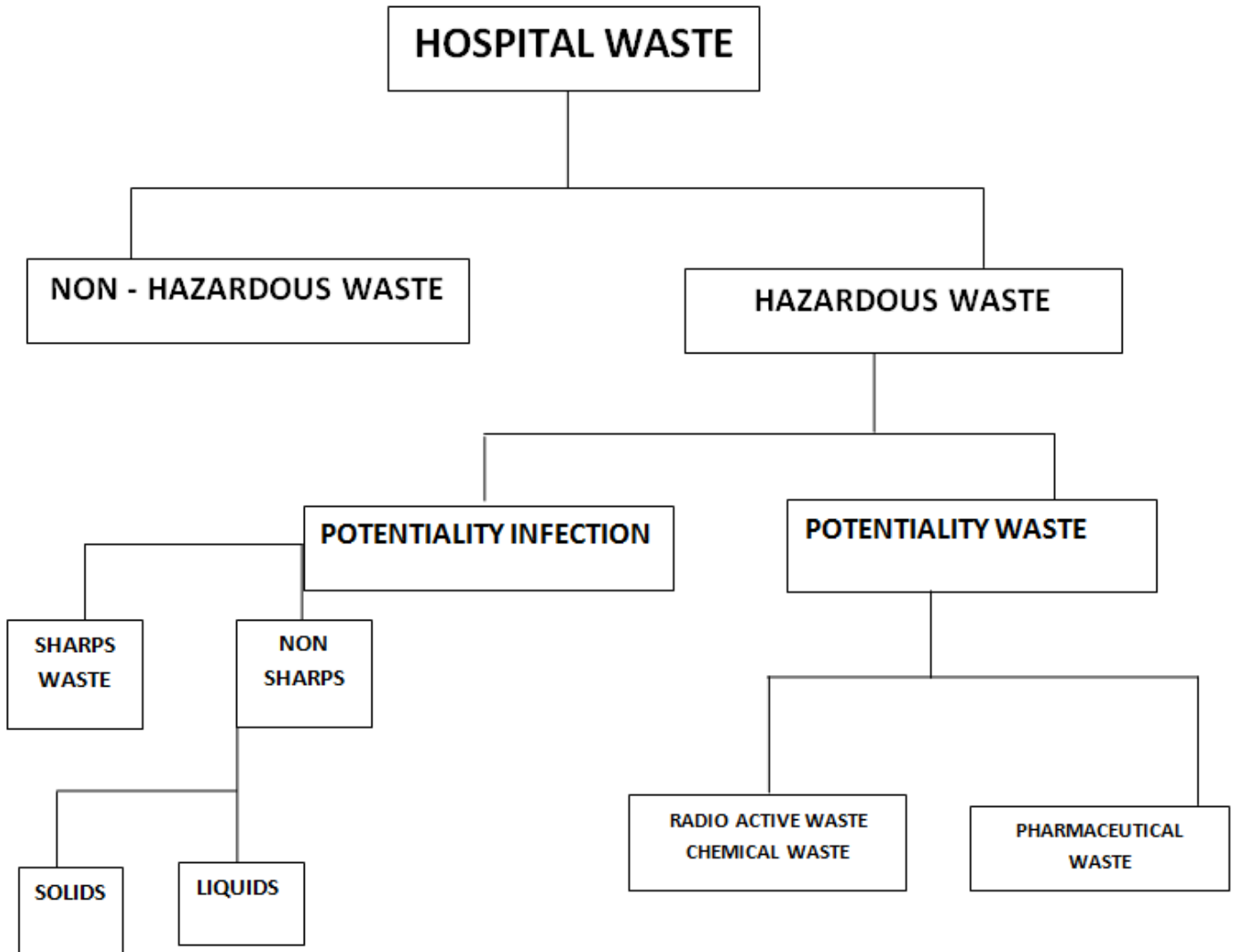
Methodology

The study involves the randomised structureral questionnaire. which was distributed to 150 staff nurses and technicians, 109 responded. The questionnaire consisted-12 questions to assess the awareness knowledge & practices having colour coding.1-6 Questions are related to (Red bin, Yellow bin, White bin, Black bin & Blue bin) likert scale method 7-10 questions are related to knowledge, awareness and Practices risk of infection (strongly Agree, Agree, Neither Agree Nor Disagree, Disagree & Strongly Disagree) and 11th and 12th questions are open ended questions (Yes or No) responses.

IV. IMPORTANCE OF HOSPITAL WASTE

The hospital waste is important from the following point of view.
1. For the hospital
2. For general public
3. Environment protection
4. Nosocomial infection[7]

Classification of Bio Medical waste

- General waste includes kitchen waste, packing materials, paper and plastic
- Pathological waste includes tissue organ, body parts, human fetus, blood and body fluids
- Infectious waste like pathogens in sufficient concentration that are culture and slocks of infectious agents from laboratory
- Sharps includes needles, blades, scalpels etc..
- Pharmaceutical waste includes drugs and chemicals that have been return from wards, outdated and contaminated items
- Chemical wasted includes housekeeping, cleaning and infectious products
- Radioactive waste includes solid, liquid and gaseous waste[9]

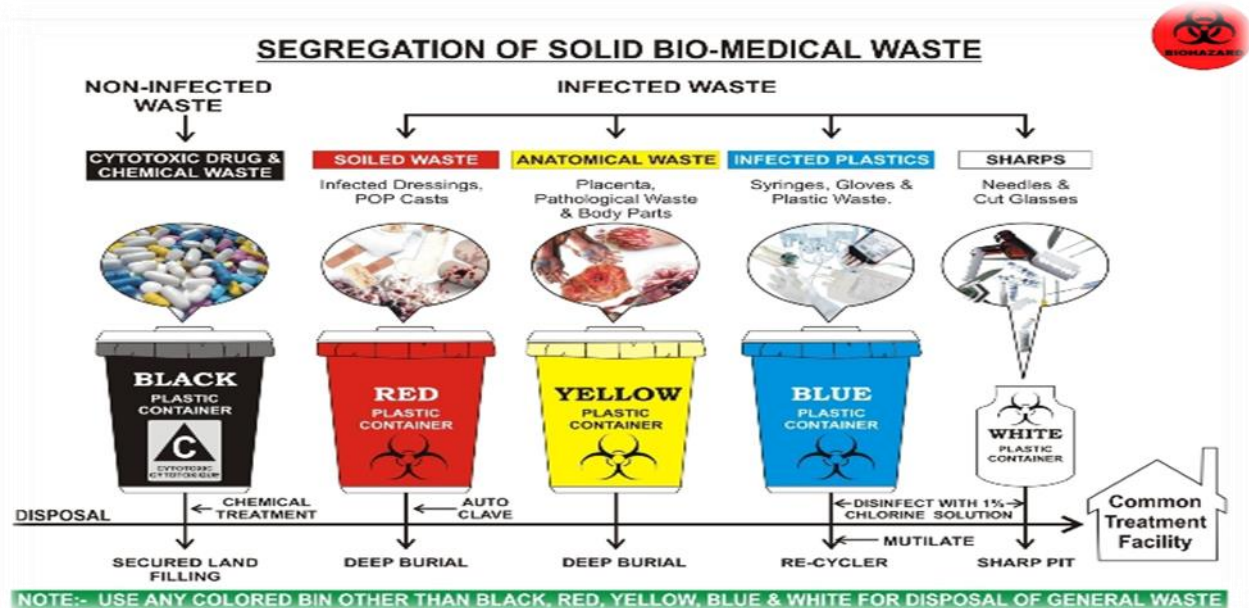On the basis of World health organization report in 2003 biomedical waste is generated during diagnosis in that 17% from treatment or immunization of human beings or animal or maternity, 8% in research activity pertaining there to or in the production of testing biological, 50% biomedical waste generated from different departments of the hospitals that are surgical wards, offices. About 85% of the waste generated is known hazardous, other 10% is infectious, other 5% is non infectious but hazardous waste.

All category of waste has to be kept segregated in proper container or bags as the case may. Untreated biomedical waste shall not be kept or stored beyond a period of 48 hours. The container must be sturdy enough to contain design maximum volume and weight of waste without damage. It should be without any puncture or leakage.

Segregation of source of generation also helps in minimizing the amount of waste to be treated besides enabling more efficient treatment for each category of waste. Color coded liners placed in the bins helps for segregation of waste.[9] the color codes are-

Colour coding & Type of container for disposal of BMW

Colour coding	Type of Container	Waste Category	Treatment options as per Schedule I
Yellow	Plastic bag	1,2,3, 6	Incineration/Deep burial
Red	Disinfected container/ plastic bag	3,6,7	Autoclaving/Micro waving/Chemical treatment
Blue/ White translucent	Plastic bag/Puncture proof container	4,7	Autoclaving/Micro waving/Chemical treatment and Destruction/Shredding
Black	Plastic bag	5,9,10	Disposal in secured landfill

V. RESULTS AND DISCUSSIONS

Table -1

Q.No	A (Red)	B (Yellow)	C (White)	D (Black)	E (Green)	F (Blue)	TOTAL
1	2 (1.83 %)	105 (96%)	0 (0 %)	1 (0.91%)	1 (0.91%)	0 (0%)	109
2	33 (3.27 %)	71 (65.13%)	1 (0.91 %)	3 (2.75 %)	1 (0.91%)	0 (0 %)	109
3	10 (9.17%)	0 (0%)	91(83.48 %)	0 (0 %)	6 (5.5 %)	2 (1.83 %)	109

4	3 (2.7 %)	0 (0 %)	99 (90.82%)	2 (1.83%)	1 (0.98 %)	4 (3.66 %)	109
5	3 (2.7%)	1 (0.91%)	1 (0.91%)	1 (0.91 %)	89(81.65 %)	14(12.84 %)	109
6	1 (0.91%)	3 (2.7%)	2 (1.83 %)	12 (11.0 %)	69 (6.33%)	22 (20.8 %)	109

Table -2

Q.No	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	TOTAL
7	52 (47.70%)	45(41.28 %)	2 (1.83 %)	5 (4.58%)	5 (4.58%)	109
8	45 (41.28%)	56(51.37 %)	2(1.83 %)	2 (1.83%)	3 (2.7%)	109
9	55 (50.45%)	42 (38.53%)	9 (1.83 %)	3 (2.7%)	0 (0%)	109
10	52(47.70 %)	50(45.87 %)	2 (1.83 %)	3 (2.7%)	2 (1.83 %)	109

Table -3

Q.No	YES	NO	Total
11	85 (77.98%)	24 (22.0%)	109
12	91 (83.48%)	18 (16.5 %)	109

VI. DATA ANALYSIS

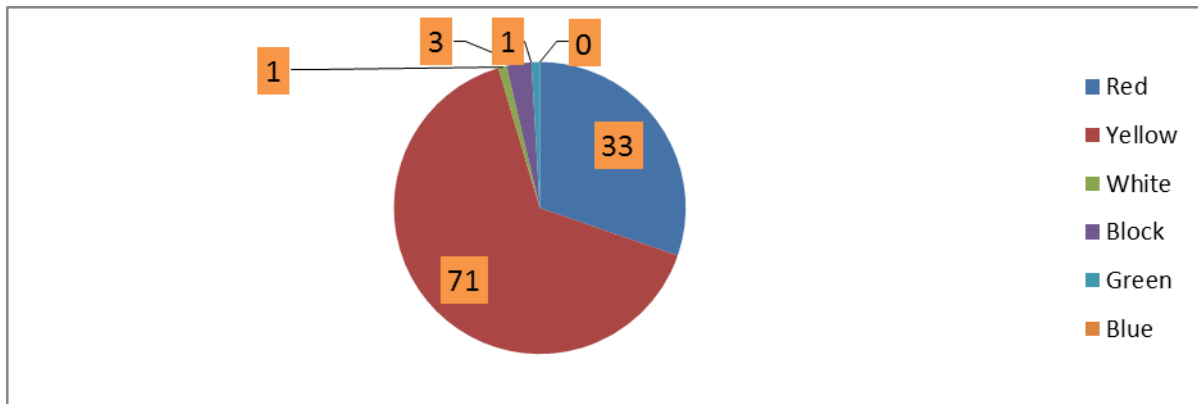### 1. Cotton gauzes, linen, blood soaked cloth, catheters, gloves

Q.No	Red	Yellow	White	Black	Green	Blue	TOTAL
1.	2 (1.83 %)	105 (96%)	0 (0 %)	1 (0.91%)	1 (0.91%)	0 (%)	109

Most of the nurses 98% of staff not aware of segregation biomedical waste management color coded bin system. Only 2% of staff nurses aware of color coded segregation of bio medical waste management bin system.

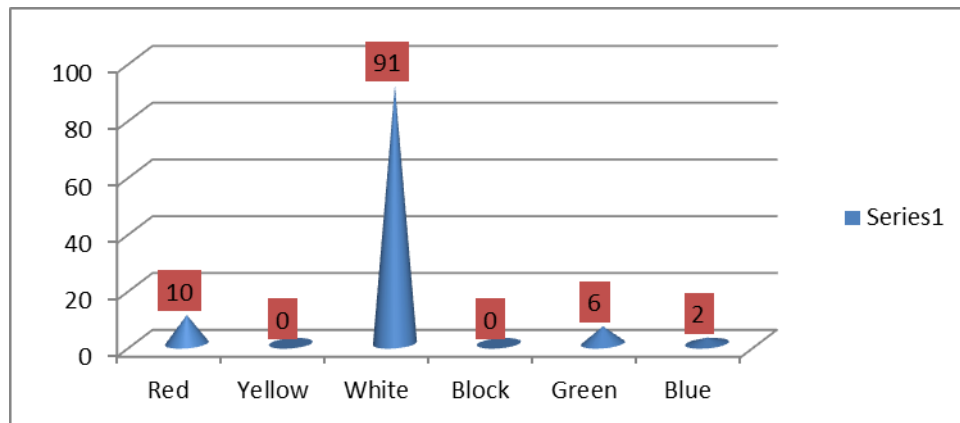### 2.   Body parts, body fluids, Cytotoxic waste, body waste

Q.No	Red	Yellow	White	Black	Green	Blue	TOTAL
2.	33(30.27 %)	71 (65.13%)	1 (0.91 %)	3 (2.75 %)	1 (0.91%)	0 (%)	109

65% of the staff nurses are aware of color coded bio medical waste management segregation, only 35% of the people they don't know the correct segregation of bio medical waste management
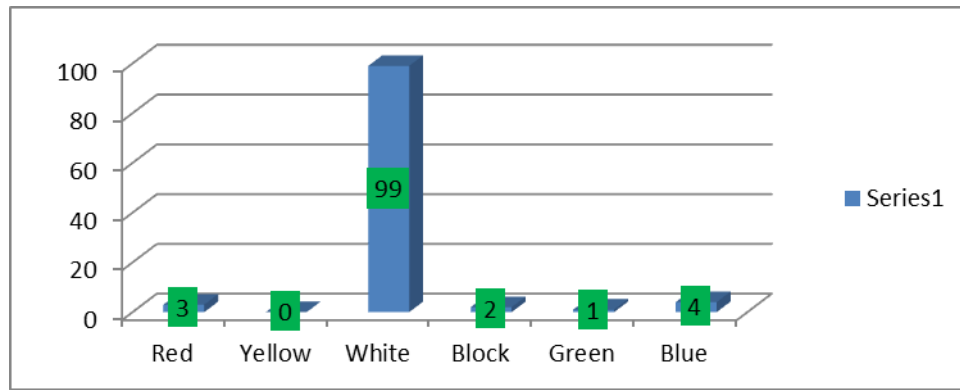
3.   Plastic waste IV tubings, syringes

Q.No	Red	Yellow	White	Black	Green	Blue	TOTAL
3.	10 (9.17%)	0 (0%)	91(83.48 %)	0 (0 %)	6 (5.5 %)	2 (1.83 %)	109

83% of the staff nurses aware plastic waste IV Tubings, Syringes which bin is corrected only 17% of the staff nurses not aware.
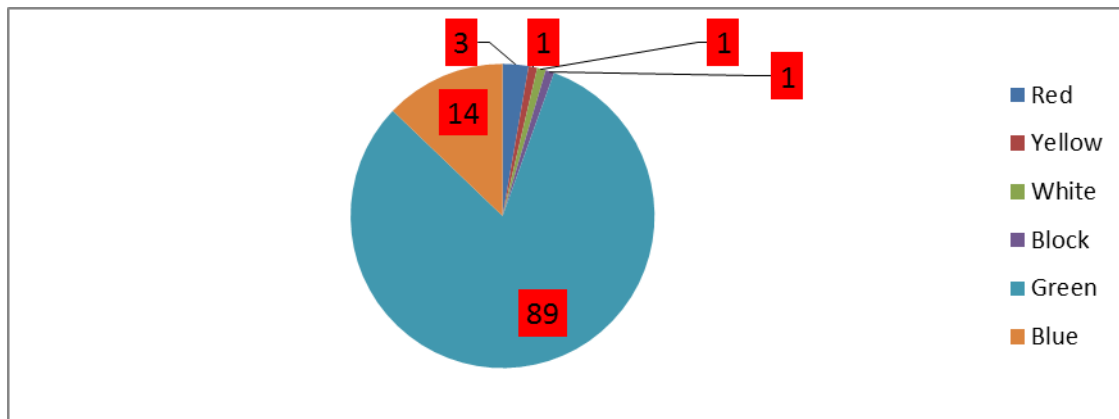
4.   Glass items

Q.No	Red	Yellow	White	Black	Green	Blue	TOTAL
4.	3 (2.7 %)	0 (0 %)	99 (90.82%)	2 (1.83%)	1 (0.98 %)	4 (3.66 %)	109

96% of the staff nurses are not aware of glass items for suitable for suitable selection of color coded bins. Only 4% of the staff nurses aware.
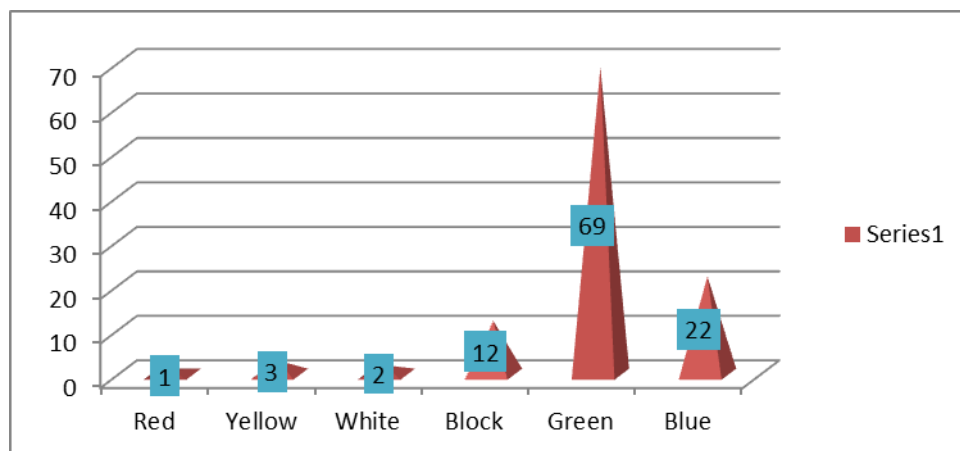
5.   Disposable polethene bags, papers, coffee cups

Q.NO	Red	Yellow	White	Black	Green	Blue	TOTAL
5.	3 (2.7%)	1 (0.91%)	1 (0.91%)	1 (0.91 %)	89(81.65 %)	14(12.84 %)	109

Only 99% staff nurses are not aware of the where should be located the disposable, polethene, bags, paper, cofee cups. only 1% of the staff nurses nown correct color coded bin.
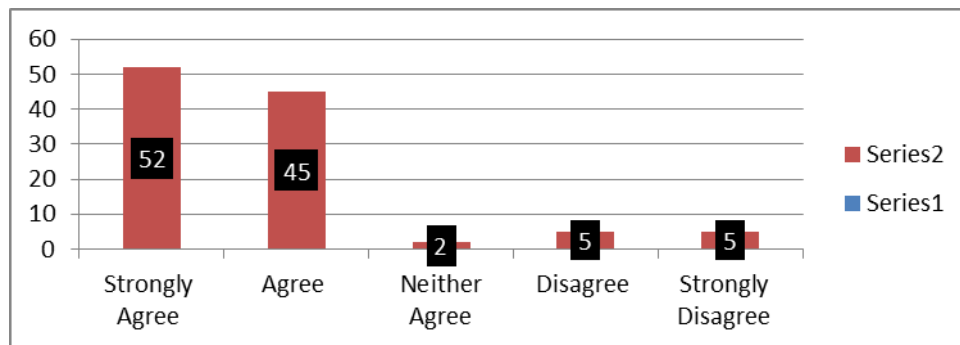
6.   Food waste and kitchen waste

Q.No	Red	Yellow	White	Black	Green	Blue	TOTAL
6.	1 (0.91%)	3 (2.7%)	2 (1.83 %)	12 (11.0 %)	69 (63.3%)	22 (20.8 %)	109

63% of the staff nurses know the food waste and kitchen waste can be inserts which color coded bin. 37% of the staff they don't know the food waste and kitchen waste can be insert.

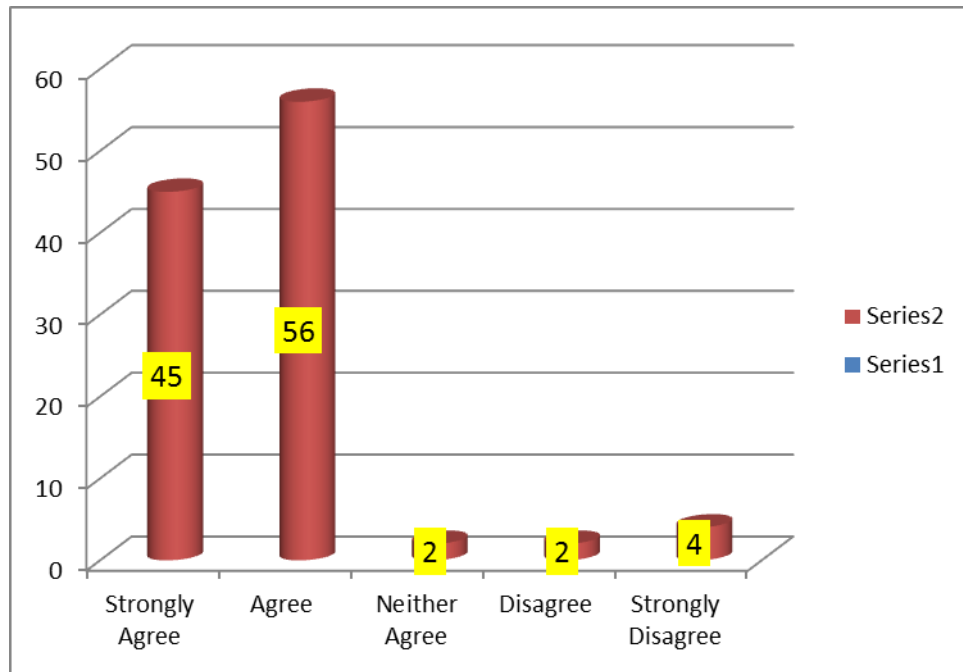### 7.   **Municipal wastes and clinical wastes are different**

Q.No	Strongly Agree	Agree	Neither Agree Nor Disagree (Neutral)	Disagree	Strongly Disagree	TOTAL
7.	52 (47.70%)	45(41.28 %)	2 (1.83 %)	5 (4.58%)	5 (4.58%)	109

89% of staff nurses only known the municipal waste and clinical waste is different, 11% of the staff nurses feel no difference.

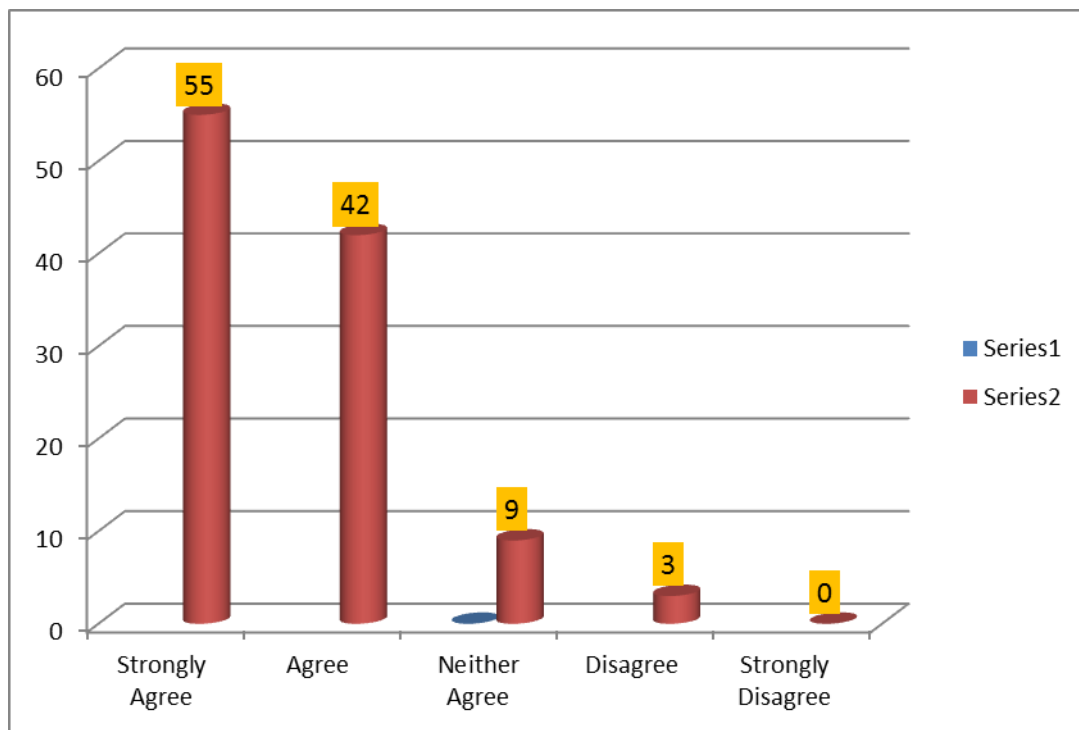### 8.   **Clinical wastes are highly hazardous than municipal waste**

Q.No	Strongly Agree	Agree	Neither Agree Nor Disagree (Neutral)	Disagree	Strongly Disagree	TOTAL
8.	45 (41.28%)	56(51.37 %)	2(1.83 %)	2 (1.83%)	4 (3.61%)	109

93% of staff nurses only known the clinical waste is more hazardous than municipal waste , remaining 7% of the staff they doesn't know the clinical is more dangerous.

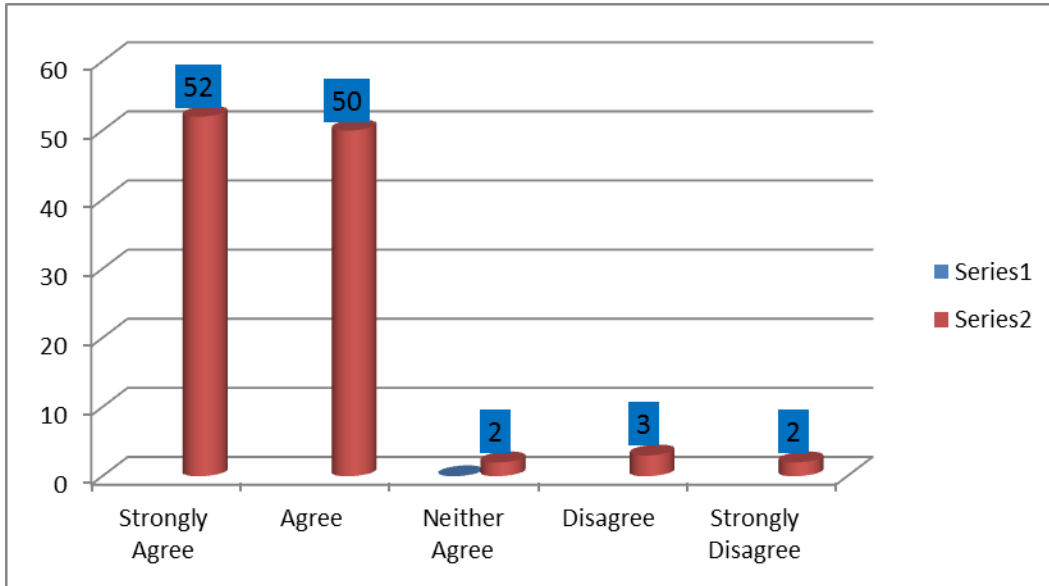**9.   Clinical waste should be treated and disposed separately from municipal waste.**

Q.No	Strongly Agree	Agree	Neither Agree Nor Disagree (Neutral)	Disagree	Strongly Disagree	TOTAL
9.	55 (50.45%)	42 (38.53%)	9 (1.83 %)	3 (2.7%)	0 (0%)	109

89% of the staff nurses are felt that clinical waste should be treated separately comparing to municipal waste. But 11% of the staff they don't know the separation.

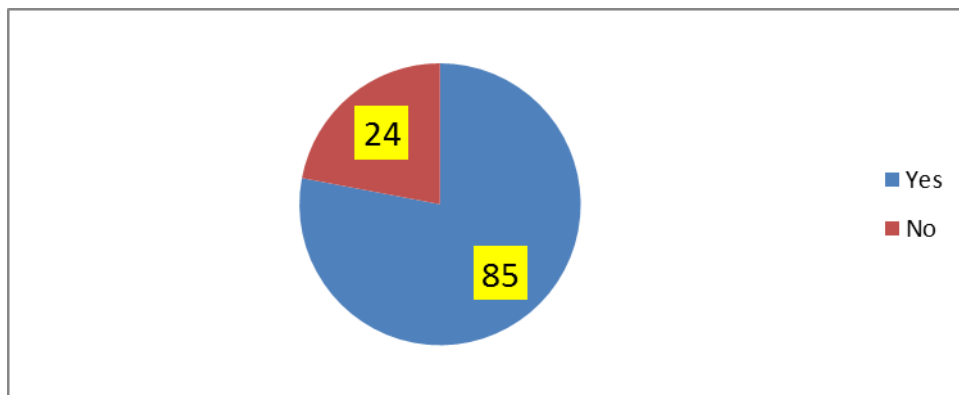**10. How much risk do you think is involved medical waste going into a wrong bin**

Q.No	Strongly Agree	Agree	Neither Agree Nor Disagree (Neutral)	Disagree	Strongly Disagree	TOTAL
10.	52(47.70 %)	50(45.87 %)	2 (1.83 %)	3 (2.7%)	2 (1.83 %)	109

93% of the staff felt that the medical waste is going to a wrong bin it is a high risk, 7% expressed no risk.
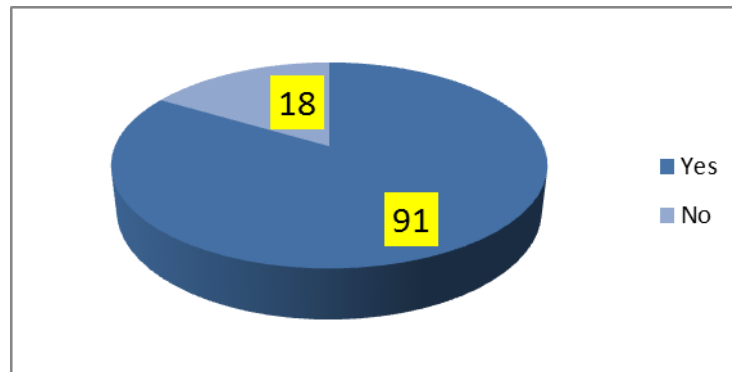
11. Do you know the four R's of waste Management

Q.No	Yes	No	TOTAL
11.	85 (77.98%)	24 (22.0%)	109

78% of the staff nurses are aware of the Four R's of bio medical waste management, 22% of the staff are not aware.

12. Are you satisfied with the current medical waste management system in our Hospital

Q.No	Yes	No	TOTAL
12.	91 (83.48%)	18 (16.5 %)	**109**

83% of staff nurses are satisfied present running biomedical waste management system. 17% of the staff are they are not satisfied the present biomedical waste management system.

VII. RECOMMENDATIONS' OR SUGGESTIONS

- Training of all staff nurses and paramedical staff to conduct more CME's, Seminars, Symposium and workshops.
- To improve quality of the management and handling of bio medical waste management.
- Segregation of waste at the point of generation is the first Pre-Requisite it should be improved.
- To suggest the universal precautions for bio medical waste management among the staff.
- Periodical supervision of biomedical waste, color bins, segregation, transport and disposal to reduce the health care associated infection.
- Use of protective materials like gloves, masks& shoes while handling any kind of bio medical waste materials.
- Proper record maintaining should be done to improve the quality of bio medical waste management.
- To create the separate department of bio medical waste management by authorized / Qualified person to supervise efficient and effectively.

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AUTHORS

First Author – Bhavanam Srinivas Reddy MHM Course Co-ordinator , Department of Hospital Administration Narayana Medical College & Hospital, Nellore, AP, India.
E-mail:srinivasreddy.bhavanam@gmail.com

Second Author – Dr.J.N.Rao MD (Hospital Administrator), Professor, Department of Hospital Administration

Third Author – Dr.B.V.Subrahmanyam Professor & HOD, Department of Forensic Medicine