Study of Knowledge, Attitude, and Practices of Bio Medical Waste Management in Hospital

Internship Training
at
Pacific Medical College and Hospital, Udaipur
(February 12 - April 30, 2014)

By
Kanupriya Tiwari

Under the guidance of
Dr. Suresh Joshi

Post Graduate Diploma in Hospital & Health Management
2012–14

IIHMR UNIVERSITY
Institute of Health Management Research
Jaipur
2014

INSTITUTE OF HEALTH MANAGEMENT RESEARCH
1, Prabhu Dayal Marg
Sanganer Airport, JAIPUR - 302 011, INDIA
Tel. : 3924700, 2791431-32
Fax : 91-141-3924738
E-mail : iihmr@iihmr.org
URL : http://www.iihmr.org
Gram : HEALTHINST

To WhomSoEver May Concern

This is to certify that **Dr. Kanupriya Tiwari** student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from Institute of Health Management Research, Jaipur has undergone internship training at **Pacific Medical College and Hospital** from Feb 2014 to April 2014.

The Candidate has successfully carried out 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.

Dr. Ashok Kaushik

Dean, Academics and Student Affairs

IIHMR, Jaipur

Dr. Suresh Joshi

Professor

IIHMR, Jaipur

PMCH
HEALTH ADVISORS

PACIFIC MEDICAL COLLEGE & HOSPITAL

(Promoters: Tirupati Balaji Educational Trust)

Bhilon Ka Bedla, NH. 27, Pratap Pura, UDAIPUR, Phone: +91 294 3920000
Email: pmchudaipur@hotmail.com

CERTIFICATE

This Certificate is awarded to **Dr. Kanupriya Tiwari** in recognition of having successfully Completed her internship in Department of **Infection Control** and has successfully Completed her Project on '**Study of Knowledge, Attitude, and Practices of Bio Medical Waste Management in Hospital'** from Feb 2014 to Apr 2014 in **Pacific Medical College and Hospital.**

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

We wish her all the best for Future endeavors.

Dr. D.P. Agrawal
Medical Superintendent
Pacific Medical College & Hospital
Udaipur (Raj.)

Dr. D.P. Agrawal
Medical Superintendent
Pacific Medical college and Hospital

HEAD-HR & Admin
Pacific Medical College & Hospital
Udaipur

Mr. Vishal Jain
Head-human Resources
Pacific medical College and hospital

INSTITUTE OF HEALTH MANAGEMENT RESEARCH
1, Prabhu Dayal Marg
Sanganer Airport, JAIPUR - 302 011, INDIA
Tel. : 3924700, 2791431-32
Fax : 91-141-3924738
E-mail : iihmr@iihmr.org
URL : http://www.iihmr.org
Gram : HEALTHINST

INSTITUTE OF HEALTH MANAGEMENT RESEARCH, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled '**Study of Knowledge, Attitude, and Practices of BioMedical Waste Management in Hospital'** and submitted by Dr. Kanupriya Tiwari Enrollment No. 1321 under the supervision of Dr. Suresh Joshi for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from Feb 2014. to Apr 2014. 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

Acknowledgement

I believe, nothing really can be accomplished alone. It's the direction, guidance, involvement, Support and prayers of more than one people around you those results into realization.
My Institute - **Indian Institute of Health Management Research (IIHMR), Jaipur** deserves the foremost appreciation for providing me the opportunities to understand my capabilities. I would like to thank one and all in the IIHMR team for providing me a platform for my professional career as well as for helping me boosting up all my capabilities and making me confident enough to work for health care organisations. I would like to thank **Dr. S.D. Gupta** (Director IIHMR, Jaipur) and **Dr. Ashok kaushik** (Dean IIHMR, Jaipur) for their continuous support.

I acknowledge the tremendous contribution of my guide **Dr.Suresh Joshi** in completion of the project right from the word go.

I would like to render my sincere thanks to **Pacific Medical College and Hospital,** Udaipur for providing me the opportunity to complete my dissertation.

I convey my deep and sincere thanks to **Dr. D.P Agrawal**, Medical Superintendent, Pacific medical college and hospital, Udaipur for giving me the opportunity to work under his guidance.

I extend my words of thanks to all the staff of Pacific medical college and Hospital for always being so cooperative and facilitating me.

Dr. Kanupriya Tiwari

Contents

LIST OF TABLES

List of Graphs

List of Figures

Abbreviations

BMW	Bio Medical Waste
CPCB	Central pollution control board
ENT	Ear Nose Throat
ICU	Intensive care unit
IPD	Inpatient department
KAP	Knowledge Attitude Practice
LAB	Laboratory
MOEF	Ministry of Environment and Forest
OPD	Outpatient department
PMCH	Pacific Medical College & Hospital
OT	Operation Theatre
PPE	Personal protective equipment
WHO	World Health Organization

2.1 Executive Summary

Despite of statutory provision of biomedical waste management practice, Indian hospitals have still not achieved the desired standard even after fifteen years of enforcement of law 'Biomedical Waste (Management and Handling) Rules, 1998'. All health care facilities are required to treat their biomedical waste as per rule.

The study was carried out in 402 bedded multi specialty hospital of Udaipur to assess the knowledge, attitude and practices of nursing and housekeeping staff regarding bio medical waste management. The primary data was collected through interviewing 80 housekeeping and 250 nursing staff on the basis KAP (Knowledge, Attitude, Practice) Questionnaire. The observation technique was used to study the existing biomedical waste practices in hospital.
The study reveals that more percentage of housekeeping staffs (50%) have knowledge about biomedical waste management with compares to nursing staff (64%). All housekeeping staffs have knowledge about Personal protective equipments used in bio medical waste handling. The more percent of nursing staff have knowledge about waste segregation compare to housekeeping staff. The attitude of housekeeping staff towards the biomedical waste management is 50.25% i.e. Neutral but nursing staff have positive attitude (74.8%) for Bio Medical Waste Management. The practices are also well followed by nursing staff (65.8 % i.e. "Average") compare to housekeeping staff (53.54% i.e. "Average").

Training to the housekeeping and nursing staff should be given periodically so the knowledge about biomedical waste management will improve among the staff. Attitude toward the handling of biomedical waste management can be improved by the support of management and commitment of all hospital staff for safe handling of bio medical waste.

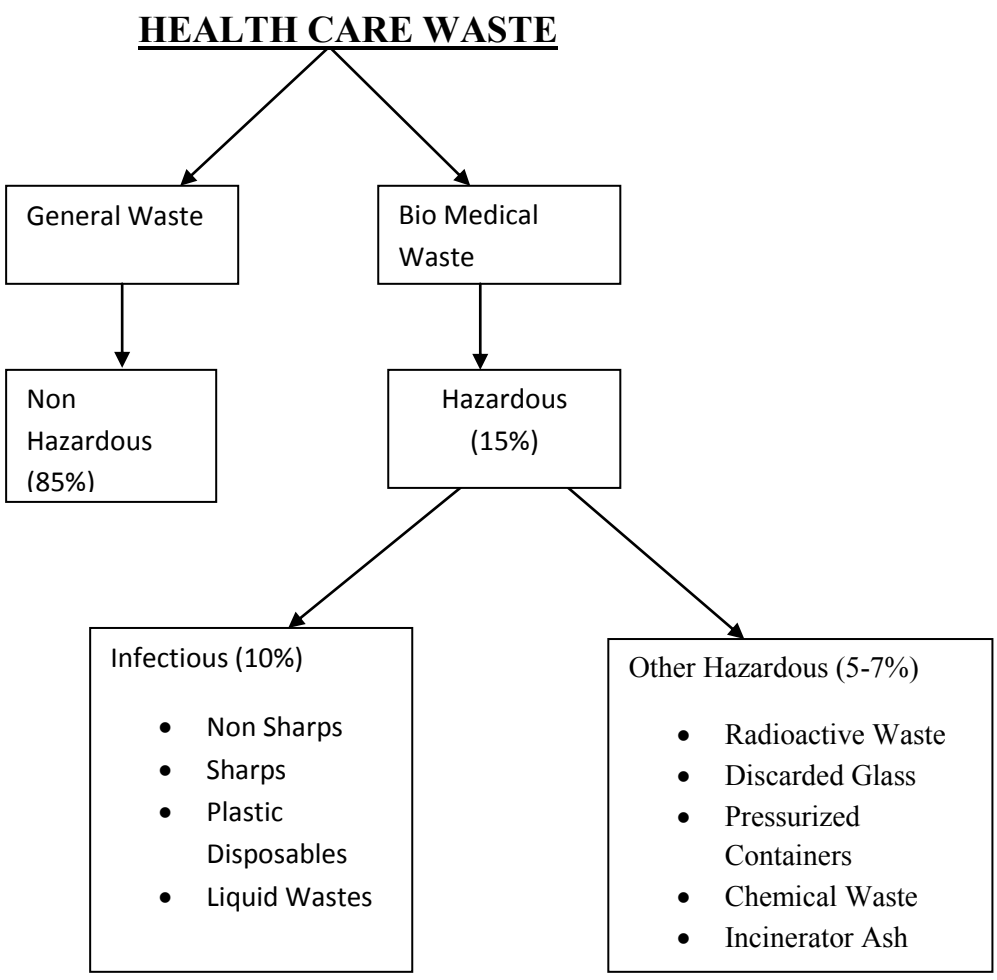
2.2 Introduction of the study

The hospital is an integral part of a social and medical organization, the function of which is to provide complete health care for the population, both curative and preventive, in order to cater health need of community lots of health care waste generated. It is estimated that 10-25% of health care waste is hazardous, with the potential for creating a variety of health problems. Bio-medical waste (BMW) collection and proper disposal has become a significant concern for both the medical and the general community. Since the implementation of the Biomedical Waste Management and Handling Rules (1998),every concerned health personnel is expected to have proper knowledge, practice, and capacity to guide others for waste collection and management, and proper handling techniques.

Definition

Biomedical wastes (BMW) are defined as waste that is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, or in the production of biological activity.

Figure 1 Type of Health care waste



The management of health care waste is a subject of considerable concern to public health and infection-control specialists, as well as the general public. It is a well-known fact that in several types of health care activities, various types of hazardous and contagious materials are generated. Even though the consequences of discarding such waste carelessly are well known, it is only recently that adequate initiatives to manage this waste in a scientific manner are being taken in India by the incorporation of Bio medical waste management handling rules, 1998.

Unscientific disposal of health care waste may lead to the transmission of communicable diseases such as gastro-enteric infections, respiratory infections, spreading through air water and direct human contact with the blood and infectious body fluids. These could be responsible for transmission of Hepatitis B, C, E and AIDS within the community. Health care professionals and the general public are at risk due to this. Diseases are spread by improper treatment and disposal of waste. Rag pickers expose themselves to diseases like Hepatitis B, Tetanus, Staphylococci, etc. while handling items like needles, surgical gloves, blood bags etc.

Importance of Bio medical waste Management

Bio medical waste management is of prime importance in the healthcare sector as it has a great potential for various adverse effects on health. Following are some of the effects which directly or indirectly affect the humankind:

1. **Infection**: -The infectious agents can enter in the body through a puncture, abrasion or cut in the skin; through mucous membranes; by inhalation and ingestion. Commonest infections, which can result from mishandling of hospital/health care waste, are gastro enteric through faeces and/or vomit, Respiratory through inhaled secretions; saliva, Ocular infections through eye secretions, Genital infections, Skin infection through pus, meningitis through Cerebrospinal fluid, AIDS through blood and sexual secretions (HIV) and Viral Hepatitis B & C through blood and body fluids (hepatitis B and C viruses).

2.Genotoxicity and Cytotoxicity: - Many cytotoxic drugs are extreme irritant and have harmful local effects after direct contact with skin and eyes. Many neoplastic drugs are carcinogenic and mutagenic; secondary neoplasia is known to be associated with chemotherapy.

3. Chemical toxicity: -Many of chemicals and pharmaceutical drugs used in health care establishments are hazardous (e.g. toxic, genotoxic, corrosive, flammable, reactive, explosive and shock-sensitive). They may cause intoxication by acute or chronic exposure, injuries including burns, poisoning.

4. **Radioactivity hazards**: - The radioactive waste exposure may cause headache, dizziness, vomiting, genotoxicity and tissue damage.

5. **Physical injuries**: - May result from sharps, chemicals and explosive agents.

6. **Public sensitivity**: - The general public is very sensitive about visual impact of the anatomical waste, recognizable body parts including foetuses if handled improperly.

People at Risk

Everyone but housekeeping staff, nurses, Doctors and patients are more prone.
The effects of hospital waste are not only on hospital personnel and patient within the hospital, but also on the human health and environment outside the hospital. Improper Hospital waste management has serious impact on environment. If the disposal of waste is not practiced properly, then the residue in the landfill can pollute the surrounding area in the form of soil and ground water pollution. In case, the recycling of polymers is not done properly, it will release Dioxin and Furan that may cause air pollution. Apart from the air, water and soil pollution, waste management is considered to be serious affair due
to aesthetic effects on public life.

Legal Framework

The following acts and rules are associated with the biomedical waste management. This suggests that the biomedical waste management is not just the concern for hospitals, but it has multifaceted implications. That is why; the Government of India has issued certain rules and guidelines from time to time.

Central legislation

1. The Water (Prevention and Control of Pollution) Act, 1974.

2. The Air (Prevention and Control of Pollution) Act, 1981.

3. The Environment (Protection Act), 1986.

4. The Hazardous wastes (Management and Handling rule), rules1989.

5. The Biomedical wastes (Management and Handling) Rules, 1998.

Biomedical Waste (Management and Handling) Rules, 1998

Keeping in view of inappropriate biomedical waste management, the Ministry of Environment and Forests notified the "Biomedical Waste (management and handling) Rules, 1998" in July 1998.

Categories of Bio-Medical Waste

The rules clearly identified the different categories of the bio medical wastes along with their treatment and disposal method. The table mentioned below shows the categorization of the bio medical waste in ten categories:

Table 1 category of Bio medical waste

CATEGORY	TYPE	TREATMENT & DISPOSAL
Category No. 1	Human Anatomical Waste	Incineration/Deep Burial
Category No. 2	Animal Waste	Incineration/Deep Burial
Category No. 3	Microbiology &	Local Autoclaving/ Microwaving/

	Biotechnology Waste	Incineration
Category No. 4	Waste Sharps	Chemical Disinfection Autoclaving/ Microwaving, Mutilation
Category No. 5	Discarded Medicines and Cytotoxic Shredding Drugs	Shredding Incineration/Destruction and disposal in land fills
Category No. 6	Soiled Waste	Autoclaving/Microwaving/Incineration
Category No. 7	Solid Waste	Chemical Disinfection/Autoclaving/ Microwaving, Mutilation and Shredding
Category No. 8	Liquid Waste	Disinfection by chemical treatment and discharge into the drains
Category No. 9	Incineration Ash	Land fills
Category No. 10	Chemical Waste	Chemical disinfection and discharge into the drains

Guidelines for Colour Coding

As per the schedule II of the Bio Medical Waste Management and handling rules, 1998, the colour coding of bio medical waste is as follows:

Table 2 Colour coding of Bio medical waste

Colour	Container	Categories	Disposal/Treatment

coding

Yellow	Plastic bag Disinfected	Cat1, 2,3&6	Incineration/deep burial
Red	Disinfected container/plastic	Cat 3,6&7	Autoclaving/microwaving/chemical Treatment
Blue	Plastic Bag/Puncture	Cat4&7	Autoclaving/microwaving, chemical treatment
Black	Plastic Bag	Cat5,9,10	According to Municipality norms

Table 3 Schedule of Bio Medical Waste

Schedule 1	Categories of Bio Medical Waste
Schedule 2	Colour Coding & type of container for disposal of Bio Medical Waste
Schedule 3	Label for Bio Medical Waste container/bags
Schedule 4	Label for transport of Bio Medical Waste containers/bags
Schedule 5	Standards for treatment & disposal of Bio Medical Waste
Schedule 6	Schedule for waste treatment facilities like incinerator/Autoclave/Microwave system

Steps of BMW Management:-

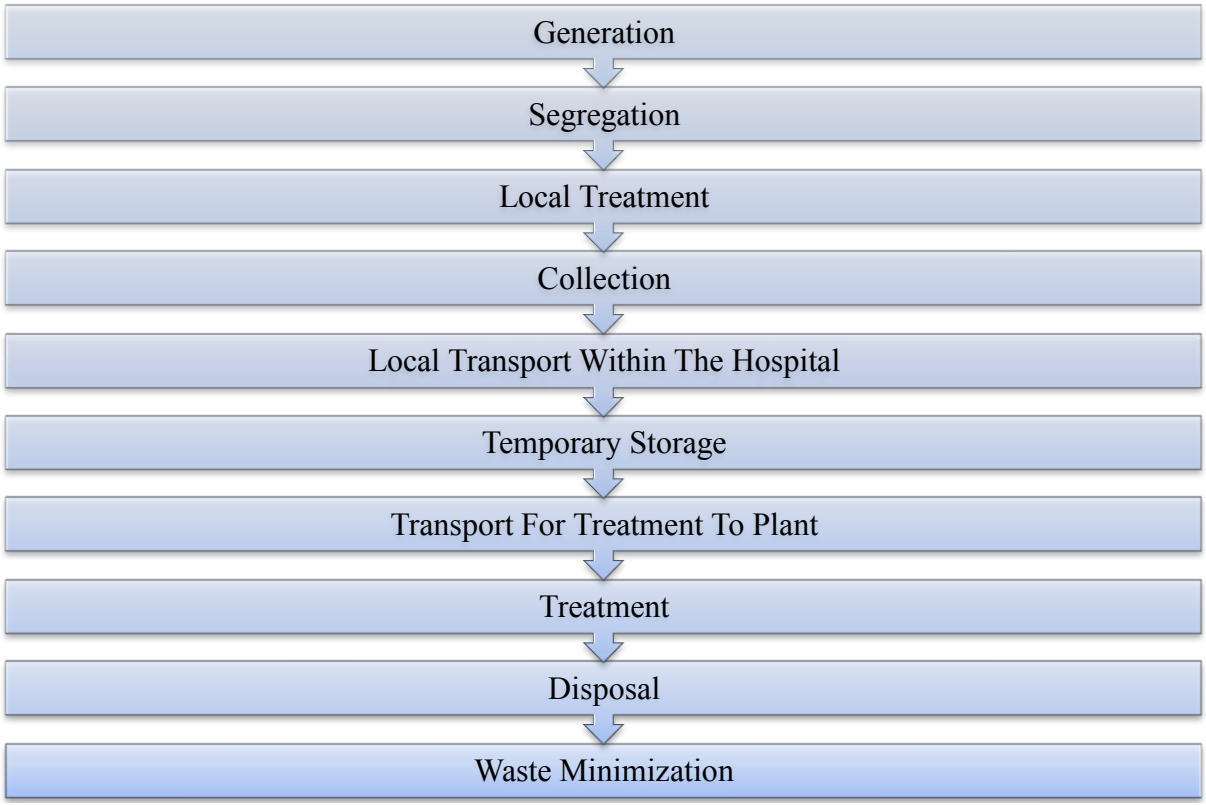


Figure 1 Steps of Bio Medical Waste Management

1.1 Problem statement

Study the Knowledge, Attitude, and practices of bio-medical waste management in hospital.

1.2 Justification of the study

Hospital waste management is a part of hospital hygiene and maintenance activities. In fact only 15% of hospital waste i.e. “Biomedical waste” is hazardous, not the complete. But when hazardous waste is not segregated at the source of generation and mixed with nonhazardous waste, then 100% waste becomes hazardous. Bio medical waste management is of prime

importance in the healthcare sector as it has a great potential for various adverse effects on health. Following are some of the effects which directly or indirectly affect the humankind:

- Nosocomial infections in patients from poor infection control practices and poor waste management.
- Risk of infection outside hospital for waste handlers and at time general public living in the vicinity of hospitals.
- Disposable" being repacked and sold by unscrupulous elements without even being washed.
- Drugs which have been disposed of, being repacked and sold off to unsuspecting buyers.
- Risk of air, water and soil pollution directly due to waste, or due to defective incineration emissions and ash.

Therefore biomedical waste management is important for health care sector ,so this study is carried out to evaluate the existing biomedical waste management practices in a hospital, to find loop holes and to suggest implementable recommendations to manage biomedical waste as per the standards.

1.3 Aim

Study and Evaluate Biomedical Waste Management practices in a 402 bedded multispecialty Hospital of Udaipur.

1.4 Objectives

1. To determine the awareness among Nurses/Housekeeping staff regarding waste management practices.

2. To study the current procedures followed for the segregation, treatment, collection, transportation of Bio-Medical Waste generated by the Hospital.

1.5 Literature Review

Many studies have been done on the Management of Bio medical waste in the hospitals. A brief abstract of some of the studies are described below:

The health care sector includes a diverse range of health care facilities which have a size assortment from large general and specialist hospitals to small municipal dispensaries and D-type centres. All these facilities are an integral part of our society with an endeavour to reduce health problems and to eliminate imminent jeopardy to people's health. In the course of curing health problems the health care sector produce huge amount of bio-medical waste which may be hazardous to all those who come in contact with this waste. Hazardous waste management is a concern for every health care organization.

Health Care Waste in India

In India, there are about 6,00,000 hospital beds, over 23,000 Primary Health Centres, thousands of registered nursing homes, countless unregistered nursing homes and dispensaries, and above all a very large number of quacks practicing at every nook and corner of urban and semi-urban locality. The hospitals are tertiary care hospitals usually associated with teaching colleges, district hospitals (more than 2,000), and health care dispensaries. There are innumerable pathology laboratories, the data of which is hardly available. According to health information statistics 20% of total beds are in rural hospitals while 80% are in urban hospitals. Extrapolating from past figures of number of beds and average quantity of waste generation at the rate of 1 kg per bed per day, it is estimated that about 0.33 million tonnes of hospital waste is being generated per year. In India, with exception to a few large hospitals, most of the smaller hospitals and nursing homes lack any effective system to safely dispose off their waste. Even the Government and municipal hospitals are no better

than the private nursing homes in this regard. Wastes generated during health services provision, the used bandages, syringes, human tissues, used culture media containing microorganisms are dumped in the open bins on the roadsides or low lying area or directed into the water bodies. Thus, an unauthorized reuse of medical wastes by rag pickers is being promoted through irresponsible dumping of these dangerous wastes into open bins and in turn facilitates in spread of many diseases. World Health Organization (WHO) predicted that India is on the verge of having an HIV epidemic. Tuberculosis (TB) and HIV combined together is taking great toll on the human health and life. Hepatitis B and C infections are on the rise .A study conducted by the Central Pollution Control Board (CPCB), an apex pollution monitoring body of Government of India, on incinerators in Delhi Hospitals, concluded that the incinerators were found to spew a high level of deadly residues and toxic emissions such as cancer-causing dioxins and furans besides chemicals which cause neonatal abnormalities, reproductive and skin disorders, endocrine disruption and suppression of the immune system.

P. Hanumantha Rao (June 2008) has conducted study in Andhra Pradesh, Maharashtra and Uttar Pradesh to assess the level of awareness and practices about biomedical waste management. Study reveals that awareness of Bio-medical Waste Management Rules was better among hospital staff in comparison with private medical practitioners and awareness was marginally higher among those in urban areas in comparison with those in rural areas. About 70% of the healthcare facilities used a needle cutter/destroyer for sharps management. Access to Common Waste Management facilities was low at about 35%. Dumping biomedical waste on the roads outside the hospital is still prevalent and access to Common Waste facilities is still limited. Surveillance, monitoring and penal machinery was found to be deficient and these require strengthening to improve compliance with the Bio-medical Waste Management Rules and to safeguard the health of employees, patients and communities.

According to study conducted by **Shalini Sharma(2010)** on Awareness about Bio-Medical Waste Management among Health Care Personnel of Some Important Medical Centres in Agra, the results obtained pointed towards lack of knowledge and awareness towards legislations on bio-medical waste management even among qualified hospital personnel. As a consequence there is inappropriate practice of BMW handling and

management, thus exposing themselves and general public to health and environment hazards.

Another study conducted by **MC Yadavannavar, Aditya S Berad, and PB Jagirdar (2010)** to assess Knowledge Attitude Practices of Biomedical waste management in a Tertiary Health Care Institution in Bijapur, reveals that the teaching staff of the hospital gave more correct responses (97.4%) to questions on BMW management than the nonteaching staff (80%). This difference was statistically significant .Similar differences were observed between teaching and non-teaching staff with respect to attitude and practices regarding BMW management.

According to the study of **Savan Sara Mathew, A. I. Benjamin, Paramita Sengupta(2011)** at tertiary care hospital of Ludhiana, The doctors were observed to be sounder in theoretical knowledge than in the more practical aspects of BMW management. In the case of nurses and paramedical staff the reverse was true, i.e., though their theoretical knowledge lagged behind that of doctors, their practical knowledge regarding BMW management was better. The doctors' attitude towards BMW management is casual, while nurses and paramedical staff are more meticulous and careful.

Another study conducted by **Mohd Shafee, NB Kasturwar, and N Nirupama(2010)** to assess Knowledge, Attitude, Practices among Paramedical Workers, reveals that The nurses were having better knowledge and attitude, and also practiced BMW management better than the housekeeping and technical staff. Regular training of nursing, technical and housekeeping staff should be done and system of monitoring should be evolved. Nursing staff who are correctly practicing BMW management should be involved as role models for others.

1.6 Methodology

Study Design

Cross sectional

Study Area

Pacific Medical College & Hospital, Udaipur

Sample size & Sample Design

All staff working in IPD (Nursing stations), OPD, OT, ICU, Lab.

Study Population

Housekeeping and Nursing staff of the hospital
(Because these two groups mainly involved in handling of Bio Medical Waste management)

Data collection Tools

KAP (Knowledge, Attitude, Practices) Questionnaire for primary data and Bio medical waste records register for secondary data.

Data collection Techniques –

1. Direct observation of various departments generating Bio medical waste.
2. Questionnaire based interview of Nursing and Housekeeping staff.

1.7 BMW findings at various departments of Hospital

1 IPD wards ---

- Bins were not covered with lids.
- Some bins covered with broken lids.
- Nurses do not use PPE (Personal protective Equipment) during segregation of waste.
- Housekeeping staff do not use PPE during segregation of waste.
- Nursing staff aware of waste management but not properly follow.

Male surgical ward

- Waste segregation- not proper
- Yellow coloured bin- general waste was present.
- Bins were not covered with lids.

- Bins were not cleaned properly.
- Hypochlorite solution was not changed every 8 hourly.

Figure 5 Waste Bins were not covered with lids and general waste are present in yellow bin in Nursing station

Figure 6 Hypochlorite solution was not changed according to protocols

Ortho Ward

- Segregation of waste was not proper.
- Yellow bin- contain general waste.
- Blue bin- drip set, disposable plates.
- Bins were not cleaned properly.
- Bins were not covered properly.
- Hypochlorite solution was not changed according to given protocols.

Figure 7 Segregation was not Properly, Blue bin contain drip bottle, bins were not covered.

Gynaecology & Obstetric Ward

- Bins covered with broken lids.
- Segregation of waste was not proper
- Blue bin shows paper and general waste
- Yellow bin contain biscuit packet.

Figure 8 Segregation was not Properly, yellow bin contain biscuit packet ,blue bin have general waste, bins have broken lids.

2. ICU

- Bins were not covered properly.
- ICU staff not use gloves and mask during segregation of wastes.
- Segregation of waste was not proper.
- Bins covered with broken lids.

- Bins were not cleaned properly.
- Sharp waste was present in yellow bin.
- Bins are overfilled with the waste

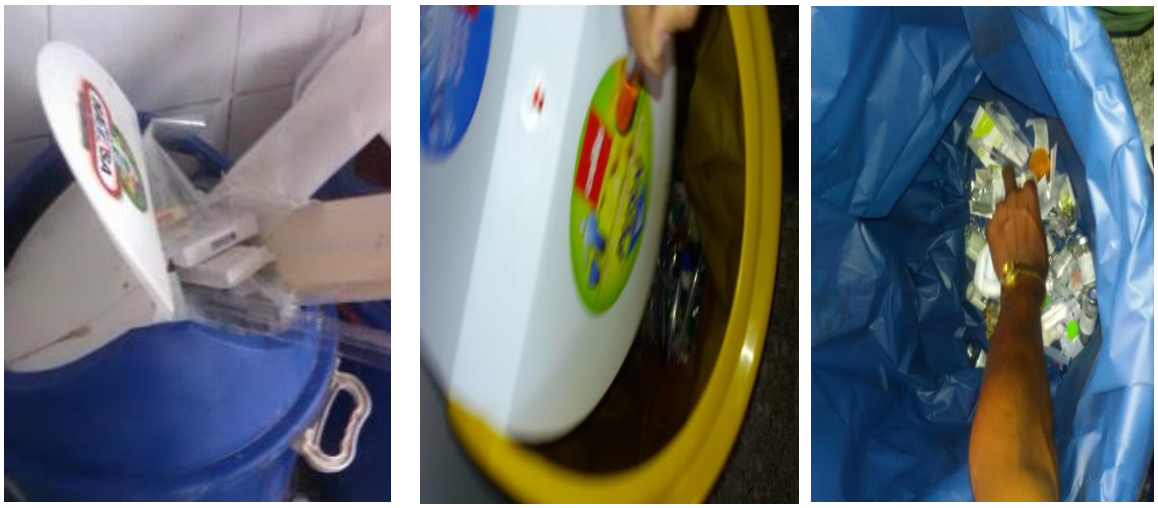


Figure 9 Bins are overfilled with the waste and waste were not segregated properly in ICU & staff did not use PPE.

3. Pre Operative Ward

Figure 10 Waste bins were not covered properly and yellow bin covered with black liner instead of yellow liner,

- Yellow bin covered with black liner
- Bins were covered with broken lids.
- Segregation of waste was not proper.

4. Laboratory

- Bins were overloaded and not cleaned timely.
- Segregation of waste was not followed properly.
    - At collection room, cotton was present in blue bin.
    - General waste was present in red bin.
- In Microbiology lab, yellow bin have broken lid.

  Disposable glasses were present in yellow bin.

Figure 11 In Microbiology lab, yellow bin have broken lid, & disposable glasses were present

5. Out Patient Department

(i) ENT

- Waste bins were not covered.
- Foot operated bins were not available only normal dustbins are used for segregation of waste.
- Waste segregation was not proper.
- Nurse does not use PPE during segregation of waste.

Figure 12 Foot operated bins were not available only normal dustbins are used for segregation of waste

(ii) Dental room

- Bins were not covered, bins were open.
- Foot operated bins were not used.
- Normal dustbins are used for segregation of waste.

Figure 13 Normal dustbins were used for segregation of waste .

(iii) Dressing room

- Bins were not cleaned properly.
- Segregation of waste was not proper, in Red bin, cotton was present, and in blue bin general waste was present.

Figure 13 bins were not cleaned properly nd blue bin contain general waste.

(iv) Vaccination Room

- Waste bins were not covered.
- Normal container was available for sharps rather than sharp waste bin. Resulting chances of splashing is more.
- Hypochlorite solution was not emptying according to protocol.

Figure 14 Normal open container for sharps rather than sharp waste bin

(v) Gynaecology & Obstetric

- Waste bins were not covered.
- Nurse does not use PPE during segregation of waste
- Nursing staff aware of waste management but not properly follow.

Some Other Findings-----

- Housekeeping Staff doing wrong Practice, put general waste in yellow bag.

  Yellow bag- General waste (non infectious waste)
- They were not using Personal Protective Equipments.

Biomedical waste bags were use for civil work

Waste bins present in patient waiting areas were not covered with lids.

Waste bin trolley with biomedical waste kept in hospital premises for long

On the basis of the above observation

Emergency department, & OT were followed the system of segregation and collection of the waste according to protocol.

But various department fall under the category of mismanaged biomedical waste system these include

Male surgical ward

Male medicine ward

Orthopaedic ward

Gyn & Obs ward

ENT OPD

Dental OPD

Dressing room present in OPD

Vaccination room

Microbiology dept. In lab

Pre Operative Ward &

ICU

1.8 Data Analysis

Data were collected on the basis of KAP (Knowledge, Attitude, Practices) questionnaire for Housekeeping and Nursing staff.

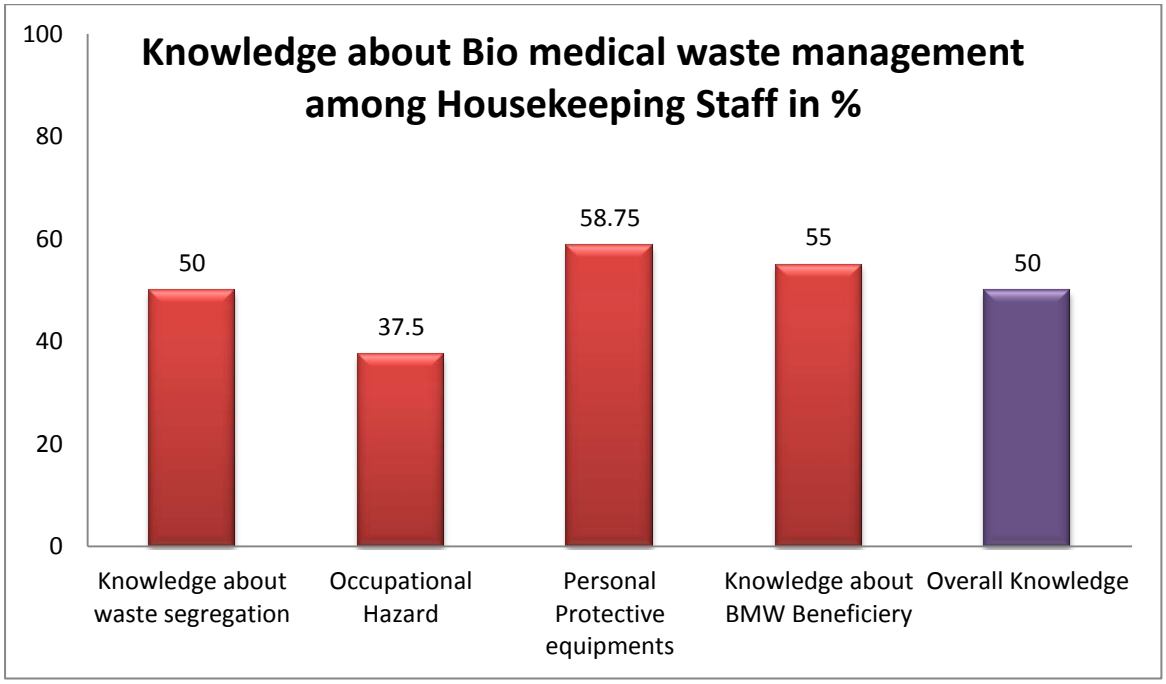
(A) KAP Analysis (Housekeeping Staff)

The knowledge of housekeeping staff was assessed on framing four questions on Bio Medical Waste Management, The attitude and practices towards the biomedical waste handling is measured on the basis of likert scale (1 to 3), five questions were framed to assess attitude and six questions for practices followed.

(i) Knowledge :-

Frequency Table - Table shows frequency of answers of the respondents

Knowledge				
Question→	1	2	3	4
Response↓				
Wrong Ans	40	50	33	44
Right Ans	40	30	47	36



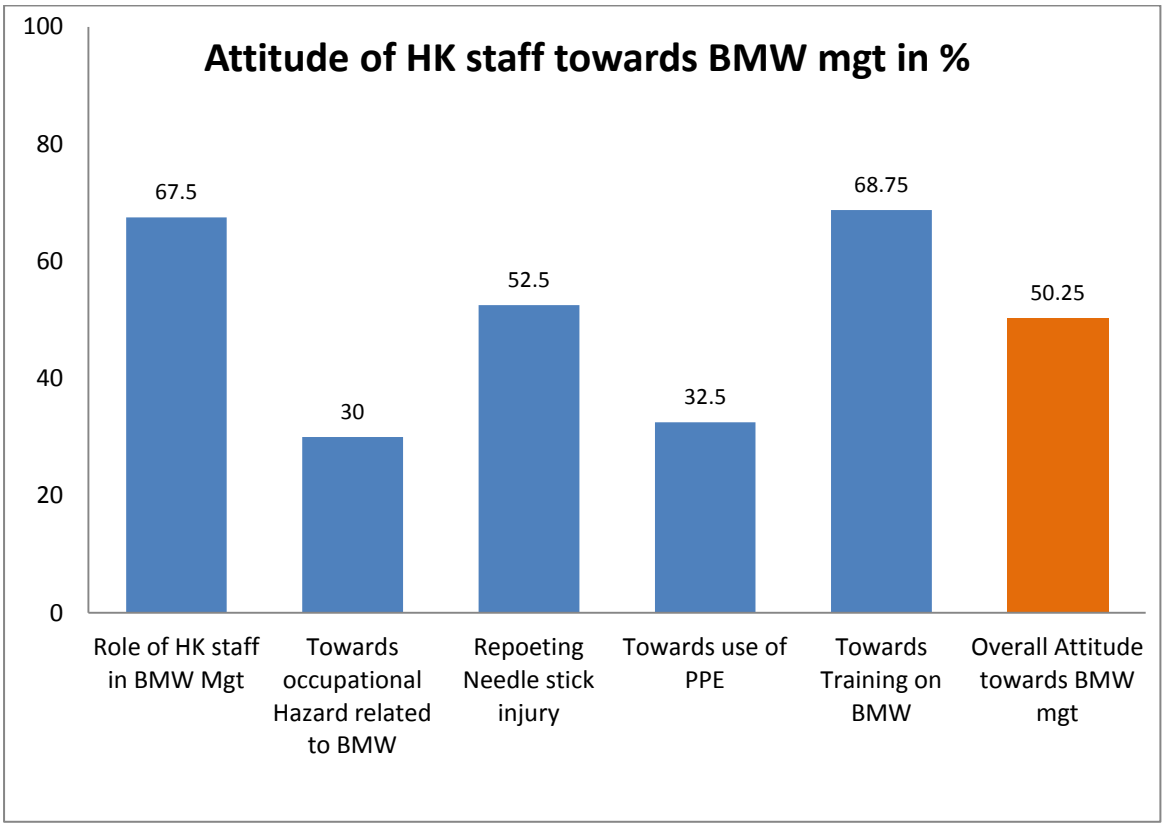
Graph 1 Knowledge about BMW among Housekeeping staff (in %)

The above graph shows that 50 percent of total housekeeping staff has knowledge about bio medical waste management which reflects that the rest of 50% still not have proper knowledge about bio medical waste management. 58.75% housekeeping staff knows that what are the different precautionary measures (PPE) to be used while handling Bio medical waste. Only 55% housekeeping staff know that safe biomedical waste practices are beneficial for patient, hospital staff as well as whole community but 45% housekeeping staff is not well aware that biomedical waste handling is beneficial for whole community, most of them think that its beneficial for only hospital staff. Only 37.5% of the housekeeping staff is aware about the occupational hazards related to biomedical waste handling as housekeeping staff is more vulnerable for needle stick injury, Housekeeping staff to be make more educate related to Bio medical waste management to bring it to 100%.

(ii) Attitude :-

Frequency Table – The table shows frequency of answers of the respondents

Attitude					
Question →	1	2	3	4	5
Response ↓					
Negative Attitude	8	33	13	25	12
Neutral Attitude	18	23	25	29	13
Positive Attitude	54	24	42	26	55



Graph 2 Attitude of housekeeping staff towards BMW Mgt (in %)

The above graph shows the attitude of housekeeping staff for biomedical waste management. The attitude was measured on likert scale, "1" is for Negative Attitude "2" is for Neutral, and "3" Positive Attitude. The findings were depicted in graph is in percentage form and categorised as below for Positive Attitude. The findings were depicted in graph is in percentage form and categorised as below-

Table 4 Likert scale to assess attitude of housekeeping staff

Likert scale	In form of %	Attitude
1	Upto 33.33	Negative
2	33.33% to 66.66%	Neutral
3	More than 66.66%	Positive

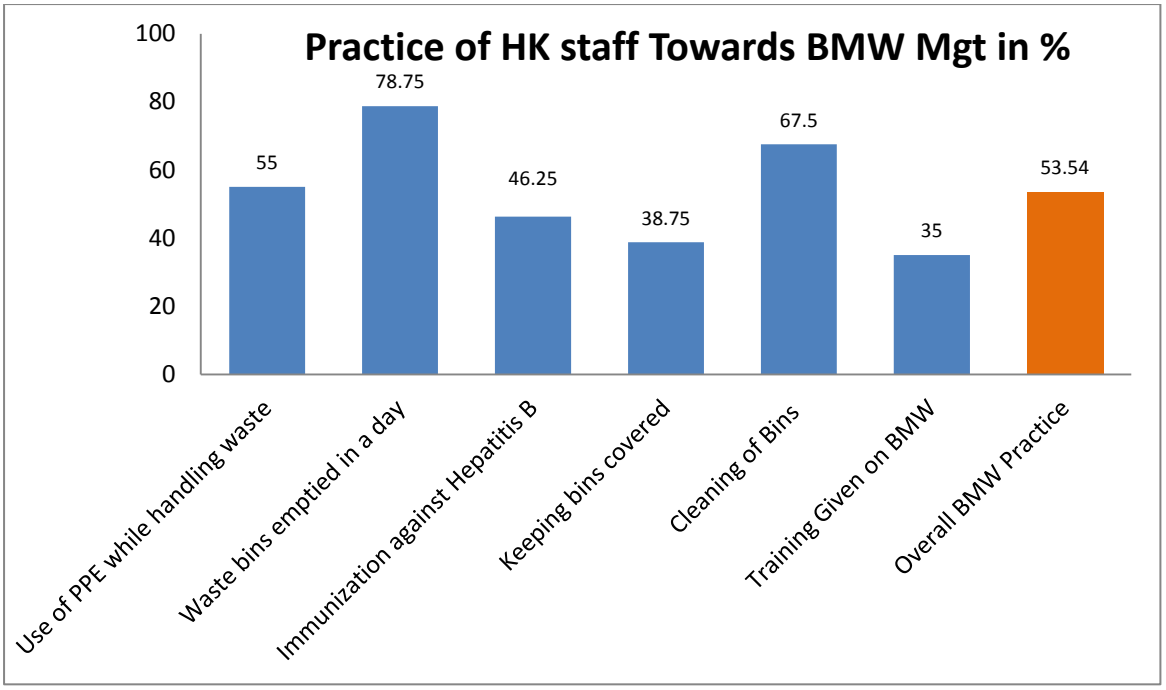
Overall attitude of Housekeeping staff is 50.25% towards Bio medical waste Management, i.e. towards "neutral" attitude; there is 49.75% lack of attitude among staff towards BMW handling. Attitude of housekeeping staff towards their role in BMW management is "positive" i.e. 67.5%, still 32.5% attitude is lacking. Staffs think that their role in biomedical waste management is less important. Housekeeping staff have "negative" attitude (30%) towards occupational hazard related to biomedical waste, which is dangerous. Towards the reporting needle stick injury, housekeeping staff have neutral attitude 52.5% but 47.5% attitude is lacking in reporting to infection control nurse if they get needle stick injury because they don't think that it can be life threatening for them.

Housekeeping staff have "negative" attitude for the use of PPE while handling waste (32.5%). The attitude towards the training on biomedical waste management is "positive" among housekeeping staff, staff thinks that training given is really helpful for them.

(iii) **Practices** :-

Frequency Table- Table shows frequency of answers of the respondents.

Practices						
Question →	1	2	3	4	5	6
Response ↓						
Poor Practice	21	5	22	34	10	35
Average	15	12	21	15	16	17
Good Practice	44	63	37	31	54	28



Graph 3 Practices of housekeeping staff towards BMW Mgt (in %)

The above graph shows the practices of Housekeeping staff towards bio medical waste Management. The attitude was measured on likert scale, "1" is for Poor practice "2" is for Average, and "3" for good practice. The findings were depicted in graph is in percentage form and categorised as below-

Table 5 Likert Scale to assess practices of Housekeeping staff

Likert scale	In form of %	Practices
1	Upto 33.33	Poor
2	33.33% to 66.66%	Average
3	More than 66.66%	Good

Overall practices of Housekeeping staff is "average" (53.54%) towards Bio medical waste Management, but proper training and monitoring is required for good practices. practices of housekeeping staff towards the use of PPE while handling waste is "average". Practice for emptying waste bins is quite "good" (78.75%). Practice for covering the waste bins is

"average" (38.75%). Practice for cleaning the waste bins is "good" (67.5%). Where Practice for immunization against hepatitis B is "average" (46.25%) it should be more than average.

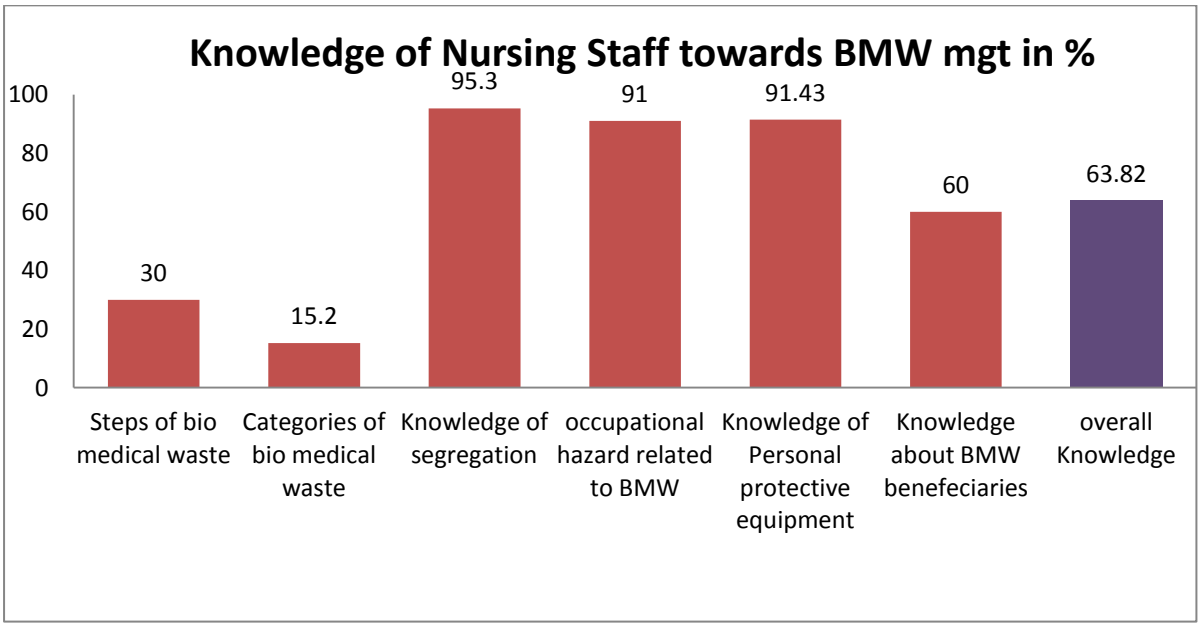
(B) KAP Analysis :- (Nursing Staff)

The knowledge of nursing staff was assessed on framing six questions on Bio Medical Waste Management, The attitude and practices towards the biomedical waste handling is measured on the basis of likert scale (1 to 3), six questions were framed to assess attitude and seven questions for practices followed.

(1) Knowledge :-

Frequency table- Table shows the frequency of answers of the respondents.

Knowledge						
Question→	1	2	3	4	5	6
Response↓						
Wrong Ans	175	212	12	22	21	100
Right Ans	75	38	238	228	229	150



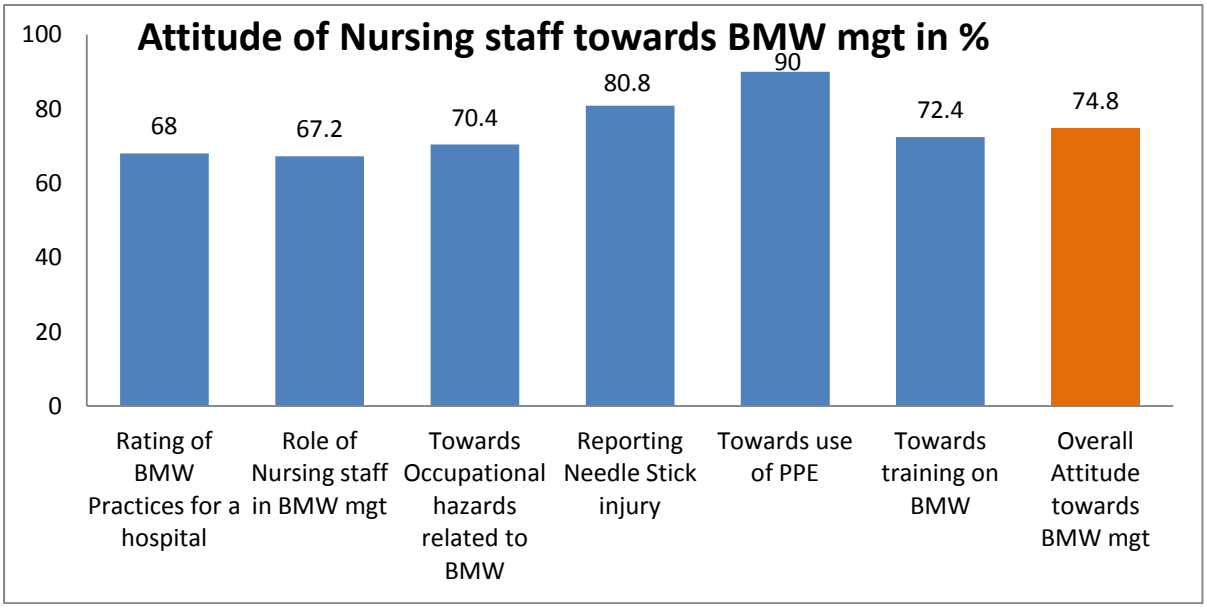
Graph 4 Knowledge about BMW among nursing staff

The above graph shows that 63.82% Nursing staff have overall knowledge on Bio medical waste management, which reflects that the rest of 36.18% staff still not have proper knowledge about bio medical waste management. Nursing staff have very less knowledge of steps of bio medical waste and ten categories of BMW but they have very good knowledge about waste segregation, use of PPE & occupational hazard related to BMW. Only 60% nursing staff knows about who all are the beneficiaries from safe biomedical waste practices

(iv) Attitude :

Frequency Table- The shows frequency of answers of the respondents

Attitude						
Question →	1	2	3	4	5	6
Response ↓						
Negative Attitude	34	43	20	12	6	20
Neutral Attitude	46	39	54	36	19	49
Positive Attitude	170	168	176	202	225	181



Graph 5 Attitude of nursing staff towards BMW Mgt (in %)

The above graph shows the attitude of nursing staff for biomedical waste management. The attitude was measured on likert scale, "1" is for Negative Attitude "2" is for Neutral, and "3" for Positive Attitude. The findings were depicted in graph is in percentage form and categorised as below-

Table 6 Likert Scale to assess attitude of Nursing Staff

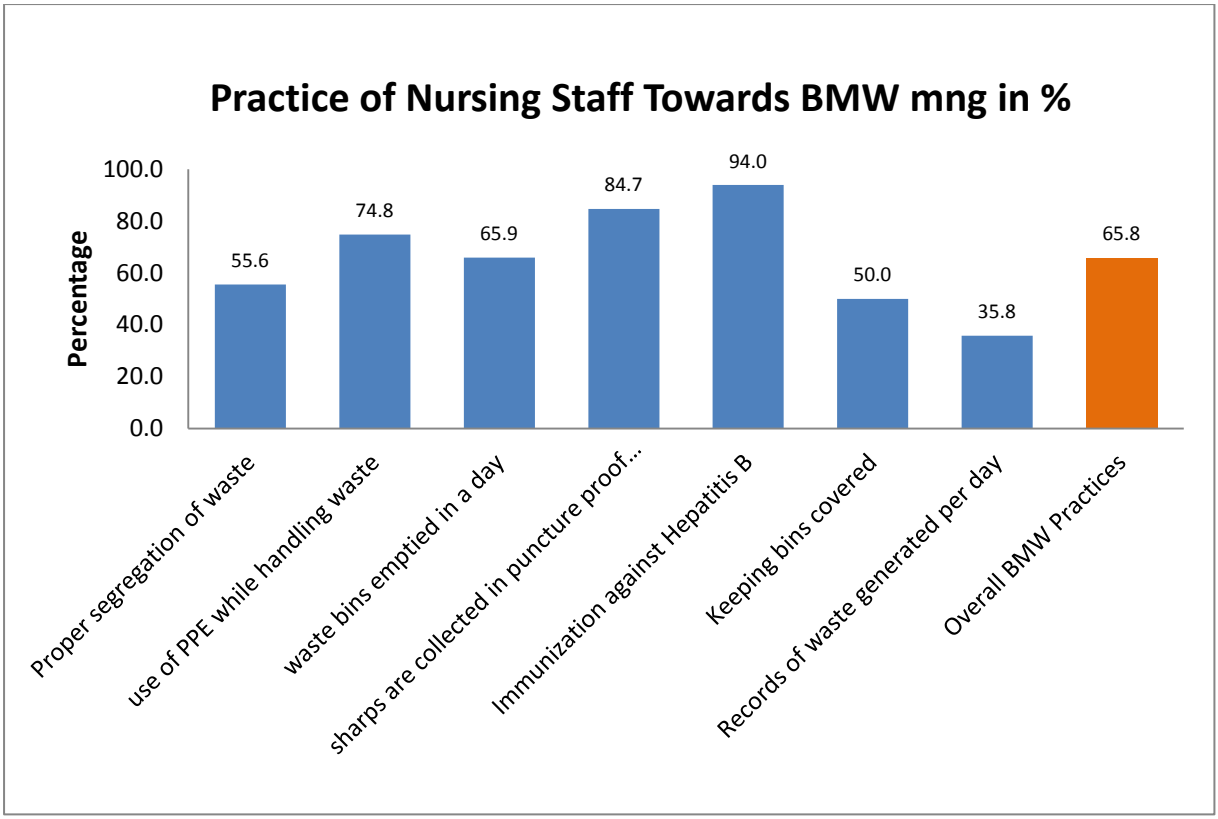
Likert scale	In form of %	Attitude
1	Upto 33.33	Negative
2	33.33% to 66.66%	Neutral
3	More than 66.66%	Positive

Overall attitude of nursing staff is 74.8 % towards Bio medical waste Management, i.e. positive attitude. Attitude of nursing staff towards Occupational hazards, towards reporting needle stick injury, towards use of PPE, and training given on BMW is very positive. Nursing staff have positive attitude (67.2%) towards Role of nursing staff in BMW management, but it should be 100%. Towards Rating of BMW practices for a hospital, nursing staff have positive attitude 68% but still 29.6% is lacking towards occupational hazards related to bio medical waste and 19.2% attitude is lacking in reporting to infection control nurse if they get needle stick injury because they don't think that it can be life threatening for them.

Practices –

Frequency Table- Table shows the frequency answers of the respondents.

Practices							
Question →	1	2	3	4	5	6	7
Response ↓							
Poor Practice	42	21	21	5	3	47	71
Average	69	42	65	34	12	78	90
Good Practice	139	187	164	211	235	125	89



Graph 6 Practices of nursing staff toward BMW Mgt (in %)

As above graph shows the practices of Nursing staff towards bio medical waste Management . The practices was measured on likert scale, "1" is for Poor practice "2" is for Average, and "3" for good practice. The findings were depicted in graph is in percentage form and categorised as below-

Table 7 Likert scale to assess practices of Nursing staff

Likert scale	In form of %	Practice
1	Upto 33.33	Poor
2	33.33% to 66.66%	Average
3	More than 66.66%	Good

Overall practices of Nursing staff is Average (65.8%) towards Bio medical waste Management. The practices towards use of PPE, sharp collection in puncture proof container, and immunization against Hepatitis B are "good". Practice of emptying bins in a day, Keeping bins covered and waste segregation is "average" and they not keeping records of waste generated per day.

Recommendations

On the basis of study findings, following recommendations are suggested –

1. **Periodic Training on Bio medical waste management** –

   The periodic training is the effective method to enhance the knowledge, to develop positive attitude and to ensure right practices regarding bio medical waste management.

   - Waste segregation is the key step of BMW management. So all staff should be trained on proper segregation of BMW.
   - As the BMW is most hazardous, the staff should be well trained about use of PPE while handling the bio medical waste.
   - Training on occupational hazards related bio medical waste must be given to aware the staff.
   - This training should preferably be carried out in the local language for housekeeping staff.
   - The induction training should also be given to the new staff of nursing or housekeeping staff on BMW management.

   The effectiveness of these training should be evaluated by post training examination of the staff.

2. **Monitoring** –

   The effective monitoring system should be established by hospital management to ensure the safe practice of bio medical waste management.

   The infection control nurse should take two rounds in a day to monitor the proper segregation of waste in all the departments.

   The use of PPE while handling the BMW should be monitored by respective department head.

3. **Increase motivation** –

   One of the housekeeping boys should be chosen every week and shall be asked to address his colleagues about the BMW management. This activity will encourage them the quality of leadership and responsibility for their job.

4. Colored dustbins corresponding to the color of the polythene bags must be used to avoid any confusion.

5. Weekly, the inventory for the bags should be checked to check any shortage so that the hospital doesn't run out of poly bags stock.
6. Special instructions must be given for blue bags to gently put them into containers and not throw them as they contain glasses, which can tear the bags.
7. Regarding transportation of waste
    - Transportation trolley should not be overloaded
    - Transportation trolley should be properly covered
    - The trolleys have to be cleaned daily.
    - The trolley should not keep in a long period in hospital premises as the waste is more hazardous.

Conclusion

In the course of curing health problems the health care sector produce huge amount of bio-medical waste which may be hazardous to all those who come in contact with this waste. The hospital staffs deals with bio medical waste on daily basis, is more vulnerable for occupational hazards related to bio medical waste. Therefore the hospital staff should have sound knowledge, a positive attitude and good practices to ensure safety regarding biomedical waste handling.

This study carried out at a 402 bedded hospital to assess the knowledge, attitude and practices of nursing and housekeeping staff. The study reveals that 50% of housekeeping staffs have knowledge about biomedical waste management with compares to nursing staff (64%). The attitude is more positive and practices are well followed by nursing staff with compare to housekeeping staff.

Training to the housekeeping and nursing staff should be given periodically so the knowledge about biomedical waste management will improve among the staffs. The effectiveness of these training should be evaluated by post training examination of the staff. Attitude toward the handling of biomedical waste management can be improved by the support of management and commitment of all hospital staff for safe handling of bio medical waste. Practices can be improved by proper monitoring of bio medical waste management. Regular audits and meeting should be carried out for find out the loopholes in biomedical waste management and come out with strategic plan to ensure safe handling of biomedical waste.

The safe handling of biomedical waste ensures the safety of hospital staff, community as well as safe environment.

References

1. **Kamalakanta Muduli,Akhilesh Barve**(August 2012), "Challenges to Waste Management Practices in Indian Health Care Sector", IPCBEE vol.32, *p63.*
2. Policy frame work, march 2007. "Infection Management and Environment Plan." Ministry of Health and Family Welfare,(Government of India), chp. 2-4.
3. **P Hanumantha Rao**(June2008), "Hospital waste management--awareness and practices: a study of three states in India."[PubMed]
4. **Shalini Sharma**(August 2010), "Awareness about Bio-Medical Waste Management among Health Care Personnel of Some Important Medical Centers in Agra", International Journal of Environmental Science and Development, Vol. 1, No. 3
5. **MC Yadavannavar, Aditya S Berad, and PB Jagirdar** (January 2010), "Biomedical Waste Management: A Study of Knowledge, Attitude, and Practices in a Tertiary Health Care Institution in Bijapur", Indian J Community Med. 2010 January; 35(1): 170–171.
6. **Savan Sara Mathew ; A. I. Benjamin ; Paramita Sengupta**(2011), "Assessment of biomedical waste management practices in a tertiary care teaching hospital in Ludhiana" Healthline Vol.2,*p*28-30
7. **Mohd Shafee, NB Kasturwar, and N Nirupama**(April,2010), "Study of Knowledge, Attitude and Practices Regarding Biomedical Waste among Paramedical Workers", Indian J Community Med. *p369*–370.
8. Biomedical Waste (Management and Handling) Rules 1998, Ministry of Environment and Forests Notification, New Delhi.
9. Kedar Rijal I and Ashok Deshpande. Critical Evaluation of Biomedical Wastes Management Practices in Kathmandu Valley. Proceedings of the International Conference on Sustainable Solid Waste Management 5 - 7 September2007, Chennai, India. pp.
10. Sharma Shalini, Chauhan SVS. Assessment of bio medica waste management in three apex Government hospitals of Agra. Journal of Environmental Biology March2008;29: 159-62.

11. Das SK, Sushant P, Jayaram K : A TQM approach to implementation of handling and management of hospital waste in Tata Main Hospital; Issued by Hospital Waste Management Committee, T.M.H. 2001; 11 – 12 (1 – 2) : 75 –78.

12. Hem Chandra : Hospital Waste – An environmental hazard and its management. Newsletter ISEB 1999.

13. Gupta S, Boojh R, Mishra A, Chandra H : Rules and Management of Bio-Medical Waste at Vivekananda Polyclinic : a case study. Waste Management, February 2009;29 (2) : 812 – 819.

14. . Saini S, Nagarajan SS, Sarma RK: Knowledge, Attitude and Practices of Biomedical Waste Management Amongst Staff of a Tertiary Level Hospital in India. Journal of the Academy of Hospital Administration, 2005; 17 (2) : 1 – 12.

15. Acharya DB, Meeta S, (2000) Hospital Waste Management. Minerva Press, New Delhi 2000,pp15,47.

Annexure

1. **Questionnaire for housekeeping staff-**

Study and Evaluation of Bio Medical Waste Management Practice in a Hospital

Questionnaire for Housekeeping staff

Name.....Age..... Sex.....

Department..... Designation.....

Hospital.....

Knowledge-

Please answer the following questions –

1. Which of the following is right combination for waste segregation ?

a) Yellow- Human Anatomical waste

b)Red- Sharp waste

c) Blue- general waste

d) Black- Infected waste

2. Which of the following is Occupational hazard related to Biomedical waste ?

a) Headache

b) Pneumoconiosis

c) Needle stick injury

3. What are the PPE should be used while handling the waste?

1. .....

2. .....

3. .....

4. .....

4. Who will be more benefitted by safe Bio medical practice?

a) Community

b) Hospital staff

c) Patient

d) No one

e) All

Attitude-

5. How important your role in Bio medical waste management?

a) Not Important

b) Less Important

c) Most Important

6. How will you rate Occupational hazards related to Bio medical waste?

a) Not dangerous

b) Less dangerous

c) Most dangerous

7. Will you report, if you get needle stick injury?

a) Never

b) Sometimes

c) Always

8. Do you think while handling waste, use of PPE is always necessary?

a) No

b) Partial

c) Yes

9. Do you think training given on Bio medical waste is really helpful?

a) No

b) Somewhat

c) Yes

Practice-

10. Do you wear all PPE while handling waste?

a) Never

b) Sometimes

c) Always

11. How often waste bins emptied in a day?

a) Not emptied in a day

b) Once in a day

c) Twice in a day

12. Are you immunized against Tetanus and Hepatitis B vaccines?

a) Completely Immunized (All 3 doses)

b) Partially Immunized (1 or 2 doses)

c) None

13. Do you keep waste bins covered with lid?

a) Never

b) Sometimes

c) Always

14.How often you clean the bins?

a) Daily

b) Weekly

c) Monthly

15. Do you get any training on Bio medical waste management?

a) No

b) Sometimes

c) Yes

2. Questionnaires for nursing staff –

Study and Evaluation of BioMedical Waste Management in a Hospital

Questionnaire for Nurses

Name.....Age..... Sex.....

Department.....Designation.....

Hospital.....

Please answer the following questions -

1.Arrange the following steps of Biomedical waste in proper sequence ?

a)Generation,segregation,collection,transportation,storage,treatment,disposal.

b)Generation,segregation, collection, storage, transportation, treatment, disposal.

c)Generation, segregation, transportation, collection, storage, treatment, disposal.

2. Do you know different categories of Biomedical waste (Name any five) ?

a) Yes

b) No

c) partial

If yes- 1. ..... 2. .....

3. ..... 4. .....

5. .....

3. Which of the following is right combination for waste segregation ?

a) Blue- general waste

b)Red- Infected waste

c) Yellow- Human Anatomical waste

d) Black- Sharp waste

4. Which of the following is Occupational hazard related to Biomedical waste ?

a) Headache

b) Pneumoconiosis

c) Needle stick injury

5. What are the PPE should be used while handling the waste?(Name any Four)

1. .....
2. .....
3. .....
4. .....

6. How will you rate Biomedical waste practices for a hospital ?

a) Not Good

b) Good

c) Very Good

7. How important your role in Biomedical waste management?

a) Not crucial

b) Less crucial

c) Most crucial

8. How will you rate Occupational hazards related to Biomedical waste ?

a) Not dangerous

b) Less dangerous

c) Most dangerous

9. Will you report, if you get needle stick injury ?

a) Never

b) Sometimes

c) Always

10. Do you think while handling waste, use of PPE is necessary ?

a) Never

b) Sometimes

c) Always

11. Do you think training given on Biomedical waste is really helpful ?

a) Yes

b) No

c) Somewhat

12. Who will be more benefitted by safe Biomedical practice?

a) Community

b) Hospital staff

c) Patient

d) No one

e) All

13. Do you follow proper segregation of waste ?

a) Never

b) Sometimes

c) Always

14. Do you wear PPE while handling waste ?

a) Never

b) Sometimes

c) Always

15. How often waste bin emptied in a day ?

a) Once

b) Twice

c) More than twice

16. Sharps are collected in a puncture proof container ?

a) Never

b) Sometimes

c) Always

17. Are you immunized against Tetanus and Hepatitis B vaccines ?

a) Not Immunized

b) Partially Immunized (1or 2 Doses)

c) Completely Immunized (All three Doses)

18. Do you keep waste bins covered with lid ?

a) Never

b) Sometimes

c) Always

19. Do you keep record of waste generated per day ?

a) No

b) Partially

c) Yes

3. Data Entry Sheets –

(A) For Housekeeping staff

i. Knowledge

Coding	
1	Wrong Answer
2	Right Answer

	Question 1	Question 2	Question 3	Question4
Respondent 1	1	1	1	1
Respondent 2	2	1	2	1
Respondent 3	1	1	2	1
Respondent 4	1	1	1	1
Respondent 5	1	2	2	1
Respondent 6	2	2	2	2
Respondent 7	1	1	1	1
Respondent 8	2	2	2	2
Respondent 9	2	2	2	2
Respondent 10	2	2	2	2
Respondent 11	2	1	2	1
Respondent 12	1	1	1	1
Respondent 13	2	2	2	1
Respondent 14	1	1	1	1
Respondent 15	1	1	1	1
Respondent 16	2	2	2	2
Respondent 17	1	1	1	1
Respondent 18	2	1	2	2
Respondent 19	2	1	2	2
Respondent 20	1	1	1	1
Respondent 21	1	1	1	1
Respondent 22	1	1	1	1
Respondent 23	1	1	2	1
Respondent 24	1	1	2	1
Respondent 25	1	1	2	1
Respondent 26	1	1	2	1
Respondent 27	2	2	1	1
Respondent 28	2	2	2	2
Respondent 29	2	2	2	2
Respondent 30	2	1	2	2
Respondent 31	2	1	2	2
Respondent 32	2	2	2	2
Respondent 33	2	1	2	2
Respondent 34	2	2	2	1
Respondent 35	2	2	2	1
Respondent 36	2	2	2	1
Respondent 37	1	1	1	1
Respondent 38	1	1	1	2
Respondent 39	2	2	2	2
Respondent 40	1	1	1	1
Respondent 41	2	2	2	2
Respondent 42	2	2	2	2
Respondent 43	1	1	1	1
Respondent 44	2	2	2	2
Respondent 45	2	2	2	2
Respondent 46	1	1	1	1
Respondent 47	1	1	1	1
Respondent 48	1	1	1	1
Respondent 49	1	1	1	1
Respondent 50	2	2	2	2
Respondent 51	2	2	2	2
Respondent 52	2	2	2	2
Respondent 53	2	2	2	2
Respondent 54	2	1	2	2
Respondent 55	2	1	2	1
Respondent 56	1	1	1	1
Respondent 57	1	1	1	1
Respondent 58	1	1	1	1
Respondent 59	1	1	1	2
Respondent 60	2	2	2	2
Respondent 61	1	1	1	1
Respondent 62	2	2	2	2
Respondent 63	2	2	2	2
Respondent 64	1	1	1	1
Respondent 65	1	1	1	1

Respondent 66	1	1	1	1
Respondent 67	1	1	1	1
Respondent 68	2	2	2	2
Respondent 69	2	2	2	2
Respondent 70	2	2	2	2
Respondent 71	1	1	1	1
Respondent 72	1	1	1	2
Respondent 73	2	1	2	2
Respondent 74	1	1	1	1
Respondent 75	1	1	1	1
Respondent 76	1	1	2	1
Respondent 77	1	1	1	1
Respondent 78	2	1	2	2
Respondent 79	2	2	2	2
Respondent 80	2	2	2	2
Total Right Answer	41	30	47	36
Right ans in %	50%	37.50%	58.75%	45%

ii. Attitude

Coding	
1	**Negative Attitude**
2	**Neutral**
3	**Positive Attitude**

	Question 1	Question 2	Question 3	Question4	Question 5
Respondent 1	3	1	2	3	3
Respondent 2	3	3	3	2	1
Respondent 3	1	3	3	2	3
Respondent 4	3	1	2	3	1
Respondent 5	3	3	1	3	3
Respondent 6	3	3	2	2	3
Respondent 7	1	3	3	3	3
Respondent 8	2	2	2	1	1
Respondent 9	3	3	3	3	3
Respondent 10	3	2	3	2	1
Respondent 11	3	3	2	3	3
Respondent 12	3	1	1	3	1
Respondent 13	3	3	2	1	3
Respondent 14	3	3	3	3	3
Respondent 15	3	1	1	1	2
Respondent 16	1	1	3	2	3
Respondent 17	3	3	3	3	3
Respondent 18	1	2	2	3	3
Respondent 19	3	2	2	2	3
Respondent 20	3	2	1	3	3
Respondent 21	2	1	3	1	2
Respondent 22	2	2	2	3	3
Respondent 23	2	1	3	3	3
Respondent 24	3	3	3	1	2
Respondent 25	1	3	3	2	3
Respondent 26	3	1	1	3	3
Respondent 27	3	2	3	2	2
Respondent 28	3	1	3	3	3
Respondent 29	3	2	3	3	3
Respondent 30	3	1	3	1	1
Respondent 31	1	2	2	2	3
Respondent 32	3	1	3	1	2
Respondent 33	3	2	2	2	3
Respondent 34	3	3	3	1	3
Respondent 35	3	3	3	2	3
Respondent 36	3	2	1	1	1
Respondent 37	1	1	3	3	3
Respondent 38	3	1	3	2	3
Respondent 39	2	2	2	1	1
Respondent 40	2	1	1	2	3
Respondent 41	3	1	2	1	2
Respondent 42	3	1	3	2	3
Respondent 43	3	3	3	1	3
Respondent 44	3	1	1	2	3
Respondent 45	3	3	3	1	3

Respondent 46	3	2	3	1	2
Respondent 47	3	1	3	1	3
Respondent 48	2	3	2	3	3
Respondent 49	2	2	3	3	1
Respondent 50	3	1	2	2	2
Respondent 51	3	2	3	2	3
Respondent 52	2	1	3	3	2
Respondent 53	3	2	3	1	3
Respondent 54	2	3	2	2	2
Respondent 55	3	3	3	3	3
Respondent 56	3	3	2	2	3
Respondent 57	2	1	3	3	3
Respondent 58	3	2	3	2	2
Respondent 59	3	1	3	2	3
Respondent 60	3	2	2	1	3
Respondent 61	2	1	3	1	2
Respondent 62	2	1	2	1	3
Respondent 63	2	1	3	2	1
Respondent 64	3	3	2	3	3
Respondent 65	2	1	3	2	3
Respondent 66	3	2	2	1	3
Respondent 67	3	1	3	2	3
Respondent 68	1	3	2	1	1
Respondent 69	3	1	3	3	3
Respondent 70	2	2	2	2	3
Respondent 71	2	1	1	1	3
Respondent 72	3	1	3	1	3
Respondent 73	3	3	1	2	3
Respondent 74	3	1	3	3	3
Respondent 75	3	2	1	2	2
Respondent 76	3	1	2	2	3
Respondent 77	1	1	2	3	3
Respondent 78	3	2	1	1	3
Respondent 79	2	3	1	2	1
Respondent 80	3	2	3	1	3
(Total) 1	8	33	13	25	12
(Total) 2	18	23	25	29	13
(Total) 3	54	24	42	26	55

iii. Practices

Coding	
1	Negative Practice
2	Neutral
3	Positive Practice

	Question 1	Question 2	Question 3	Question4	Question 5	Question6
Respondent 1	1	3	1	3	1	3
Respondent 2	1	2	2	3	2	1
Respondent 3	3	3	3	2	3	3
Respondent 4	3	3	2	3	3	1
Respondent 5	3	3	3	1	3	2
Respondent 6	2	3	1	1	3	3
Respondent 7	3	2	1	3	2	2
Respondent 8	1	3	3	2	3	3
Respondent 9	1	2	3	1	1	3
Respondent 10	3	3	2	3	3	3
Respondent 11	3	3	3	1	3	2
Respondent 12	3	3	2	2	3	3
Respondent 13	2	3	3	1	2	3
Respondent 14	3	3	3	1	3	1
Respondent 15	3	3	2	2	3	2
Respondent 16	2	3	3	1	2	1
Respondent 17	3	2	1	3	3	3
Respondent 18	3	3	3	2	3	3
Respondent 19	2	1	2	1	3	2
Respondent 20	3	3	1	1	2	2
Respondent 21	3	3	3	2	1	2
Respondent 22	3	3	3	1	3	3
Respondent 23	3	3	2	3	3	2

Respondent 24	3	3	3	1	2	1
Respondent 25	2	2	1	2	3	1
Respondent 26	3	3	3	3	3	2
Respondent 27	2	3	1	1	2	1
Respondent 28	3	3	2	2	3	2
Respondent 29	3	3	1	3	3	3
Respondent 30	1	3	3	1	1	2
Respondent 31	3	3	1	2	3	3
Respondent 32	1	3	1	2	2	2
Respondent 33	1	3	1	1	3	1
Respondent 34	2	3	3	1	3	1
Respondent 35	3	3	3	3	3	2
Respondent 36	3	3	3	1	2	3
Respondent 37	3	2	2	3	1	2
Respondent 38	3	3	3	2	1	1
Respondent 39	1	3	2	1	3	1
Respondent 40	3	3	3	3	2	2
Respondent 41	3	3	3	3	3	3
Respondent 42	3	2	3	1	3	1
Respondent 43	1	3	1	3	1	2
Respondent 44	2	2	2	1	3	1
Respondent 45	2	3	1	3	1	1
Respondent 46	3	3	1	1	1	1
Respondent 47	1	3	3	3	3	3
Respondent 48	3	3	2	1	3	1
Respondent 49	1	3	1	2	3	3
Respondent 50	3	2	3	3	2	1
Respondent 51	1	3	2	3	3	1
Respondent 52	3	3	1	3	3	1
Respondent 53	3	3	3	3	2	3
Respondent 54	1	3	2	1	3	1
Respondent 55	3	3	1	3	2	3
Respondent 56	3	3	3	3	3	1
Respondent 57	1	3	2	1	1	1
Respondent 58	2	3	1	3	3	1
Respondent 59	2	3	3	3	2	3
Respondent 60	3	3	2	1	3	3
Respondent 61	3	1	3	1	3	1
Respondent 62	1	3	1	3	1	1
Respondent 63	1	3	3	1	3	1
Respondent 64	1	1	2	3	3	3
Respondent 65	3	3	3	1	3	1
Respondent 66	1	3	1	1	3	3
Respondent 67	2	3	3	1	3	2
Respondent 68	3	1	2	3	3	3
Respondent 69	3	3	1	2	3	3
Respondent 70	2	1	3	1	3	1
Respondent 71	3	3	2	3	3	3
Respondent 72	2	3	1	1	3	1
Respondent 73	1	3	3	2	3	3
Respondent 74	3	2	3	1	3	1
Respondent 75	1	3	2	1	3	1
Respondent 76	3	2	3	3	3	1
Respondent 77	1	3	3	1	2	1
Respondent 78	3	3	3	3	3	1
Respondent 79	2	2	2	1	2	1
Respondent 80	3	3	3	3	3	1
1	21	5	22	34	10	35
2	15	12	21	15	16	17
3	44	63	37	31	54	28

(B) For Nursing staff

i. Knowledge

		Coding				
		1	Wrong Answer			
		2	Right Answer			
	Question 1	1	Question 3	Question4	Question5	Question6
Respondent 1	1	1	1	1	2	2
Respondent 2	1	1	2	2	2	2
Respondent 3	1	1	2	2	2	1
Respondent 4	1	1	1	1	2	2
Respondent 5	1	1	2	2	2	1
Respondent 6	1	1	2	1	2	2
Respondent 7	1	1	1	2	2	2
Respondent 8	1	1	2	1	2	2
Respondent 9	1	1	2	2	2	1
Respondent 10	1	1	2	1	2	2
Respondent 11	1	1	2	2	2	1
Respondent 12	1	1	2	1	2	2
Respondent 13	1	1	2	2	2	2
Respondent 14	1	1	2	1	2	1
Respondent 15	1	1	1	1	2	2
Respondent 16	2	1	2	2	2	2
Respondent 17	1	1	1	1	2	1
Respondent 18	1	1	2	2	2	2
Respondent 19	1	1	1	2	2	1
Respondent 20	1	1	1	1	2	2
Respondent 21	1	1	1	1	2	1
Respondent 22	1	1	2	2	2	2
Respondent 23	1	1	2	2	2	1
Respondent 24	1	1	2	2	2	2
Respondent 25	1	1	2	2	2	1
Respondent 26	1	1	2	2	2	2
Respondent 27	1	1	2	1	2	2
Respondent 28	2	1	2	2	2	2
Respondent 29	1	1	2	2	2	1
Respondent 30	1	1	2	2	2	2
Respondent 31	1	1	2	2	2	1
Respondent 32	2	2	2	1	2	2
Respondent 33	1	1	2	2	2	1
Respondent 34	1	2	2	1	2	2
Respondent 35	1	2	2	2	2	1
Respondent 36	1	2	2	2	2	2
Respondent 37	1	1	2	1	2	1
Respondent 38	1	1	2	2	2	2
Respondent 39	1	2	2	2	2	1
Respondent 40	1	1	2	2	2	2
Respondent 41	1	2	2	2	2	2
Respondent 42	2	2	2	2	2	2
Respondent 43	1	1	2	2	2	1
Respondent 44	1	1	2	2	2	1
Respondent 45	1	1	2	2	2	1
Respondent 46	1	1	2	2	2	2
Respondent 47	1	1	2	2	2	2
Respondent 48	1	1	2	2	2	1
Respondent 49	1	1	2	2	2	2
Respondent 50	1	1	2	2	2	2
Respondent 51	1	1	2	2	2	1
Respondent 52	1	1	2	2	2	1
Respondent 53	1	1	2	1	2	2
Respondent 54	1	1	2	2	2	2
Respondent 55	1	1	2	2	2	2
Respondent 56	1	1	2	2	2	1
Respondent 57	1	1	2	2	2	2
Respondent 58	1	1	2	2	2	1
Respondent 59	1	1	2	2	2	2
Respondent 60	2	1	2	2	2	1

Respondent 61	1	1	2	2	2	2
Respondent 62	1	1	2	2	2	2
Respondent 63	1	1	2	2	2	2
Respondent 64	1	1	2	2	2	1
Respondent 65	1	1	2	2	2	2
Respondent 66	1	1	1	2	2	1
Respondent 67	1	1	2	2	2	2
Respondent 68	1	1	2	2	2	1
Respondent 69	1	1	1	2	2	2
Respondent 70	1	1	2	2	2	1
Respondent 71	1	1	2	2	2	2
Respondent 72	1	1	2	2	2	1
Respondent 73	1	1	2	2	2	2
Respondent 74	1	1	2	2	2	2
Respondent 75	1	2	2	1	2	2
Respondent 76	1	1	2	2	2	1
Respondent 77	1	1	2	2	2	2
Respondent 78	1	1	2	2	2	2
Respondent 79	2	1	2	2	2	2
Respondent 80	1	1	2	2	2	2
Respondent 81	1	1	2	2	2	1
Respondent 82	1	1	2	2	2	2
Respondent 83	1	1	2	2	2	1
Respondent 84	1	1	2	2	2	2
Respondent 85	1	1	2	2	2	1
Respondent 86	1	1	2	1	2	2
Respondent 87	1	1	2	2	2	1
Respondent 88	1	1	2	2	2	2
Respondent 89	1	1	2	2	2	1
Respondent 90	1	1	2	2	2	2
Respondent 91	1	1	2	2	2	2
Respondent 92	1	1	2	1	2	2
Respondent 93	1	1	2	2	2	2
Respondent 94	1	1	2	2	2	1
Respondent 95	1	1	2	1	2	2
Respondent 96	1	1	2	2	2	2
Respondent 97	1	1	2	2	2	2
Respondent 98	1	1	2	1	2	1
Respondent 99	1	1	2	2	2	2
Respondent 100	1	1	2	2	2	1
Respondent 101	1	1	2	2	2	1
Respondent 102	1	1	2	2	2	2
Respondent 103	2	1	2	2	2	1
Respondent 104	1	1	2	2	2	2
Respondent 105	1	1	2	2	2	1
Respondent 106	1	1	2	2	2	2
Respondent 107	1	1	2	2	2	1
Respondent 108	1	1	2	2	2	2
Respondent 109	1	1	2	2	2	2
Respondent 110	1	1	2	2	2	1
Respondent 111	1	1	2	2	2	1
Respondent 112	1	1	2	2	2	1
Respondent 113	1	1	2	2	2	2
Respondent 114	1	1	2	2	2	2
Respondent 115	1	1	2	2	2	2
Respondent 116	1	1	2	2	2	1
Respondent 117	1	1	2	2	2	2
Respondent 118	1	1	2	2	2	2
Respondent 119	1	1	2	2	2	2
Respondent 120	1	1	2	2	2	1
Respondent 121	1	1	2	2	2	2
Respondent 122	1	1	2	2	2	1
Respondent 123	1	1	2	2	2	1
Respondent 124	1	1	2	2	2	2
Respondent 125	1	1	2	2	2	2
Respondent 126	1	1	2	2	2	2
Respondent 127	1	1	2	2	2	2
Respondent 128	1	1	2	2	2	1
Respondent 129	1	1	2	2	2	2
Respondent 130	1	1	2	2	2	1
Respondent 131	1	1	2	2	2	2
Respondent 132	1	1	2	2	2	1
Respondent 133	1	1	2	2	2	1

Respondent 134	2	1	2	2	2	2
Respondent 135	1	1	2	2	2	2
Respondent 136	1	1	2	2	1	1
Respondent 137	1	1	2	2	2	2
Respondent 138	1	1	2	2	2	2
Respondent 139	1	1	2	2	2	2
Respondent 140	1	1	2	2	2	2
Respondent 141	2	1	2	2	2	2
Respondent 142	1	1	2	2	2	1
Respondent 143	1	1	2	2	2	2
Respondent 144	1	1	2	2	2	2
Respondent 145	1	1	2	2	2	2
Respondent 146	2	1	2	2	2	1
Respondent 147	1	1	2	2	2	2
Respondent 148	1	1	2	2	2	2
Respondent 149	1	1	2	2	2	1
Respondent 150	1	1	2	2	2	2
Respondent 151	1	1	2	2	2	2
Respondent 152	1	1	2	2	2	1
Respondent 153	2	1	2	2	2	2
Respondent 154	1	1	2	2	2	2
Respondent 155	1	2	2	2	2	2
Respondent 156	1	1	2	2	2	1
Respondent 157	1	1	2	2	2	2
Respondent 158	1	1	2	2	2	1
Respondent 159	2	1	2	2	2	2
Respondent 160	1	1	2	2	2	1
Respondent 161	1	1	2	2	2	2
Respondent 162	1	1	2	2	2	1
Respondent 163	1	1	2	2	2	2
Respondent 164	1	1	2	2	2	1
Respondent 165	1	1	2	2	2	2
Respondent 166	2	1	2	2	2	2
Respondent 167	1	1	2	2	1	2
Respondent 168	2	1	2	2	2	1
Respondent 169	1	1	2	2	2	2
Respondent 170	1	1	2	2	2	1
Respondent 171	1	1	2	2	1	2
Respondent 172	1	1	2	2	2	2
Respondent 173	1	2	2	2	1	1
Respondent 174	1	1	2	2	2	2
Respondent 175	1	1	2	2	1	1
Respondent 176	1	1	2	2	2	2
Respondent 177	1	1	2	2	2	1
Respondent 178	1	1	2	2	2	2
Respondent 179	2	2	2	2	2	2
Respondent 180	1	2	2	2	2	1
Respondent 181	1	2	2	2	1	2
Respondent 182	1	1	2	2	2	2
Respondent 183	1	1	2	2	1	1
Respondent 184	2	1	2	2	2	2
Respondent 185	1	1	2	2	1	2
Respondent 186	2	1	2	2	2	2
Respondent 187	2	2	1	2	2	2
Respondent 188	2	2	2	2	2	1
Respondent 189	2	1	2	2	1	2
Respondent 190	1	1	2	2	2	1
Respondent 191	2	1	2	2	2	2
Respondent 192	1	1	2	2	2	1
Respondent 193	2	1	2	2	2	2
Respondent 194	1	1	2	2	1	2
Respondent 195	2	1	2	2	2	2
Respondent 196	1	1	2	2	2	2
Respondent 197	2	1	2	2	2	1
Respondent 198	2	1	2	2	2	1
Respondent 199	2	1	2	2	1	2
Respondent 200	1	2	2	2	2	2
Respondent 201	2	1	2	2	1	2
Respondent 202	1	1	2	2	2	1
Respondent 203	2	1	2	2	1	2
Respondent 204	1	2	2	2	2	1
Respondent 205	2	1	2	2	2	2
Respondent 206	2	2	2	2	2	2

Respondent 207	2	1	2	2	2	1
Respondent 208	1	1	2	2	2	2
Respondent 209	2	1	2	2	2	2
Respondent 210	2	2	2	2	2	2
Respondent 211	1	1	2	2	2	2
Respondent 212	1	1	2	2	2	2
Respondent 213	2	1	2	2	1	2
Respondent 214	2	2	2	2	2	1
Respondent 215	1	1	2	2	2	2
Respondent 216	1	1	2	2	2	2
Respondent 217	2	1	2	2	2	2
Respondent 218	2	1	2	2	2	2
Respondent 219	2	1	2	2	2	2
Respondent 220	2	1	2	2	2	2
Respondent 221	2	2	2	2	2	2
Respondent 222	2	1	2	2	2	2
Respondent 223	2	2	2	2	2	2
Respondent 224	2	1	2	2	2	2
Respondent 225	2	1	2	2	2	2
Respondent 226	1	1	2	2	1	2
Respondent 227	2	1	2	2	2	2
Respondent 228	2	2	2	2	2	2
Respondent 229	2	1	2	2	2	1
Respondent 230	2	2	2	2	2	2
Respondent 231	2	1	2	2	2	1
Respondent 232	2	1	2	2	1	2
Respondent 233	2	2	2	2	2	1
Respondent 234	2	1	2	2	2	1
Respondent 235	2	1	2	2	1	2
Respondent 236	2	2	2	2	2	2
Respondent 237	1	1	2	2	2	1
Respondent 238	2	2	2	2	2	1
Respondent 239	2	1	2	2	2	1
Respondent 240	2	2	2	2	2	1
Respondent 241	2	2	2	2	1	1
Respondent 242	2	2	2	2	2	1
Respondent 243	2	2	2	2	2	1
Respondent 244	2	2	2	2	1	1
Respondent 245	2	1	2	2	2	1
Respondent 246	2	2	2	2	2	1
Respondent 247	1	1	2	2	2	1
Respondent 248	2	2	2	2	1	1
Respondent 249	2	2	2	2	2	1
Respondent 250	2	1	2	2	2	1
wrong ans	175	212	12	22	21	100
right ans	75	38	238	228	229	150

ii. Attitude

Coding	
1	**Negative Attitude**
2	**Neutral**
3	**positive Attitude**

	Question 1	Question 2	Question 3	Question 4	Question5	Question 6
Respondent 1	3	1	3	3	3	3
Respondent 2	3	1	3	3	2	2
Respondent 3	2	2	3	3	3	3
Respondent 4	3	1	3	3	3	3
Respondent 5	2	2	1	2	3	3
Respondent 6	3	1	3	3	3	3
Respondent 7	3	3	3	2	2	3
Respondent 8	3	2	3	3	3	3
Respondent 9	2	3	2	3	3	2
Respondent 10	3	2	3	3	3	3
Respondent 11	1	3	1	3	3	3
Respondent 12	3	1	3	3	3	2
Respondent 13	3	3	2	3	3	3
Respondent 14	3	1	3	2	3	3
Respondent 15	3	3	3	3	3	2
Respondent 16	3	1	3	3	3	3

Respondent 17	2	3	3	3	3	2
Respondent 18	3	2	2	3	3	3
Respondent 19	3	3	3	2	3	3
Respondent 20	3	3	3	2	3	2
Respondent 21	3	1	3	3	3	3
Respondent 22	3	3	2	3	2	3
Respondent 23	2	1	3	3	3	2
Respondent 24	3	3	3	2	3	3
Respondent 25	3	3	2	3	3	3
Respondent 26	3	1	3	3	3	3
Respondent 27	3	3	2	2	2	2
Respondent 28	2	3	3	3	3	3
Respondent 29	3	1	2	3	3	2
Respondent 30	3	3	3	3	3	3
Respondent 31	2	1	3	3	3	3
Respondent 32	3	1	3	3	3	3
Respondent 33	3	3	2	3	2	3
Respondent 34	3	2	3	3	3	3
Respondent 35	2	3	2	3	3	1
Respondent 36	3	1	3	3	3	3
Respondent 37	3	3	3	3	3	1
Respondent 38	1	1	3	3	3	3
Respondent 39	3	3	3	3	3	3
Respondent 40	2	2	3	3	2	2
Respondent 41	3	3	3	3	3	3
Respondent 42	2	3	1	3	1	3
Respondent 43	3	3	3	3	3	3
Respondent 44	3	1	1	3	3	3
Respondent 45	3	3	3	2	3	1
Respondent 46	2	3	3	3	3	3
Respondent 47	3	3	1	3	1	2
Respondent 48	2	3	3	3	3	2
Respondent 49	3	2	3	3	3	3
Respondent 50	3	3	3	3	3	3
Respondent 51	3	3	3	2	3	3
Respondent 52	2	3	2	3	1	2
Respondent 53	3	3	3	3	3	3
Respondent 54	2	3	3	3	3	3
Respondent 55	3	1	3	3	2	2
Respondent 56	3	3	1	3	3	3
Respondent 57	2	3	3	2	3	3
Respondent 58	3	3	1	3	3	3
Respondent 59	1	1	3	3	3	3
Respondent 60	3	3	1	3	3	2
Respondent 61	2	3	3	3	3	3
Respondent 62	3	3	3	3	3	1
Respondent 63	3	1	3	2	3	3
Respondent 64	3	3	1	3	3	2
Respondent 65	3	1	3	3	3	3
Respondent 66	2	1	1	3	3	2
Respondent 67	3	3	2	2	3	3
Respondent 68	3	3	3	3	2	2
Respondent 69	3	2	3	2	3	3
Respondent 70	3	3	3	3	2	2
Respondent 71	2	3	3	3	2	3
Respondent 72	3	1	3	3	3	3
Respondent 73	2	3	2	1	3	3
Respondent 74	3	3	3	3	3	3
Respondent 75	1	3	1	3	3	1
Respondent 76	3	2	3	3	3	3
Respondent 77	2	3	3	3	3	1
Respondent 78	3	3	3	1	3	3
Respondent 79	1	3	3	3	3	2
Respondent 80	3	1	1	3	3	3
Respondent 81	2	3	3	3	2	2
Respondent 82	3	3	1	3	3	3
Respondent 83	3	3	3	3	3	2
Respondent 84	3	3	3	3	3	2
Respondent 85	2	1	3	1	3	3
Respondent 86	3	3	3	3	3	2
Respondent 87	3	2	3	3	3	3
Respondent 88	3	3	3	3	3	3
Respondent 89	2	3	3	2	3	3
Respondent 90	3	3	3	3	1	2
Respondent 91	1	3	3	2	3	3
Respondent 92	3	3	3	3	3	3
Respondent 93	3	1	3	1	3	2

Respondent 94	1	3	2	3	3	3
Respondent 95	3	2	3	3	3	2
Respondent 96	2	3	2	3	3	3
Respondent 97	3	2	3	3	3	3
Respondent 98	1	3	2	3	3	3
Respondent 99	3	3	3	2	1	3
Respondent 100	2	2	2	3	3	3
Respondent 101	3	3	3	3	3	3
Respondent 102	2	3	2	3	3	3
Respondent 103	3	3	3	3	3	2
Respondent 104	3	1	3	2	3	3
Respondent 105	3	3	3	3	3	1
Respondent 106	3	3	2	3	2	3
Respondent 107	3	3	3	3	3	3
Respondent 108	1	3	2	3	3	3
Respondent 109	3	3	3	3	3	3
Respondent 110	2	1	3	3	3	3
Respondent 111	3	3	3	3	3	3
Respondent 112	3	3	3	3	3	3
Respondent 113	3	3	3	2	3	3
Respondent 114	3	3	2	3	3	3
Respondent 115	2	3	3	3	3	3
Respondent 116	3	2	1	3	3	3
Respondent 117	3	3	3	2	3	3
Respondent 118	3	2	2	3	2	2
Respondent 119	1	3	3	2	3	1
Respondent 120	3	2	2	3	3	3
Respondent 121	3	3	3	2	3	3
Respondent 122	3	2	2	3	3	3
Respondent 123	3	1	3	1	3	3
Respondent 124	1	3	2	3	3	2
Respondent 125	3	3	3	3	3	3
Respondent 126	3	2	3	3	3	2
Respondent 127	3	2	2	2	3	3
Respondent 128	2	3	3	3	3	3
Respondent 129	3	2	3	2	3	3
Respondent 130	3	3	3	3	3	2
Respondent 131	1	1	3	3	3	3
Respondent 132	3	1	2	3	3	3
Respondent 133	2	3	3	2	3	3
Respondent 134	3	3	2	3	3	3
Respondent 135	1	3	3	2	3	3
Respondent 136	3	1	3	3	3	3
Respondent 137	2	2	3	3	3	3
Respondent 138	3	1	3	3	3	2
Respondent 139	3	3	2	3	2	3
Respondent 140	2	3	3	3	3	2
Respondent 141	3	3	3	3	3	1
Respondent 142	1	3	3	3	3	3
Respondent 143	3	3	3	3	3	3
Respondent 144	2	3	2	3	3	3
Respondent 145	3	3	3	3	3	2
Respondent 146	3	1	3	3	3	3
Respondent 147	3	3	3	2	3	3
Respondent 148	3	3	1	3	1	3
Respondent 149	1	3	3	3	3	2
Respondent 150	3	3	3	3	3	3
Respondent 151	2	3	2	3	3	3
Respondent 152	3	3	3	3	3	3
Respondent 153	3	2	3	2	3	3
Respondent 154	2	3	3	3	3	3
Respondent 155	3	3	3	3	2	3
Respondent 156	1	2	3	3	3	3
Respondent 157	3	3	2	3	3	3
Respondent 158	1	1	3	2	3	3
Respondent 159	3	3	2	3	3	2
Respondent 160	3	3	3	3	3	3
Respondent 161	2	3	3	3	2	3
Respondent 162	3	3	3	3	3	3
Respondent 163	2	1	3	3	3	2
Respondent 164	3	3	3	3	3	3
Respondent 165	2	1	3	3	3	3
Respondent 166	3	3	3	3	3	3
Respondent 167	3	3	2	3	3	3
Respondent 168	3	3	3	3	3	2
Respondent 169	2	3	3	3	3	3
Respondent 170	3	1	3	3	3	2

Respondent 171	3	3	2	3	3	3
Respondent 172	3	3	3	3	3	2
Respondent 173	2	1	3	2	3	3
Respondent 174	3	3	3	3	3	3
Respondent 175	3	2	3	2	3	2
Respondent 176	3	3	2	3	2	3
Respondent 177	3	2	3	3	3	2
Respondent 178	3	3	2	3	3	3
Respondent 179	3	2	3	3	3	3
Respondent 180	3	2	2	3	3	3
Respondent 181	2	1	3	3	3	3
Respondent 182	3	3	2	3	3	2
Respondent 183	2	3	3	3	3	3
Respondent 184	3	3	1	3	3	2
Respondent 185	3	3	3	3	3	3
Respondent 186	3	2	3	1	3	3
Respondent 187	2	3	3	3	3	2
Respondent 188	3	1	3	3	3	3
Respondent 189	3	3	3	3	2	3
Respondent 190	2	1	3	3	3	2
Respondent 191	3	2	3	1	3	3
Respondent 192	2	3	3	1	3	3
Respondent 193	3	2	1	3	3	3
Respondent 194	2	3	3	2	3	3
Respondent 195	3	3	3	3	3	3
Respondent 196	3	3	3	3	3	3
Respondent 197	3	3	3	3	3	2
Respondent 198	3	3	1	3	3	3
Respondent 199	3	3	1	3	2	3
Respondent 200	3	2	3	3	3	3
Respondent 201	1	3	3	3	3	2
Respondent 202	1	1	3	2	2	3
Respondent 203	2	3	2	3	3	3
Respondent 204	2	1	3	3	3	3
Respondent 205	3	3	3	3	3	1
Respondent 206	3	3	2	3	3	3
Respondent 207	1	3	3	3	3	3
Respondent 208	3	3	1	3	3	3
Respondent 209	2	2	3	2	3	3
Respondent 210	3	3	1	3	3	3
Respondent 211	2	2	3	3	3	3
Respondent 212	3	3	1	3	3	3
Respondent 213	2	2	3	2	3	3
Respondent 214	3	3	2	3	3	2
Respondent 215	2	2	3	3	3	3
Respondent 216	3	3	3	3	3	2
Respondent 217	3	3	1	3	3	3
Respondent 218	3	3	3	3	3	2
Respondent 219	1	3	3	3	3	3
Respondent 220	3	3	2	2	3	3
Respondent 221	1	1	3	3	2	2
Respondent 222	3	3	1	3	3	3
Respondent 223	1	3	3	1	3	3
Respondent 224	3	3	1	3	3	3
Respondent 225	3	1	3	1	3	3
Respondent 226	3	3	3	3	3	3
Respondent 227	1	1	3	3	3	3
Respondent 228	3	3	1	3	3	2
Respondent 229	2	1	3	3	3	1
Respondent 230	3	3	1	3	2	3
Respondent 231	1	1	3	2	3	3
Respondent 232	3	3	3	3	3	3
Respondent 233	1	1	3	3	3	2
Respondent 234	3	3	1	3	3	3
Respondent 235	1	3	3	3	3	3
Respondent 236	3	1	1	3	3	2
Respondent 237	3	3	3	2	3	3
Respondent 238	2	1	3	3	3	2
Respondent 239	3	3	3	3	3	2
Respondent 240	3	3	3	3	3	3
Respondent 241	1	1	1	3	3	3
Respondent 242	3	3	3	3	2	3
Respondent 243	3	3	3	3	3	3
Respondent 244	3	2	1	3	2	1
Respondent 245	3	3	3	3	3	3
Respondent 246	3	1	1	2	3	3
Respondent 247	1	3	3	3	3	3

Respondent 248	3	3	1	3	3	3
Respondent 249	3	1	3	3	3	3
Respondent 250	1	3	3	3	3	1
1	34	43	20	12	6	20
2	46	39	54	36	19	49
3	170	168	176	202	225	181
Total	250	250	250	250	250	250

iii. Practices

Coding	
1	**Negative Practice**
2	**Neutral**
3	**Positive Practice**

	Question 1	Question 2	Question 3	Question 4	Question5	Question 6	Question 7
Respondent 1	3	3	3	3	3	3	1
Respondent 2	2	3	3	2	2	1	2
Respondent 3	3	2	2	3	2	2	3
Respondent 4	3	3	3	2	3	3	1
Respondent 5	2	1	2	1	2	2	1
Respondent 6	3	3	3	3	2	3	2
Respondent 7	2	2	3	3	2	3	1
Respondent 8	3	3	3	1	3	1	2
Respondent 9	3	3	2	3	3	3	3
Respondent 10	2	1	3	2	2	3	1
Respondent 11	2	2	3	3	3	1	2
Respondent 12	3	3	1	1	3	3	3
Respondent 13	3	3	2	3	2	3	2
Respondent 14	2	3	3	2	3	3	1
Respondent 15	3	2	3	3	2	2	2
Respondent 16	3	3	2	2	3	3	1
Respondent 17	3	2	1	3	2	3	1
Respondent 18	2	3	3	1	3	3	2
Respondent 19	2	2	3	3	2	1	3
Respondent 20	3	3	2	1	2	3	1
Respondent 21	3	1	3	3	2	3	2
Respondent 22	3	2	3	2	3	3	3
Respondent 23	2	3	3	3	3	1	1
Respondent 24	3	2	2	2	3	3	2
Respondent 25	3	3	3	3	3	3	3
Respondent 26	1	2	1	2	3	3	1
Respondent 27	3	3	3	3	3	2	2
Respondent 28	2	3	2	2	3	3	1
Respondent 29	3	2	3	3	1	2	2
Respondent 30	2	3	3	3	3	1	1
Respondent 31	3	1	1	3	1	2	2
Respondent 32	2	3	3	1	3	3	1
Respondent 33	3	2	3	3	3	2	2
Respondent 34	2	3	2	3	3	3	3
Respondent 35	3	3	3	1	2	2	2
Respondent 36	2	1	2	3	3	3	3
Respondent 37	3	2	3	3	2	1	2
Respondent 38	3	3	2	3	3	3	1
Respondent 39	3	2	3	1	2	3	2
Respondent 40	2	3	3	3	2	1	1
Respondent 41	3	1	3	3	3	3	2
Respondent 42	2	3	2	3	3	2	3
Respondent 43	3	3	3	3	3	3	3
Respondent 44	3	3	3	2	2	2	1
Respondent 45	3	3	3	3	3	3	3
Respondent 46	3	3	1	1	2	3	1
Respondent 47	2	1	3	2	2	2	3
Respondent 48	3	3	2	3	3	3	3
Respondent 49	2	3	3	2	3	1	3
Respondent 50	3	1	3	2	1	3	3
Respondent 51	2	3	3	3	3	3	2
Respondent 52	3	3	1	3	3	1	3
Respondent 53	2	1	2	3	3	3	2
Respondent 54	3	2	3	1	3	2	2
Respondent 55	3	2	1	3	2	3	3

Respondent 56	2	3	3	3	3	3	2
Respondent 57	3	3	3	2	2	2	3
Respondent 58	2	3	3	2	1	3	2
Respondent 59	2	3	1	3	2	1	3
Respondent 60	3	3	3	2	2	3	3
Respondent 61	2	3	3	3	2	2	2
Respondent 62	2	2	2	3	3	2	2
Respondent 63	3	3	3	2	2	1	3
Respondent 64	3	3	1	3	3	2	2
Respondent 65	3	2	3	1	2	3	3
Respondent 66	3	3	1	3	3	2	1
Respondent 67	3	3	2	3	3	3	2
Respondent 68	2	3	3	3	2	2	3
Respondent 69	3	2	2	3	3	2	3
Respondent 70	3	3	1	2	3	3	2
Respondent 71	1	2	2	2	2	2	1
Respondent 72	3	3	1	1	2	3	2
Respondent 73	3	3	2	2	2	2	1
Respondent 74	2	2	1	1	3	3	2
Respondent 75	3	3	3	2	2	1	1
Respondent 76	3	3	3	1	3	2	2
Respondent 77	2	3	1	2	2	3	1
Respondent 78	3	3	3	1	2	2	3
Respondent 79	3	1	1	2	3	3	2
Respondent 80	2	3	3	1	3	2	1
Respondent 81	3	2	2	2	2	3	2
Respondent 82	2	3	2	3	3	2	3
Respondent 83	3	2	3	2	2	3	2
Respondent 84	2	3	2	1	3	2	1
Respondent 85	3	1	3	2	3	3	2
Respondent 86	3	3	1	1	2	2	3
Respondent 87	3	3	3	2	2	3	3
Respondent 88	3	2	1	1	3	1	3
Respondent 89	3	3	3	2	2	3	3
Respondent 90	3	2	1	3	3	3	2
Respondent 91	2	3	3	2	2	3	2
Respondent 92	3	1	3	3	3	2	1
Respondent 93	3	3	2	2	2	2	2
Respondent 94	3	3	3	3	3	3	1
Respondent 95	3	2	2	1	2	1	2
Respondent 96	3	1	3	3	3	3	3
Respondent 97	3	2	2	2	3	3	3
Respondent 98	3	3	3	1	2	2	3
Respondent 99	3	3	1	1	3	3	3
Respondent 100	2	2	2	2	1	3	3
Respondent 101	3	3	2	1	3	1	3
Respondent 102	3	2	1	2	3	2	2
Respondent 103	2	3	3	3	3	1	3
Respondent 104	3	3	1	2	2	3	1
Respondent 105	3	3	3	3	2	1	2
Respondent 106	3	3	1	3	3	3	3
Respondent 107	3	2	3	3	2	3	2
Respondent 108	3	3	3	1	3	3	3
Respondent 109	3	2	2	3	3	3	2
Respondent 110	3	3	3	3	2	2	3
Respondent 111	3	3	1	1	3	3	1
Respondent 112	3	3	3	3	2	2	1
Respondent 113	3	3	2	2	3	3	2
Respondent 114	2	3	3	1	2	3	2
Respondent 115	3	2	3	3	3	3	3
Respondent 116	3	3	3	3	2	3	1
Respondent 117	3	3	3	3	3	1	3
Respondent 118	2	2	3	3	2	3	2
Respondent 119	3	3	3	1	3	3	3
Respondent 120	3	1	2	3	2	1	2
Respondent 121	3	2	3	2	3	3	3
Respondent 122	3	3	3	3	2	3	2
Respondent 123	3	3	3	2	3	2	3
Respondent 124	3	3	3	3	2	3	3
Respondent 125	3	2	3	2	2	3	3
Respondent 126	3	3	2	1	1	3	2
Respondent 127	3	3	3	3	1	1	1
Respondent 128	3	1	3	2	3	3	1
Respondent 129	2	3	2	3	3	1	2
Respondent 130	3	2	3	3	3	2	3
Respondent 131	3	3	1	1	3	3	2
Respondent 132	2	3	3	3	3	2	1

Respondent 133	3	2	2	3	3	3	2
Respondent 134	3	3	1	1	3	2	3
Respondent 135	2	3	2	3	3	3	2
Respondent 136	2	3	3	3	2	2	3
Respondent 137	3	2	1	3	3	3	3
Respondent 138	2	3	2	1	2	2	2
Respondent 139	2	2	3	3	3	3	2
Respondent 140	3	3	3	3	2	3	1
Respondent 141	2	3	3	2	3	1	2
Respondent 142	3	3	2	3	2	3	1
Respondent 143	3	2	2	2	3	3	2
Respondent 144	3	3	3	3	2	3	3
Respondent 145	3	3	3	1	3	1	2
Respondent 146	3	2	2	3	2	3	1
Respondent 147	3	3	1	2	2	3	2
Respondent 148	2	3	2	3	1	3	2
Respondent 149	3	3	2	2	2	3	3
Respondent 150	3	3	2	1	1	2	2
Respondent 151	3	2	3	3	3	3	1
Respondent 152	1	3	1	3	3	2	2
Respondent 153	3	3	3	3	3	3	2
Respondent 154	3	3	1	3	2	2	3
Respondent 155	3	3	2	1	2	3	2
Respondent 156	3	3	1	3	3	3	3
Respondent 157	3	2	2	3	2	2	2
Respondent 158	3	3	2	1	3	3	3
Respondent 159	3	3	3	2	2	1	2
Respondent 160	1	3	2	3	3	3	3
Respondent 161	3	3	3	2	3	3	2
Respondent 162	3	2	2	1	2	2	3
Respondent 163	3	3	2	2	3	3	3
Respondent 164	3	3	3	3	2	3	2
Respondent 165	3	2	3	2	2	3	3
Respondent 166	3	3	2	1	3	3	2
Respondent 167	3	2	3	3	3	1	1
Respondent 168	3	3	1	2	3	3	2
Respondent 169	3	3	2	3	3	3	2
Respondent 170	3	1	3	3	2	1	2
Respondent 171	3	3	1	1	3	3	3
Respondent 172	3	3	3	3	2	2	3
Respondent 173	3	3	1	2	3	2	1
Respondent 174	2	3	3	3	2	2	1
Respondent 175	3	3	3	2	3	3	1
Respondent 176	2	3	3	3	2	2	1
Respondent 177	3	3	1	3	3	3	1
Respondent 178	3	2	2	2	3	2	1
Respondent 179	3	3	3	1	2	2	1
Respondent 180	3	2	3	2	3	3	1
Respondent 181	3	3	2	3	2	2	1
Respondent 182	3	2	2	2	3	3	2
Respondent 183	3	3	2	3	2	3	2
Respondent 184	3	3	1	2	2	2	1
Respondent 185	2	3	3	3	3	1	1
Respondent 186	3	2	2	3	3	3	2
Respondent 187	2	3	3	3	2	1	3
Respondent 188	3	2	2	3	3	3	2
Respondent 189	3	2	1	3	2	3	1
Respondent 190	2	3	2	2	2	3	2
Respondent 191	2	3	3	3	3	1	3
Respondent 192	3	2	2	3	3	3	1
Respondent 193	3	3	3	2	2	2	2
Respondent 194	3	3	2	3	3	2	1
Respondent 195	3	3	1	2	2	3	2
Respondent 196	2	3	2	3	3	3	1
Respondent 197	3	3	1	3	2	3	2
Respondent 198	3	3	3	2	3	2	1
Respondent 199	3	3	2	3	3	1	2
Respondent 200	3	2	1	2	2	3	1
Respondent 201	3	3	3	3	2	3	2
Respondent 202	3	2	3	2	2	3	3
Respondent 203	3	3	1	3	3	2	2
Respondent 204	3	1	2	3	3	2	3
Respondent 205	3	3	1	3	3	2	3
Respondent 206	3	3	2	2	2	3	1
Respondent 207	3	3	1	3	3	2	2
Respondent 208	3	3	2	2	3	1	2
Respondent 209	3	2	1	3	3	3	1

Respondent 210	3	1	2	2	2	1	1
Respondent 211	3	3	3	3	3	2	1
Respondent 212	3	1	3	3	2	1	2
Respondent 213	3	3	3	2	3	1	2
Respondent 214	3	3	1	2	2	3	2
Respondent 215	3	3	3	3	3	2	1
Respondent 216	3	3	3	2	3	3	2
Respondent 217	2	2	3	3	2	3	1
Respondent 218	3	3	1	2	3	1	2
Respondent 219	3	3	2	3	2	3	1
Respondent 220	2	1	3	1	3	3	2
Respondent 221	3	3	2	3	2	1	1
Respondent 222	3	3	3	3	3	3	2
Respondent 223	3	3	3	3	3	1	1
Respondent 224	2	3	3	2	3	3	1
Respondent 225	3	3	2	3	3	1	2
Respondent 226	2	3	3	1	2	3	3
Respondent 227	3	3	3	2	3	2	2
Respondent 228	3	3	1	3	2	3	1
Respondent 229	3	2	3	3	2	2	2
Respondent 230	3	1	3	3	3	3	3
Respondent 231	2	3	3	1	3	2	2
Respondent 232	3	3	3	3	2	2	1
Respondent 233	3	3	1	3	2	1	1
Respondent 234	3	3	2	1	3	3	2
Respondent 235	3	2	3	3	2	2	3
Respondent 236	3	3	3	1	3	3	2
Respondent 237	3	3	3	3	2	2	1
Respondent 238	3	3	3	3	2	3	2
Respondent 239	3	3	3	2	3	1	3
Respondent 240	3	3	1	3	1	3	2
Respondent 241	3	3	3	3	3	2	1
Respondent 242	3	1	2	3	2	3	3
Respondent 243	3	3	3	1	3	3	2
Respondent 244	3	3	2	3	2	3	3
Respondent 245	3	1	3	3	3	1	3
Respondent 246	3	3	3	2	3	3	3
Respondent 247	3	3	3	1	3	1	2
Respondent 248	3	3	3	3	2	3	3
Respondent 249	3	3	3	2	3	1	1
Respondent 250	3	3	2	3	3	3	2
1	17	21	21	5	3	9	71
2	53	42	97	77	12	65	90
3	180	187	132	168	235	176	89
Total	250	250	250	250	250	250	250
Percentage	73%	74.8	65.9	84.7	94	70.4	35.8

4 Bio medical waste management check list

BIO MEDICAL WASTE MANAGEMENT CHECKLIST

Sr. NO.	CRITERIA	YES/ NO/ PARTIAL	REMARKS

STRUCTURE

1.	Are all the colour-coded waste buckets available as per norms? (Red / Yellow / Black /Sharp	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".

	container/ Blue)?		
2.	Are the Biomedical waste buckets with lids, present or not?	Partial	Bins without lids used for segregation of waste in OPD area- ENT dept, Dental room, Orthopaedic dept, gynae & Obs dept.
3.	Is their any Bio medical waste bin present with broken lids ?	Yes	Bio medical waste bins with broken lids were present in microbiology dept. of lab. In Gyn & Obs ward. In ICU and in Pre Operative ward.
4.	Are the posters for segregation displayed?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
5.	Is the Bio hazard symbol visible on the buckets / Bags?	Partial	Buckets were placed such that bio hazard symbol not visible properly from the front. Some of the bio hazard symbols were faded on waste bins.
6.	Is the Transport trolley present for transporting waste to the storage room?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
7.	Is Bio hazard symbol present on waste transport trolley?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
8.	Are adequate precautionary measures (PPE) available?	Partial	Most of the time Masks were not available, Housekeeping staff use one mask for 2-3 days. Sometimes housekeeping staff do not use PPE (Personal protective Equipment) during segregation of waste.

9.	Is there separate storage room available for biomedical waste?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
10.	Separate partition present for separate waste in storage room?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
11.	Where is the storage room located?	Yes	Backside of the Hospital.
12.	Is Hospital licensed for generate Bio medical waste?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
13.	Is MoU signed with outsourcing agency for treatment of waste?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".

PROCESS

14.	Are puncture proof container used for disposal sharps and needles?	Partial	Using open ordinary container with hypochlorite solution.
15.	Is the staff aware of Waste management practices?	Partial	Staff moderately aware but lack in implementation of correct BMW practices.
16.	Is proper training given to staff at regular interval?	Partial	Training given to the staff but not at regular interval.
17.	Is there any spillage observed?	No	
18.	Is the waste segregation proper?	No	Segregation of waste was not proper. In Ortho ward yellow coloured

			bin contain general waste and blue bin contain drip set, disposable plates. At lab collection room, cotton was present in blue bin. In microbiology lab yellow bin contain general waste and have broken lid. In Gyn & Obs ward Blue bin shows paper and general waste and Yellow bin contain biscuit packets. In Male Surgical Ward yellow bin have general waste and Hypochlorite solution was not cleaned according to protocol. In Dressing room present in surgery opd, Segregation of waste was not proper, in Red bin, cotton was present, and in blue bin general waste was present
19.	Are the buckets away from normal patient care areas?	yes	Yes the waste bins were present at patient care area
20.	Is storage area regularly cleaned and disinfected?	No	Storage area not regularly cleaned &disinfected.
22.	Is there any fixed schedule for immunization of staff?	Yes	Yes there is fix schedule for immunization of staff including main dose and boaster dose.
23.	Is there any records of immunization?	No	Records of immunization not maintained.
24.	Is waste management record maintained?	Partial	Records of Bio Medical waste not maintain properly on the daily basis, staff collect the data in rough paper not in proper register.

25.	Is waste stored less than 48 hrs in storage room?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
26.	Is Annual report (form-II) of Bio medical waste submitted to prescribed authority?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
27.	Is Accident reporting followed (form-III)?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".
28.	Is ART given to staff who gets needle stick injury?	Yes	Present as per the "Biomedical Waste Management and handling Rules, 1998".

OUTCOME

29.	Total quantity of waste generated per bed per day in an average?	Yes	Feb- 35.400 Kg March-35.600 Kg April-36.800 kg