HEALTH

Health is a general condition of a person in all aspects. It is also a level of functional and metabolic efficiency of an organism ,often implicitly human.

At the time of creation of the WORLD HEALTH ORGANIZATION (WHO) ,in 1948 health was defined as being "a state of complete physical mental and social wellbeing and not merely the absence of disease or infirmity.

In 1986, the WHO , in the Ottawa charter for health promotion , said that health is ,a resource for everyday life , not the objective of living. Health is a positive concept emphasizing social and personal resources , as well as physical capacities. classification systems such as the WHO .family of international classifications , which is composed of the international classification of functioning , disability , and health and international classification of disease also define health.

The process of enabling people to increase control over their health and its determinants and thereby improve their health. The primary means of health promotion occur through developing healthy public policy

(Source – healthcare in India by Dr .Devi shetty)

Recent times, health care concept of the people have undergone a tremendous change which has lead to higher expectation and increase demand for high quality medical care and facilities. here comes the importance of health and hospital management .it is one of the most lucrative and important part of an hospital.

Hospital management involves ensuring effective utilization of physical and financial resources of the hospital as well as creating an organization environment or climate beneficial to the growth and development.

(Source – www.wikipedia.org)

HOSPITAL INDUSTRY IN INDIA

Hospital industry is an important component of the value chain in Indian healthcare industry rendering services and recognized as healthcare delivery segment of the health care industry which is growing at an annual rate .

1. (Source - http://www.technavio.com/content/healthcare-industry-india-2009)

The country had 15,675 hospitals, which had 8.75 lakh beds. according to the WHO report , India needs to add 80,000 hospital beds each year for the next five year to meet the demands of growing population .

(Source- challenges of healthcare in India by Dr. Devi Shetty)

Newfound prosperity of many Indian households is spurring demand for high quality medical care , transforming the healthcare delivery sector in to profitable industry.

Medical tourism is changing the face of traditional healthcare industry in India . India's excellence in the field of modern medicine and its ancient methods of physical and social wellbeing makes it more favorable destination for good health and peaceful living.

India's cost advantage and explosive growth of private hospitals , equipped with latest technology and skilled healthcare professionals has made it a preferred destination to the medical tourism

HISTORY AND INTRODUCTION TO HOSPITALS

The word hospital come from Latin hospes which refers to either a visitor or the host who receives the visitors . from hospes came a Latin word hospitalia an apartment for strangers or guests.

Definition: Hospital is an integral part of social and medical organization, the function of which is to provide for population complete healthcare, both curative & preventive and whose outpatient services reach out to the family and its home environment. Hospital is also a center for training of workers and biomedical staff. (According to WHO)

WHAT IS THE IMPORTANCE OF HOSPITAL MANAGEMENT?

The answer to this question is simply that supervisors and managers of hospitals must not only have vocation al , technical knowledge about hospitals and treatment ,but also should have knowledge about contemporary management and its functions and its functions and principles. The work module of any job is based on two pillars ,namely technical work and management work .

BHAGWAN MAHAVEER CANCER HOSPITAL & RESEARCH CENTER

The BMCHRC is a 207 bedded comprehensive cancer care centre which provides multi-disciplinary tertiary cancer care with the latest equipments and technology essential for cancer diagnosis and treatment.

BMCHRC philosophy is to provide the possible treatment to patients irrespective of class, caste, creed and nationality. It makes this hospital unique not only in Rajasthan but in the whole Northern part of India.

Vision:

To make bhagwan mahaveer hospital and research center a comprehensive world class cancer management center with cutting edge technology.

Mission

BMCHRC Mission is to control and eliminate the problem of cancer and to alleviate the suffering of cancer patients in the country.

Location and surface area

Bhagwan Mahaveer Cancer Hospital is situated on Jawahar Lal Nehru Marg, and occupies an area of 22,166 m2. The hospital building is meticulously planned, magnificently built and has beautiful surroundings.

It is constructed on area of 90,000sq.ft.

The building for the main OPD situated on the first floor and has an area of 32460 sq.ft. which includes:

Reception, Enquiry & Waiting area and consultants chambers

- Radiotherapy OPD is at the ground floor within the department of radiotherapy.

Bhagwan mahaveer cancer hospital and research centre is a tertiary care hospital established to alleviate the suffering of the cancer afflicted patient where even poor, needy and deprived of the society can avail treatment.

BMCHRC is equipped with latest tertiary care facilities like linear accelerator, CT scan, mammography and other ultra sound equipments.

Hospital has various departments:

- Medical oncology
- Surgical oncology
- Radiation oncology
- Anesthesiology
- Pathology
- Radio diagnosis
- Blood bank
- Dept of alternative medicine
- Preventive oncology
- Internal medicine
- Gynecology
- Nuclear medicine

Floor wise distribution of the various departments:

Lower Ground floor : LGF

Department of nuclear medicine

General ward (surgical oncology) - 31 bed

Department of radiation oncology (OPD)

Basement

Transfusion medicine/ blood bank

Laboratory

Upper ground floor: (UGF)

Front office counters (both OPD & IPD)

Private ward – 15 bed (8 post operative beds)

Post operative care unit

Operation theatre/ ICU (5 beds)

Department of radio diagnosis

X- Ray department

Mammography unit

Department of surgical oncology

Department of medical oncology

Procedure room

Gynecology OPD

Ward 3: 49 beds

Ward 4: 49 beds

Day care building - chemo day care – 35 beds

AFF ward (Private ward) – 9

AGF ward - 14

Category of patients coming to hospital

Three category of patient are coming to our hospital

1. Cash
2. Credit
3. Free

1. Cash patients are
   a.) Self
   b.) Referred for consultant

2. Credit are empanelled/ TPA

3. Free patients are:
   a.) BPL card holder
   b.) Camp patient
   c.) general public (recommended by consultant)

SWOT ANALYSIS OF BMCHRC

STRENGTH

- Bhagwan mahaveer cancer hospital and research center is equipped with new and advanced medical technology.
- It is one of the best hospitals for cancer care is whole Rajasthan region.
- It exclusively serve cancer patient not only from Rajasthan but also from other part of country.
- It serves BPL category of patients and thus has a huge flow of patient. Hospital covers all categories of patient.
- Cancer is one of the major health related problem in India and thus this hospital is meant for the same.
- It is located in the heart of the city.
- Hospital is upcoming with another 50 beds and thus it will serve more patient effectively.

WEAKNESS:

- Only cancer patients are treated here and people have to go to other healthcare provider for thousands of other health related problems.
- The hospital cover mainly BPL category of patient so discounts and free care is provided to patients

OPPORTUNITY:

- Indians are becoming more health conscious and they are spending more on health care needs. Cancer is one of the major health related issue and people need more effective services for their ailments. In such a scenario BMCHRC can cater their needs by providing them quality health care.
- It is the best hospital in Rajasthan for cancer care thus serve patient more effectively.

THREAT:

- Hospital like Fortis, SMS and S.K Soni hospital which has fully equipped Seroc oncology wing can be a threat to hospital.

MAIN PROJECT

A SURVEY TO ASSESS KNOWLEDGE, EDUCATION AND ATTITUDE OF NURSING STAFF IN THE HOSPITAL REGARDING BIOMEDICAL WASTE MANAGEMENT.

INTRODUCTION

Bio-medical waste" means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological.

All over the country, unseggregated and untreated biomedical waste is being indiscriminately discarded into municipal bins, dump sites, on roadsides, in water bodies or is being incompletely and improperly burnt in the open. All this is leading to rapid proliferation and spreading of infectious, dangerous and fatal communicable diseases like hepatitis, AIDS and several types of cancers. In urban and rural areas alike, incidence and prevalence of several such human diseases has increased and the per capita medical expenditure has also gone high several folds. Although, yet to be proven,
morbidity or illness amongst both urban and rural dwellers has increased albeit for different reasons.

The Ministry of Environment and Forests, Govt. of India has notified the Biomedical Waste (Management and Handling) rules 1998 with subsequent amendments (June 2nd 2000 and September 2003). However, only 5-10% of institutions in the country has implemented the Rules or is following them at present.

The improper handling, treatment, storage, transport and disposal of waste can lead to serious problems like:

The entire waste from a healthcare establishment, which includes non-infectious as well as infectious waste, if unsegregated and untreated is mixed with the rest of the waste in a healthcare establishment, will convert the entire non infectious general waste (75-80%) also into infectious waste.

The indiscriminate disposal of sharps within and outside institutions leading to occupational hazards like needle stick injuries, cuts, and infections among hospital employees, municipal workers and rag pickers.

Injuries due to the sharp especially among rag pickers and hospital / municipal workers increases the incidence of Hepatitis B, C, E and HIV among these groups who transmit these diseases to others in the community and also succumb to such fatal diseases.

The problem with medical waste lies in the fact that it is not handled and treated according to its type, which leads to hazardous working conditions for hospital personnel and exorbitant investment in technology that creates more problems.

Hospital waste is generated during the diagnosis, treatment, or immunization of human beings or animals or in research activities in these fields or in the production or testing of biological.

It may include wastes like sharps, soiled waste, disposables, anatomical waste, cultures, discarded medicines, chemical wastes, etc. These are in the form of disposable syringes, swabs, bandages, body fluids, human excreta, etc.

This waste is highly infectious and can be a serious threat to human health if not managed in a scientific and discriminate manner. It has been roughly estimated that of the 4 kg of waste generated in a hospital at least 1 kg would be infected.

Undestroyed needles and syringes being circulated back to Recycling, through unscrupulous traders who employ the poor and the destitute to collect such waste for repackaging and selling in the market.

Reuse of disposable like syringes, needles, catheters, IV and dialysis sets are causing spread of infection from healthcare establishments to the general community.

Disposal of hospital waste and veterinary hospital waste in municipal dumpsite resulting in animals especially cows feeding on the blood soaked cotton and plastics, and this in turn leading to diseases like bovine tuberculosis which through milk can infect humans.

-The indiscriminate dumping of untreated hospital waste in municipal bins increasing the possibility of survival, proliferation and mutation of pathogenic microbial population in the municipal waste. This leads to epidemics and increased incidence and prevalence of communicable diseases in the community.

Incidence and prevalence of diseases like AIDS, Hepatitis B&C tuberculosis and other infectious diseases increasing due to inappropriate use, storage, treatment, transport and disposal of biomedical waste.

Chances of vectors like cats, rats, mosquitoes, files and stray dogs getting infected or becoming carriers which also spread diseases in the community.

DEFINITION OF BIOMEDICAL WASTE

According to WHO,

Bio-medical waste: "Bio-Medical Waste" is any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals. These wastes are also generated during research activities or in the production or testing of biological material.

Redefining it scientifically, Biomedical waste is defined as "any solid, fluid or liquid waste, including its container and any intermediate product, which is generated during its diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological and the animal wastes from slaughter houses or any other like establishments."

"**Any waste that is generated in the diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological."**

Infectious wastes are those biomedical wastes which contain sufficient population of infectious agents that are capable of causing and spreading infections among people, livestock and vectors.

Infectious wastes include human tissues, anatomical waste, organs, body parts, placenta, animal waste (tissue / cell cultures), any pathological surgical waste, microbiology and biotechnology waste (cultures, stocks, specimens of micro-organism, live or attenuated vaccines, etc.), cytological, pathological wastes, solid waste (swabs, bandages, mops, any item contaminated with blood or body fluids), infected syringes, needles, other sharps, glass, rubber, metal, plastics.

Cytotoxic substances, as the word suggests are toxic to cells and are often anti-neoplastic which inhibit cell growth and multiplication. These drugs when come in contact with normal cells can damage them and cause severe disability or even death of those affected. These drugs could be present in the waste generated from the treatment of cancer patients or from other work related to testing and control of cancerous cells

TYPE OF BIO MEDICAL WASTE

Type A: Waste which does not require any special treatment.

This is the waste produced by the hospital administration, the cleaning service, the kitchens, stores and workshops. It can be disposed of in the same way as household waste.

Type B: Waste with which special precautions must be taken to prevent infection in the hospital.

This is usually taken to include all waste from inpatient and casualty wards and doctors' practices, e.g. used dressings, disposable linen and packaging materials.

It only constitutes a risk for patients with weakened defenses while it is still inside the hospital. Once it has been removed from the wards it can be handled by the local domestic refuse collection service.

Type C: Waste which must be disposed of in a particular way to prevent infection.

This is waste from isolation wards for patients with infectious diseases; from dialysis wards and laboratories, in particular those for microbiological investigations, which contains pathogens of dangerous infectious diseases, e.g. tuberculosis, hepatitis infectious diarrheal diseases and which constitutes a real risk of infection when disposing of this waste. It includes needles and sharp objects coated with blood, or disposable items contaminated with stool.

Type D: Parts of human bodies: limbs, organs etc.

This waste originates in pathology, surgical, gynecological and obstetric departments. It has to be disposed of separately, not to prevent infection but for ethical reasons.

Type E: Other waste.

Hospitals provide a service, and hence have infrastructures which can also generate hazardous waste products, Chemical residues from laboratories, as well as inflammable, exposable, toxic or radioactive waste, which must be disposed of in accordance with statutory provisions.

Waste also includes plastic material like IV, catheter, plastic tubes, sharps such as glass bottles, ampoules, needles which need special treatment.

BIOMEDICAL WASTE SEGREGATION IN HOSPITAL

Biomedical waste is mainly segregated in four categories.

They are

- Infectious waste which include human parts, tissue, dressings, soiled Lenin, swab. This waste is segregated in yellow colour code container having biomedical symbol over it.
- Waste like sharps, bottles, ampoules, knifes etc are to be disposed in blue coloured bin.
- Plastics, Ryle's tube, uro bag, gloves, catheters etc to be disposed in red coloured bin.
- All general municipal waste, papers, kitchen waste is to be disposed in black bin.

According to hospital policy, needles are disposed in sodium hypochlorite containing PPTC which are used for one week period. The solution has to be changed every day to maintain disinfecting level.

TREATMENT OF BMW ACCORDING TO CATAGORIES OF WASTE

COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES

COLOUR CODES	**Type of Container** -I Waste Category	**TREATMENT**
Yellow	All anatomic waste, trail waste, biopsy waste, soiled cotton, dressings	Incineration/deep burial
Red	Plastics, Ryle's tube, uro bag, catheters	Autoclaving/Microwaving/ Chemical Treatment
Blue/White translucent	Plastic bag/puncture proof containers Sharps, bottles, ampoules	Autoclaving/Microwaving/ Chemical Treatment and destruction/shredding
Black	General municipal waste, papers, kitchen waste	Disposal in secured landfill

Table no 1

Hazards of biomedical waste:

Bio medical waste in the hospital if not handled properly (collection, storage, transportation and treatment) leads to many hazards in terms of infection in the hospital as well as in the outer environment.

Picture shows various hazard of biomedical waste which may occur if waste is not disposed and treated properly and carefully

BIO MEDICAL WASTE MANAGEMENT IN BMCHRC

In every healthcare setup bio medical waste management is very important and necessary practice. In everyday practice some amount of waste is generated in hospital. This waste is generated from OPD, procedure room, IPD, operation theatre, wards etc.

Type of waste depends on healthcare setup.

BMCHRC is a cancer care specialty hospital so has waste generated from biopsy, daycare services, IPD, tissue culture, cytology in pathology department etc.

The waste is highly infectious and should be handled with care as patient seeking oncology services are already immune suppressed.

Amount of waste generated every day is **250 to 300 kg/ day**

Segregation is the waste management practice in the hospital.

Hospital has outsourced service with a authorized hospital waste collection agency named **Istromedics India pvt limited**.

The authorized vehicle comes every day to the hospital for waste collection as hospital does not have enough space for waste storage.

The waste generated in the different areas are segregated and disposed in bin with colour coding.

Bin colour code in hospital:

- Black code is meant for general municipal waste
- Red colour bins are meant for plastic waste i.e. I.V sets, catheters, urine bags, gloves etc.
- Yellow colour bins are meant for all soiled item, gauze, blood, dressings etc.
- Blue bins are meant for sharp items like bottles, ampoules etc

Hospital has a day care wing where patients get chemotherapy treatment and medicine residual, empty bottles, syringes are disposed carefully in separate yellow colour code bin meant for it.

This bin has symbol of cytotoxin for identification and staff convenience.

The container is treated with 1% sodium hypo chloride solution for disinfection.

If in case any residual medicine left in bottles after administration, 1% sodium hypo chloride solution is pushed in to it by the syringe for disinfection. This bottle is then only thrown in to the container.

For sharp instrument like needle after use is burnt by the needle cutter and then dropped in the sodium hypo chloride solution.

Provision of a separate cane is made in wards, sample collection room, OT, procedure room. This cane has sodium hypo chloride solution.

10% sodium hypo chloride + 1 liter of water

The cane is used for a week and daily the solution is changed.

Solution is separated with the help of mesh and thrown and new solution is prepared daily and needles are soaked in it.

Same cane is used for a week and after week cane is taken by the person of outsourced waste management agency.

- ✓ Method of disposal of residual blood in the hospital:

Residual blood is first autoclaved

↓

Blood gets haemolyzed

↓

Converted in to solid form

↓

Converted in small pieces with blade

↓

Disposed in to yellow bin

Gloves used by staff are first cut with knife and then only disposed in red bin.

According to hospital policy those gloves which are used for drug administration, minor procedures, which are not soiled are disposed in separate red bag, washed, dried and autoclaved and reused again.

Staff responsible for segregation:

Staff nurse is responsible for the waste management as well as housekeeping staff also takes care of the work.

Nursing in charge in the ward (IPD), day care, OT has to supervise it carefully.

Record keeping:

Record is maintained regarding day and timings of waste collection by authorized agency.

Requirement if any are also documented in the ward or OT register by nursing in charge and time to time it is sent to nursing superintendent for intend.

Thing to be kept under consideration before dispatching the bags to storage room for disposal and treatment.

The colour code polythene bags are labeled with day and date of collection of waste by agency personal and ward name from where it is collected. The bags are tied properly with thread in order to avoid spillage or any infection risk.

These bags are taken in biohazard cart meant for the purpose.

According to protocol gloves should be disposed after use. These gloves should be cut in to pieces by scissor and thrown in yellow code bags.

OBJECTIVE OF THE STUDY

- To assess the knowledge among nursing staff regarding biomedical waste management.
- To know hospital policy and practices for biomedical waste management.
- Assessment of knowledge, attitude and education status of nursing staff regarding BMW management.
- To determine awareness regarding waste management policy and practices.
- To provide necessary recommendation for the improvement of BMW management and thereby establish safe practices for patient and staff welfare.

METHOD OF DATA COLLECTION

- Closed ended and open ended biomedical waste management concerned questionnaires.
- On spot observation

TYPE OF DATA COLLECTED:

- Quantitative data

METHODOLOGY

The study is conducted at Bhagwan Mahaveer Cancer Hospital and Research Center an exclusive cancer care hospital located in the heart of the Jaipur city.

The tool used for collection of data was questionnaires which both open and closed ended questions related to their knowledge, understanding and behavior on biomedical waste management practices.

The questionnaires are further categorized in to three sets with different questions concerned to knowledge, attitude and education of ANS about BMWM.

Questionnaires were distributed among 81 staff nurses working in different areas of hospital like IPD, OPD, OT, Daycare services

Out of total 81 staff nurses, 60 staff nurses responded to the questionnaires and

Staff nurses of different age group, experience and educational background are surveyed for the assessment.

Age wise distribution of staff nurse

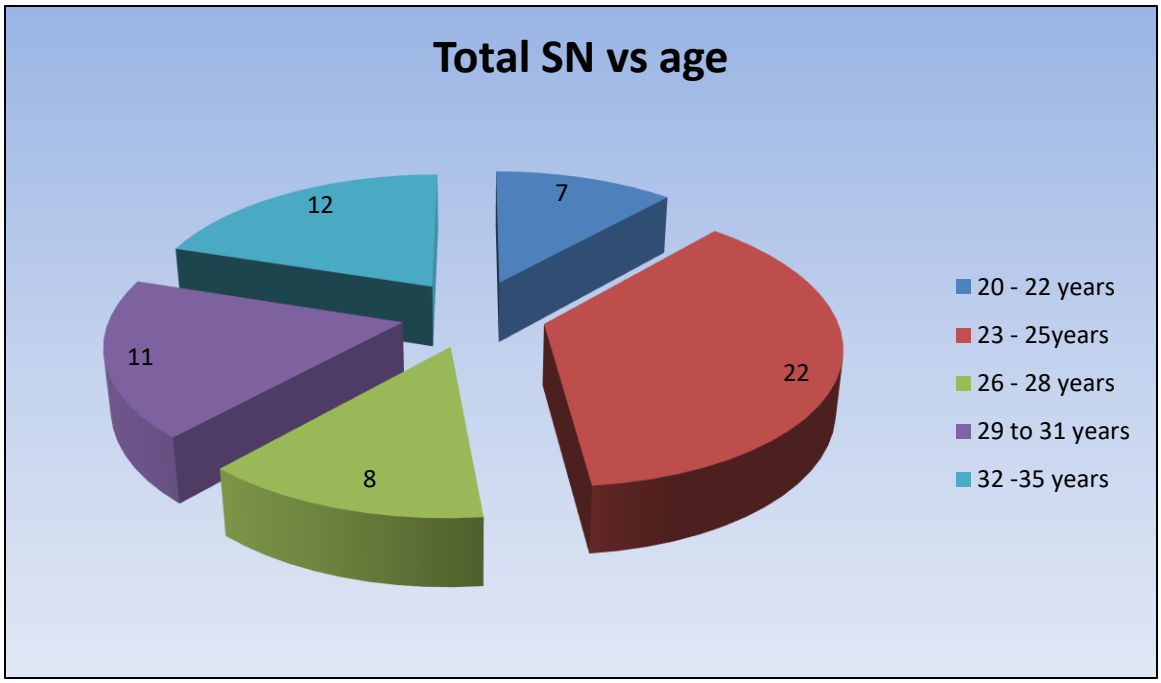


Figure no.1 Pie diagram shows staff nurses with different age groups

Mean age for staff nurses working in the hospital is 23 years.

TOTAL STAFF NURSE DISTRIBUTION AND EXPERIENCE

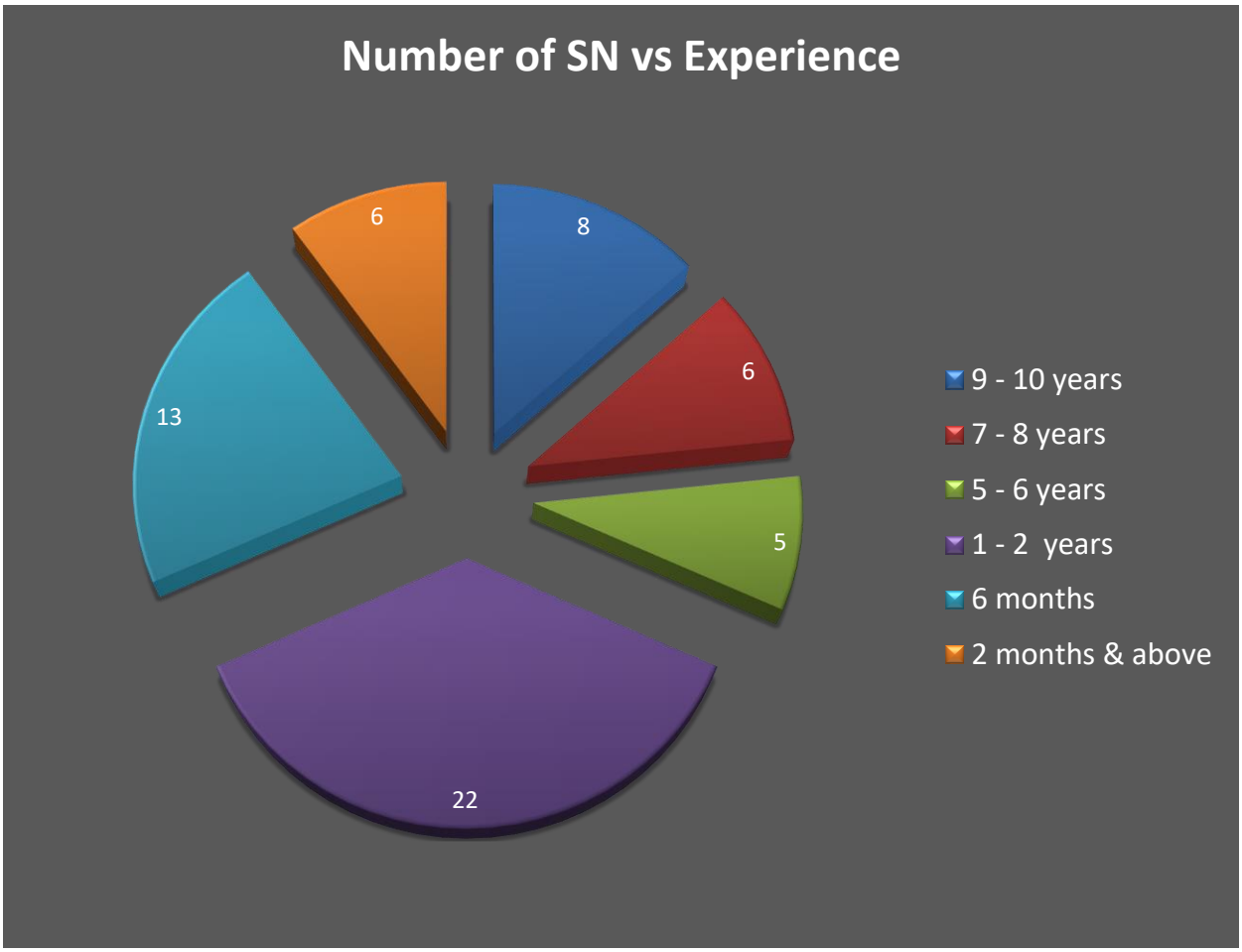


Figure no. 2 Pie diagram representing nursing staff experience.

Maximum staff nurses are with 1-2 years of experience in this field

Minimum of them are having experience of 5 years.

STAFF NURSES vs. EDUCATIONAL BACKGROUND

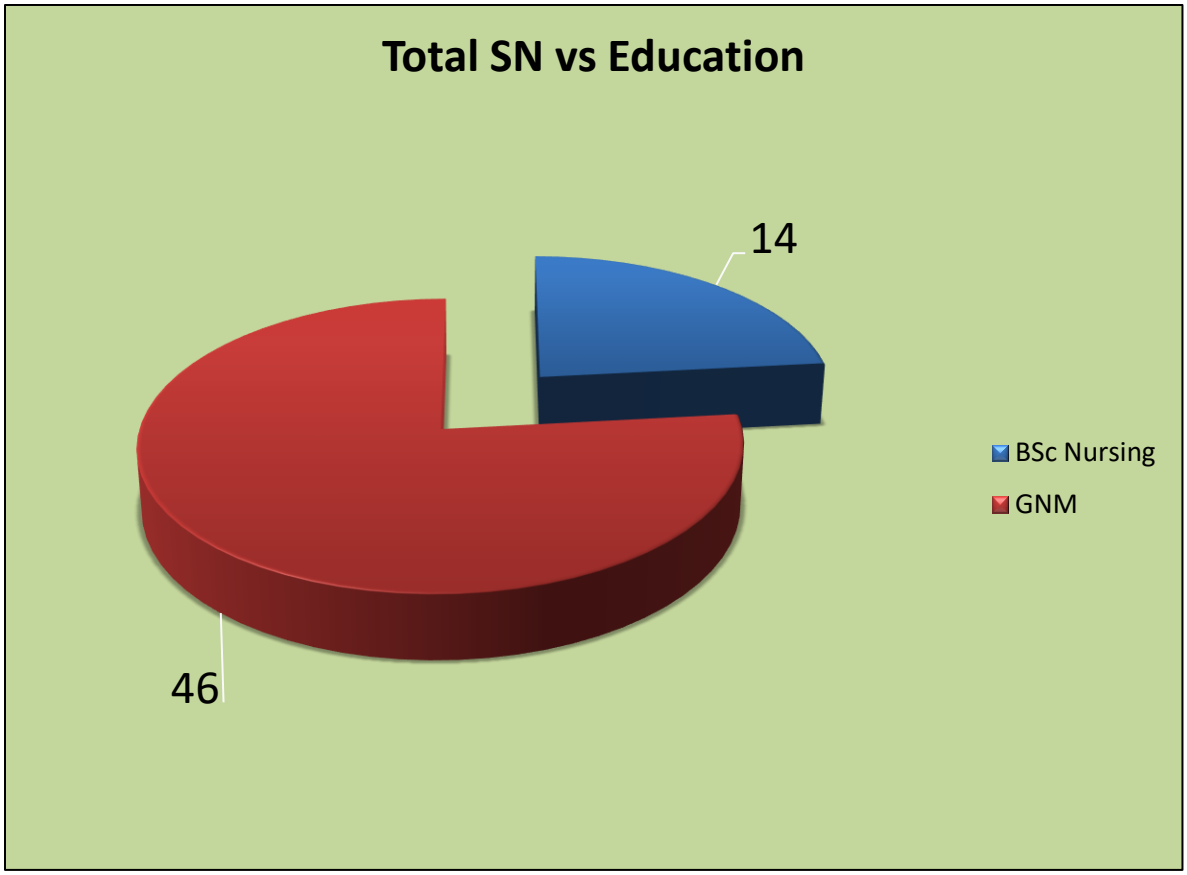


Figure no.3 study background of nursing staff.

During the survey of 60 staff nurses out of 83, 46 out of these 60 are found to be of GNM background and rest of 14 is BSc nursing graduates

Hospital has more density of GNM staff nurses.

Observation regarding waste management policy

Staff nurses are surveyed for the determination of awareness among them regarding the legislation applicable to hospital waste management and authorization.

They are also asked about their job description and whether waste management responsibility is included in it.

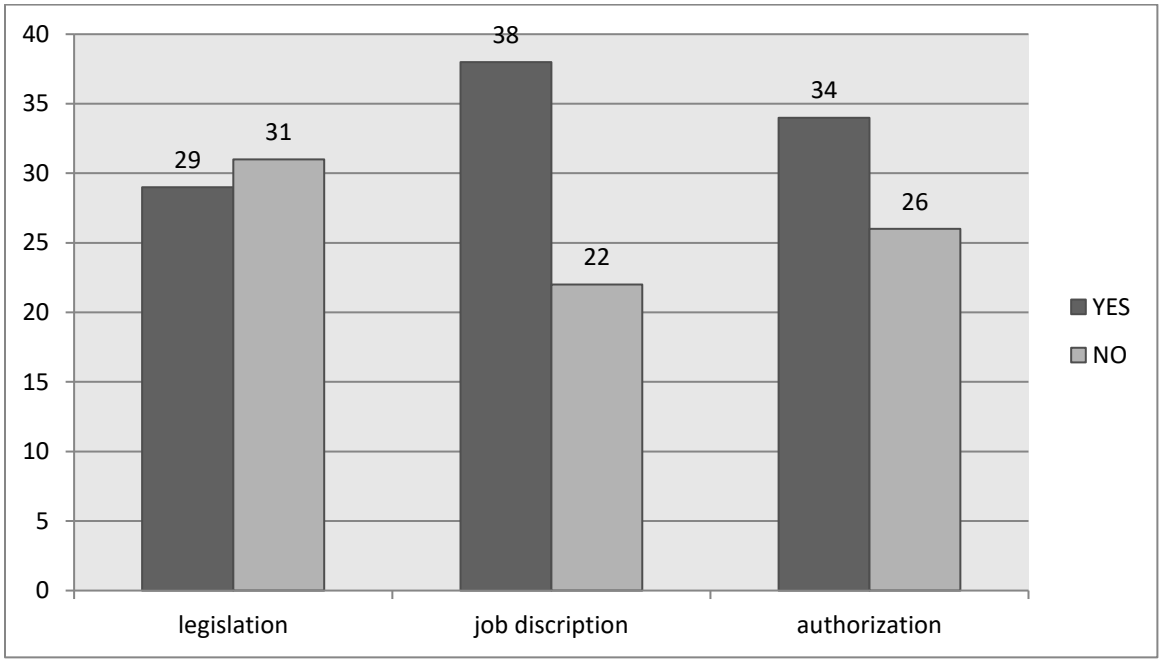


Figure no.4 Bar chart representing awareness among nursing staff for legislation and authorization.

48.4% of nursing staff are aware of legislation and can be able to explain it to some extent.

51.66% of staff nurses are not at all aware of legislation.

Total 63.3% staff nurses responded that the hospital waste management is included in their job description.

Only 32.67% have responded “NO” for the question

56.7% staff nurses explained the meaning of authorization and they are aware of it and rests of the staff don’t know about authorization.

WASTE MANAGEMENT PRACTICE

Regarding waste management staff was asked about waste management practices in their hospital in order to determine their knowledge and awareness about what is practiced in their hospital.

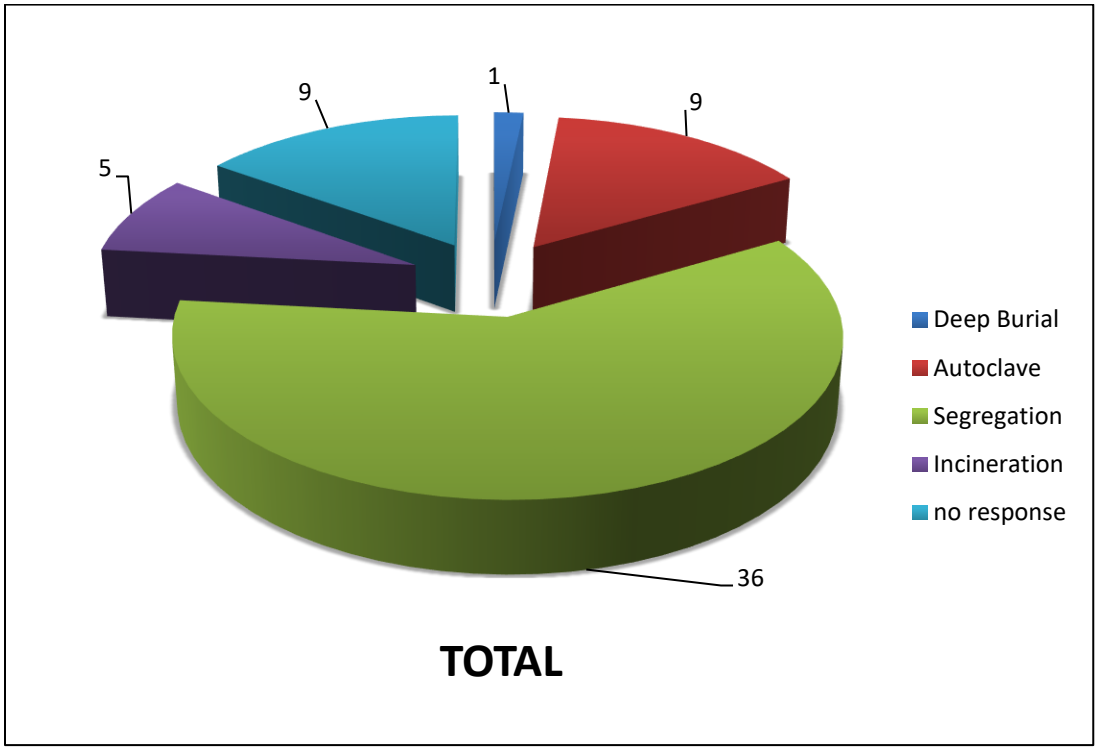


Figure no.5 Pie chart representing responses about waste management practice in hospital

Majority of the nursing staff responded “segregation” for waste management practice in hospital.

Although some are confused and ticked autoclave alone as gloves which are not soiled and used for minor procedure and medicine administration are washed and autoclaved but not considered as waste for disposal.

Hospital has only segregation method in practice and rest of the followed treatment is outsourced

WASTE DISPOSAL METHOD

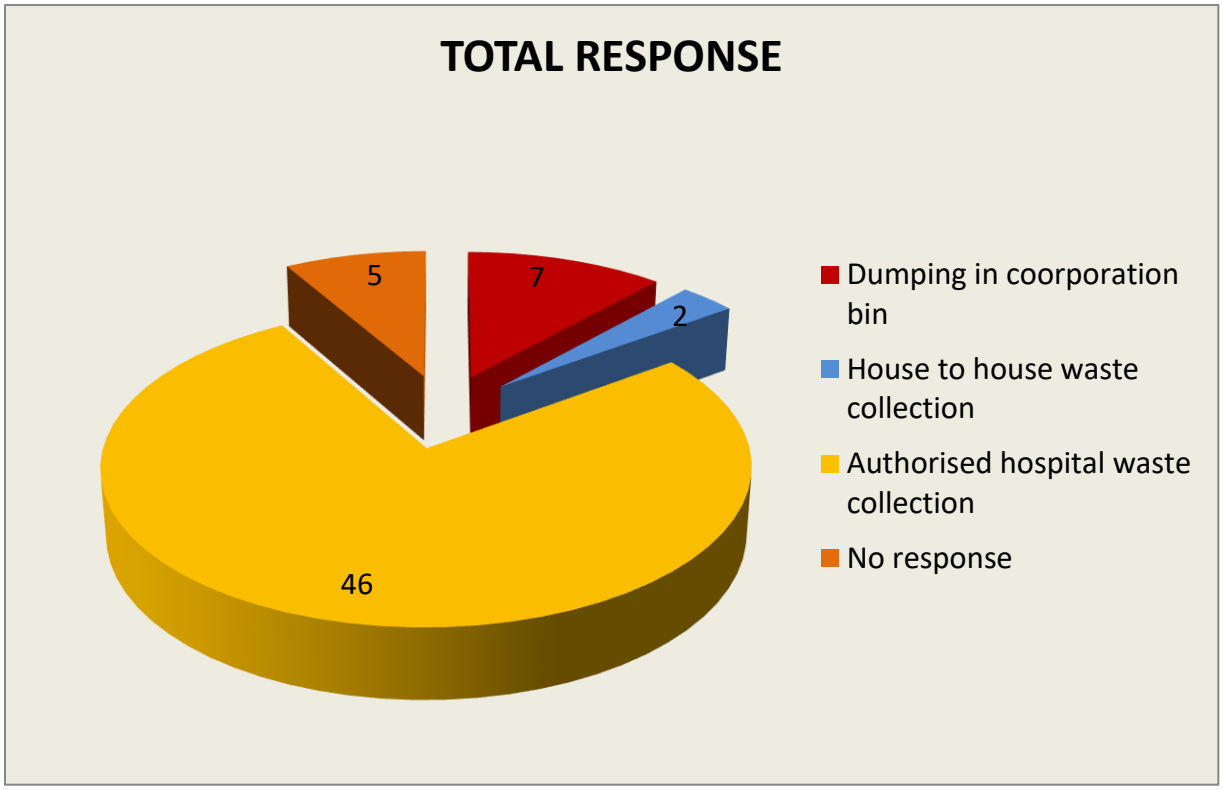


Figure no.6 Responses regarding waste disposal method

Total 46 SN responded correctly as authorized hospital waste disposal method.

5 SN have no response to the question and were confused.

7 said it is dumping in corporation bin

Rest of 2 responded house to house waste collection

Variation among total number of Staff and their responses for the time recommended for disposal of biomedical waste

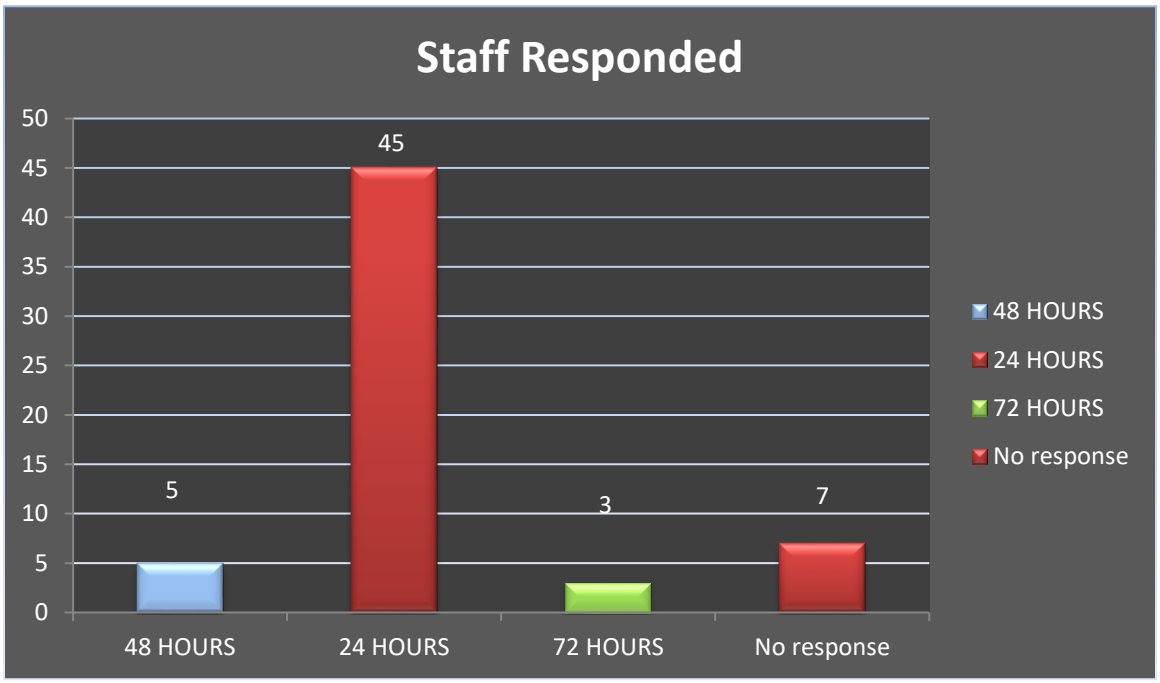


Figure no.7 Responses for waste storage time limit

Staff nurses when asked regarding time limit up to which BMW can be stored in the hospital, majority of the staff 75% responded 24 hours and few said 48 hours.

As per universal standard, BMW can be stored minimum 48 hours but in hospital bio medical waste is stored 24 hours and is taken by authorized vehicle after 24 hours. Hospital has no enough storage area so it is preferred to be disposed on daily basis.

So staff answered 24 hours for the question.

Only few number of staff was confused and don't responded to the question.

Three among them answered 72hours

Chemical treatment used for disinfecting waste in the hospital

Staff nurses have been asked regarding the chemical treatment they used for disinfecting the waste in order to know their level of awareness

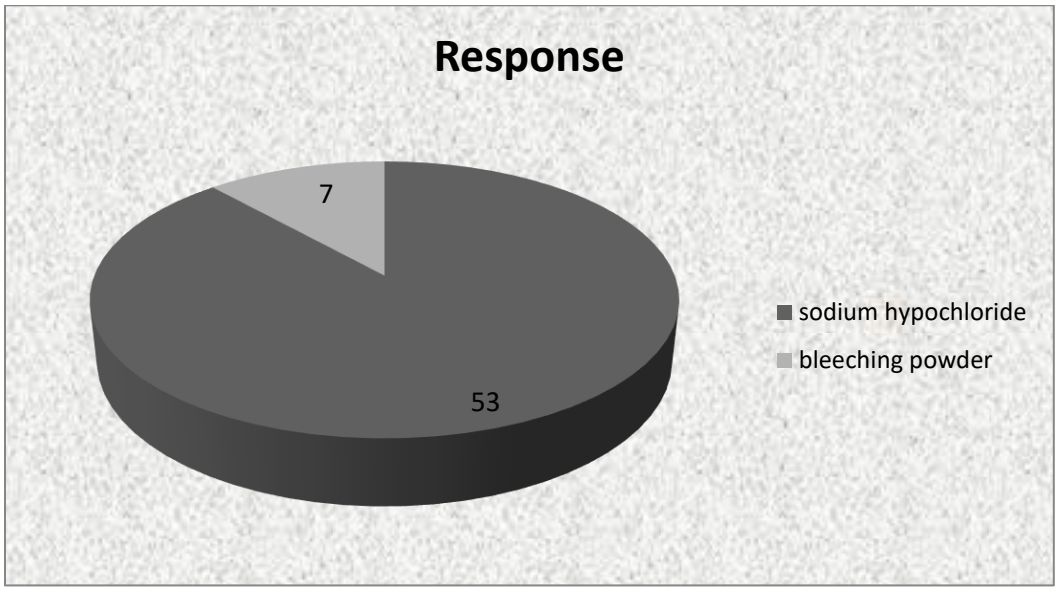


Figure no.8 response about disinfecting agent used in hospital

Majority of the staff responded correctly SODIUM Hypochlorite and few answered bleaching powder

Knowledge regarding colour coded bin and related waste

Total correct matches for the colour code containers and related waste disposed in them.

Total correct responses vs. total incorrect responses

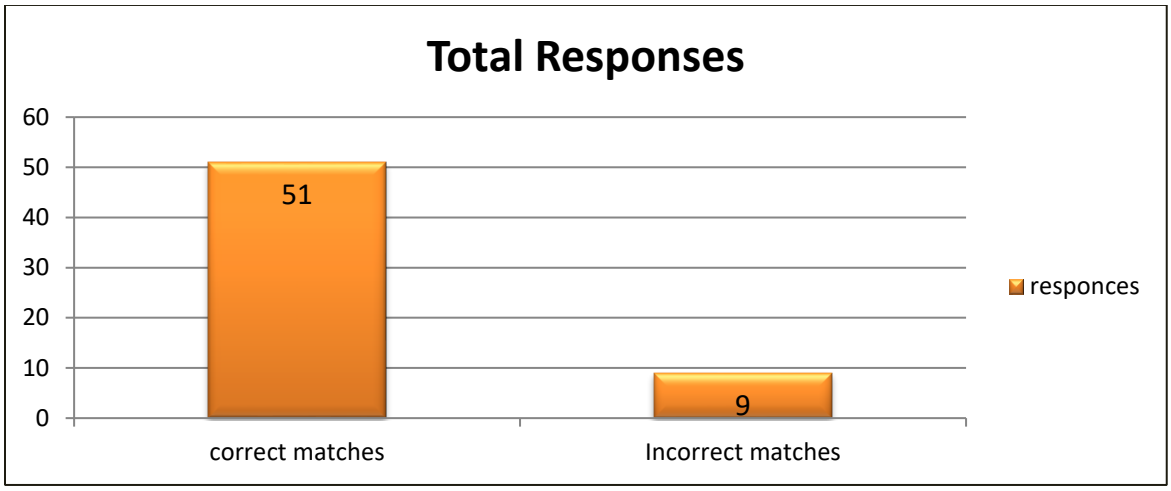
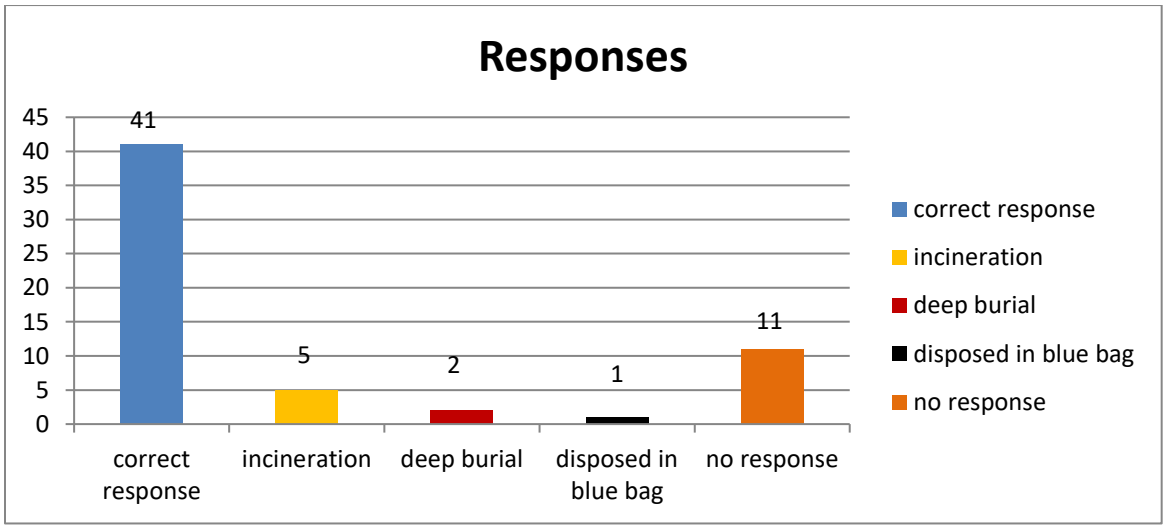


Fig no.9 Responses about colour coding

Method of needle disposal

An open ended question was asked to staff regarding method they adopt for needle disposal

Results: figure no.10 responses regards to needle disposal method in hospital



According to hospital policy needle are to be burnt by electric needle cutter and put in the PPC containing sodium hypochlorite (total 41 responses). This should be disposed when the level of the needle reaches 3/4th of the container. Ideally the PPC are disposed after week and taken by authorized person along with the other waste.

Method of disinfecting blood spillage

An open ended question was asked to the staff regarding the method of disinfecting blood spillage to assess their awareness and knowledge

23 staff nurses have given correct and complete answer to the question.

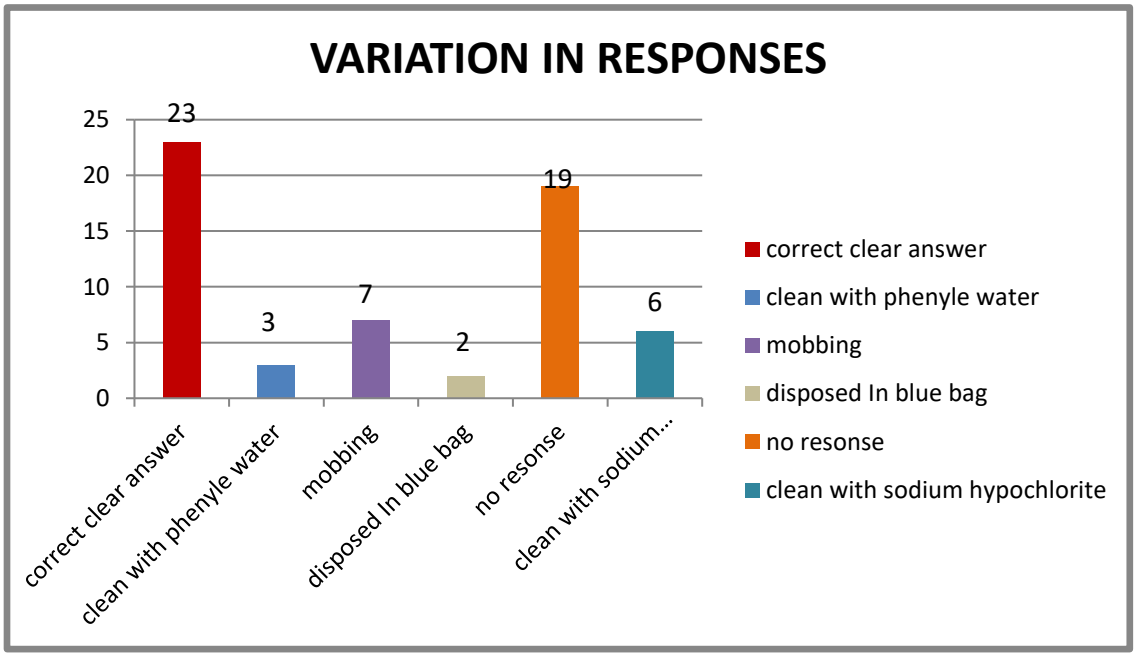
3 responded that it should be cleaned with phenyl mixed water.

6 said cleaning to be done with sodium hypochlorite.

2 said it should be disposed in blue code bin.

Other rest of 19 staff didn't respond to the question.

Figure no.11 Bars representing response variation among staff for disinfecting blood spillage



Graph showing variation in responses among nursing staff

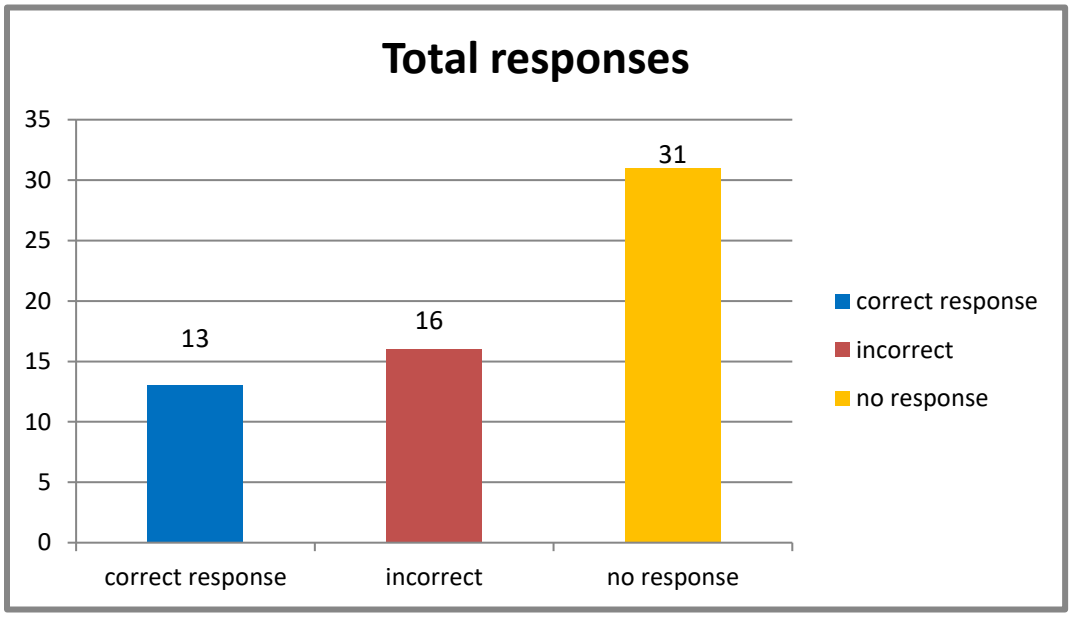
Method of disposing Cytotoxic drugs

It is one of the important aspects under biomedical waste management as cytotoxic waste is generated in the hospital on daily basis.

Care should be taken for proper management of this waste as they are very harmful. As hospital deals with cancer patients so cytotoxin waste is generated in much amount as compared to other hospitals which are not cancer specialty hospitals

An open ended question is asked to the staff to assess their knowledge regarding disposal and management of these drugs and it is noticed that:

Figure no.12 Bar representation related to responses for management of cytotoxic waste



According to hospital policy for BMW management cytotoxic drug, it should be disposed in separate yellow bags with cyotoxic symbol over it.

Residual medicine if left in the voil or bottle should be disinfected with sodium hypochlorite 1% solution.

Only 13 staff nurses answered correctly to the question and it is observed that these sisters belonged to daycare where patient for chemotherapy are admitted.

Total 16 staff nurses have given incorrect answer as some said it should be disposed in blue bag.

Majority of staff in other part of the hospital didn't respond to the question

Method of disposing used gloves

According to hospital policy those gloves which are soiled with blood, used in OT, procedure room, for dressing purpose should be cut and thrown in the red bag.

On the other hand gloves used in drug administration, minor procedure and not soiled are kept in separate container for identification convenience and are rewashed, filled with powder and autoclaved after keeping them in green cloth. These gloves are reused 2 to 3 time until the strength remains.

Staff responded variably to the question as some replied directly put in yellow bin,

Some said first cut and then thrown in the red bag.

Some according to knowledge, observation and practice replied autoclave.

Few others don't respond to this question.

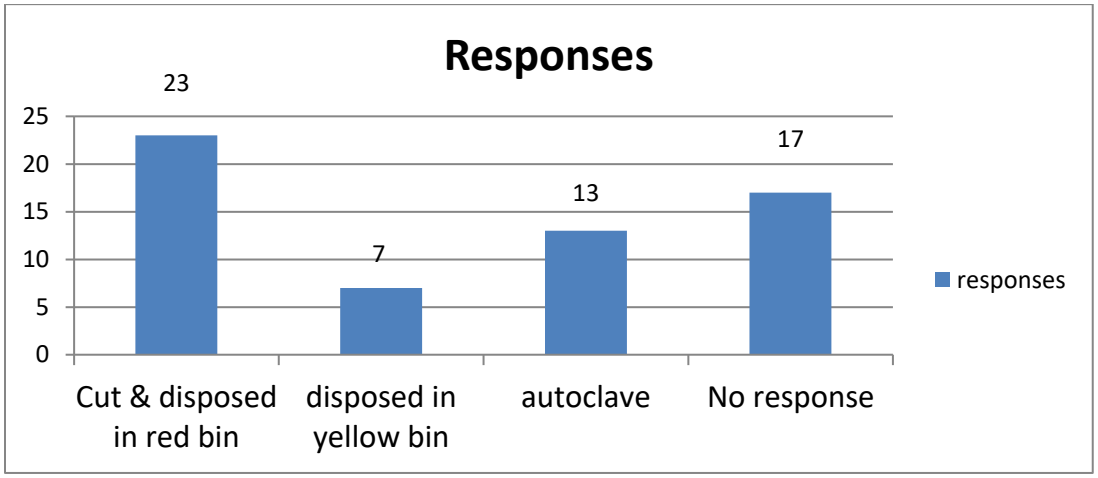


Figure no. 13

Bar diagram represents different responses by staff regarding method of gloves disposal

Identification of Biohazard and Cytotoxic symbol

Nursing staff was asked to identify two different symbols over the questionnaire and name them accordingly.

It was noticed that

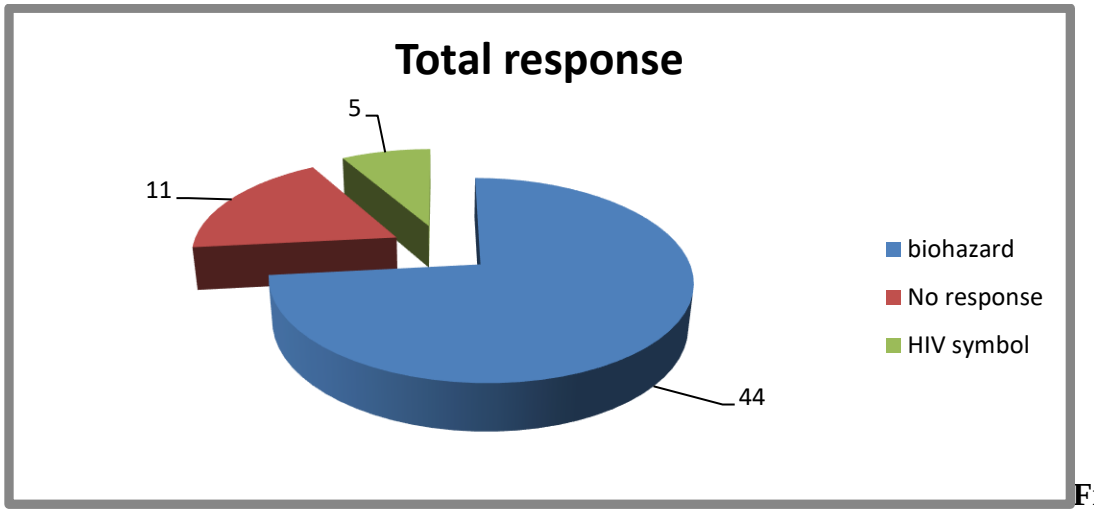


Figure no.14

74% of total staff can able to identify biohazard symbol.

18% have no response and couldn't identify the symbol &other 5% said it HIV symbol.

Similarly for cytotoxic symbol

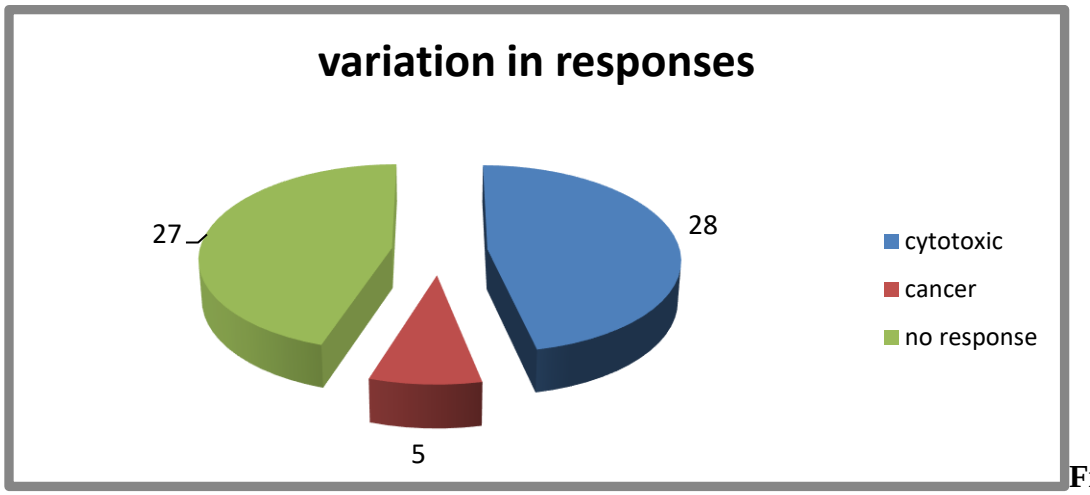


Figure no.15

EDUCATION ASSESSMENT OF STAFF

Staff nurses are asked regarding training program if any they have attended in past related to BMW management, annual education provided by the hospital and whether they are interested in such education and training program to enhance their knowledge.

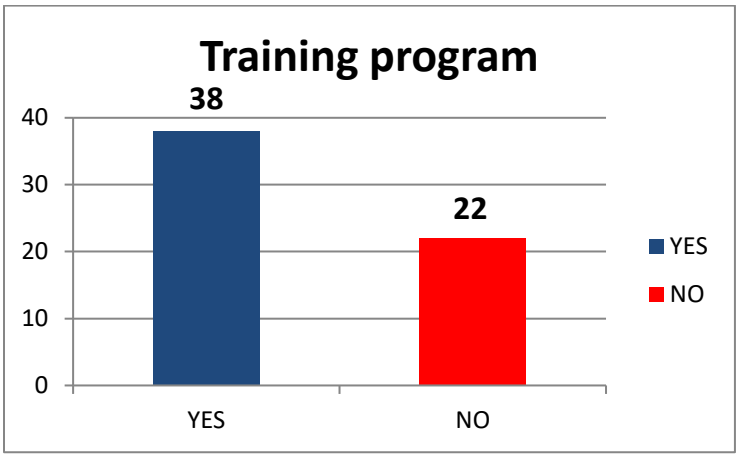


Figure no.16

Graph representing total number of staff attended training program and total not attended

38 staff nurses responded that they have undergone training program related to BMW management.

22 staff nurses responded no. The main reason was the rest of staff is new in the hospital or due to staff shortage they couldn't get the opportunity to attend the program.

When asked it was found that the training program was mainly attended by staff nurse in charge and senior staff

100% of staff nurses responded yes when asked whether they are interested in attended training program in future and the new junior staff was found eager to learn more regarding the topic.

Safe management of biomedical waste is responsibility of government

When the staff is asked about this there are different responses came.

Near about 22% of staff said it is a responsibility of hospital only not government.

31% said it is government responsibility mainly.

But other 49% of staff gave an effective answer that it is mutual responsibility and cannot be managed alone.

OBSERVATION AND FINDINGS

Knowledge regarding legislation and authorization:

48.4% of nursing staff are aware of legislation and can be able to explain it to some extent.

51.66% of staff nurses are not at all aware of legislation.

Total 63.3% staff nurses responded that the hospital waste management is included in their job description.

Only 32.67% have responded "NO" for the question.

Waste management practices in hospital

For waste management practices in hospital, 65% (Majority) of the nursing staff responded "segregation" for waste management practice in hospital.

Although some are confused and ticked autoclave alone as gloves which are not soiled and used for minor procedure and medicine administration are washed and autoclaved but not considered as waste for disposal.

Hospital has only segregation method in practice and rest of the followed treatment is outsourced

Waste disposal method in hospital: for disposal method it was found that:

Total 46 SN responded correctly as authorized hospital waste disposal method.

5 SN have no response to the question and were confused.

7 said it is dumping in corporation bin

Rest of 2 responded house to house waste collection

Time limit recommended for waste disposal:

Waste should not be kept in hospital beyond the time……..

Staff nurses when asked regarding time limit up to which BMW can be stored in the hospital, majority of the staff 75% responded 24 hours and few said 48 hours.

As per universal standard, BMW can be stored minimum 48 hours but in hospital bio medical waste is stored 24 hours and is taken by authorized vehicle after 24 hours. Hospital has no enough storage area so it is preferred to be disposed on daily basis.

So staff answered 24 hours for the question.

Only few number of staff was confused and don't responded to the question.

Three among them answered 72hours

Knowledge regarding Colour coded bins and waste:

Total 85% of staff have matched corrected the coloured bags to the respective waste and rest of 15% were wrongly matched them.

Method of needle disposal:

For method of needle disposal 69% staff nurses have given correct answer of the question and other 31% ticked wrong option.

Method of disinfecting blood spillage:

Only 38% of staff nurses responded correctly the method used for it and other staff had given wrong method.

Method of gloves disposal: staff was confused regarding gloves disposal and responded in a different way.

Gloves are disposed in red coded bin, only gloves used over HIV, HBsAG patients are disposed in separate yellow coded container which contains sodium hypochlorite solution.

OBSERVATION IN GENERAL REGARDING BMWM IN HOSPITAL

Hospital is generating near about 300 kg of biomedical waste per day. It includes harmful cytotoxic waste from day care area. Every hospital has its own policy about waste management.

There is no treatment plant of facility available in the hospital complex as the hospital is located in the main centre of the city so it is outsourced to Istromedics India Pvt lmt located 30 km away from the main city.

Waste management practices in the hospital is only segregation where in there are four different colour coded for different categories of the waste.

For cytotoxic drugs they are using yellow coded bins.

Wards generally don't have charts and pictorial representation for their reference and knowledge purpose.

Biohazard and cytotoxic symbols are often missing over the bins which is very important for staff to quickly identify the correct bin for disposal.

Needles are kept in the try without cutting them which may causes injury and spread infection.

PPTC are kept open in day care ward which can cause spillage of solution containing burnt needle.

Often it was noticed that tea cups, foils etc are disposed in yellow or red bags.

Staff dispose gloves in yellow bin where as it should be disposed in red code bin.

Disposal bags when taken to the storage area are sometime left in the circulation are or over the ramp which can be a source of infection.

CONCLUSION & DISCUSSION

Biomedical waste management is one of the important aspects which are being practiced in the hospital. Its proper management serves in hospital infection control. All type of staff in the hospital comes in its contact directly or indirectly so it is needed that disposal and management of the waste should be carefully carried out. After a survey for assessment of nursing staff regards to knowledge, behavior, education and attitude for waste management it was noted that few of the nursing staff have good knowledge about the matter and want to implement all the policies related to it in the hospital that means they showed a positive attitude towards it. Some don't know much about the subject but are keen to learn it and shows interest in future training and education.

Less than half of the staff is fully aware of the waste management practices and can be able to give clear and correct responses during the survey.

Biomedical waste management is very important for effective infection free patient care.

Patient suffering from cancer disorder have very less immunity due to medications and radiotherapy like treatment and they are susceptible to get infection very easily.

They need a clean and infection free environment for quick recovery and effective care. Length of stay for such patient is also much as they have to stay in hospital environment for a long period of time and thus an effective patient care should be indirectly provided to him by implementing and following waste management practices in the organization

RECOMMENDATION

- In order to enhance the knowledge and awareness of staff regarding waste management and other several aspects related to waste it is very necessary to have training program for the staff.
- New staff nurses should be given a proper orientation related to the subject so that they can understand it and can able to manage it.
- Nursing in charge at each ward should also be responsible to guide new staff.
- Periodic audits for biomedical waste management should be undertaken by management in order to find any problem or mistake or carelessness on the side of nursing and housekeeping staff
- Proper record maintenance, record keeping should be mandatory at each ward, OT, OPD etc. this record should have details of

- Type of waste
- Amount of waste generated per day
- Material used
- Day, date, time of waste dispatched from ward by authorized person,
- Date when new PPC is kept in the ward

- These record help during audit, material intend and transparency is maintained where in management can look in to it easily.
- Charts with pictorial representation for waste segregation should be pasted at each ward and OT area for staff reference; it helps them in recalling the subject and understanding.
- Staff nurses in charge should instruct and guide their junior staff so they can work effectively.
- PPTC should be labeled with date of issue and should be disposed after week and Solution should be daily changed and recorded.

- A demonstration class should be arranged time to time for housekeeping staff also as they can understand effectively by this method as they are also coming in contact with the waste regularly.
- Gloves should be used only one time and disposed after use as after use the resistance for infection remains less.
- Bin should be kept closed properly to avoid spillage and to maintain cleanliness.
- Biomedical waste bin should be kept in a separate area or corner away from patients and attendants circulation area.

- Staff nurses and housekeeping staff carries biomedical waste or come in contact of it should wear gloves, masks for their safety.
- Biomedical waste should be filled to ¾th only in order to avoid spillage etc.
- PPTC should be filled up to 3/4th level so to have proper immersion of needle in it.
- PPTC should be kept closed always after putting needles to it, it can leads to spillage and spread of infection.
- For knowledge and awareness for BMWM, chart with pictorial representation are kept in all the wards, daycare, ICU, OT. These charts represent segregation method, Gloves disposal method, Blood spillage disinfection method etc.

ANNEURE / APPENDIX

BHAGWAN MAHAVEER CANCER HOSPITAL
RESEARCH CENTRE
(MANAGED BY: K.G. KOTHARI MEMORIAL TRUST)

QUESTIONNAIRE SURVEY ON NURSING STAFF FOR BMW MANAGEMENT

Person interviewed

Name: sex: Age:

Education: Designation: Experience:

(3) Are you aware of legislation applicable to hospital waste management?

Yes no

If yes please justify acts:

(4) Are you aware of authorization?

Yes no

If yes when required

(5) Do the waste management responsibility were included in your job description?

Yes no

(6) Name the waste management practices in your hospital?

Deep burial	Autoclave	Segregation
Incineration	None of above	

(7) What is the waste disposal method in your hospital?

A. Dumping in corporation bin
B. House to house waste collection
C. Authorized hospital waste collection

(8) If authorized hospital waste collection please name the authorized agency meant for it:

_____

(9) Biomedical waste should not be kept in the hospital beyond

(a) 24hours (b) 72hours (c) 48 hours (d) don't know

(10) Deep burial of bio medical waste is recommended only in area with population less then

(a) 1 lakh (b) 5 lakh (c) 2lakh (d) don't know

(11) What method should be adopted for disposal of sharps (needles)?

(a) Incineration (b) deep burial (c) autoclave (d) shredding/mutilation

(12) Chemical treatment used for disinfecting waste is:

(a) Bleaching power (b) sodium chloride (c) sodium hypo chloride

(d) Chlorine

(13) Do you colour code waste for disposal?

Yes no

(14) If yes match the following:

(a) Black code	(a) Blood, human tissue, soiled clothes
(b) Yellow code	(b) plastic bags, IV, ryle's tube, catheter
(c) Red code	(c) glasses, sharp instruments, bottles
(d) Blue code	(d) general municipal waste

(15) Should we tie bio medical waste disposable bags before disposing?

Yes no

If yes then how justify:

(16) What is the method of disposing sharp needles in your hospital?

_____

(17) Match the correct one:

A. Yellow bin waste	(a) shredding, deep burial
B. Red bin waste	(b) municipal corporation disposal
C. Black bin waste	(c) shredding, autoclaving, disinfection
D. Blue bin waste	(d) incineration@ deep burial

(18) Do you know the method of disinfecting the blood spillage?

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(19) What is the method of disposing cytotoxic drugs?

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(20) How the residual waste blood in hospital should be disposed according to hospital waste management policy?

21. What method do you adopt for disposal of used gloves?

22. What should be done to the BMW bags before it is handed over to waste collector?

23. Please recognize these symbols:

BIOHAZARD SYMBOL

BIOHAZARD

CYTOTOXIC HAZARD SYMBOL

CYTOTOXIC

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EDUCATION ASSESSMENT:

(21) Have you under gone any training program on the hospital waste management?

Yes no

If yes

How effective you felt it is?

(22) Does the hospital provide annual education on waste management for employees?

Yes no

(23) Would you like to attend a programme on hospital waste management?

Yes no

(24) Safe management of healthcare waste is not an issue at all.

Agree disagree no comment

(25) Safe management of health care waste is a responsibility of government:

Agree disagree no comment

(26) Waste management is team work / no single class of people is responsible for the safe management:

Agree disagree no comment

THANK YOU FOR YOUR CO-OPERATION

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PHOTOGALLERY OF BIOMEDICAL WASTE SEGREGATION , DISPOSAL AND MANAGEMENT IN BMCHRC

Ryle's tube and catheter disposed in yellow bin

Needles and syringes kept open and exposed.

PPTC containing needles is kept open without any closet.

Papers, masks and gloves disposed in yellow coded bin

Gloves are washed and hanged for drying in the ward circulation area

BIOMEDICAL WASTE STORAGE AREA

Training program for staff nurses on Bio Medical Waste Management

(A brief overview to biomedical waste)