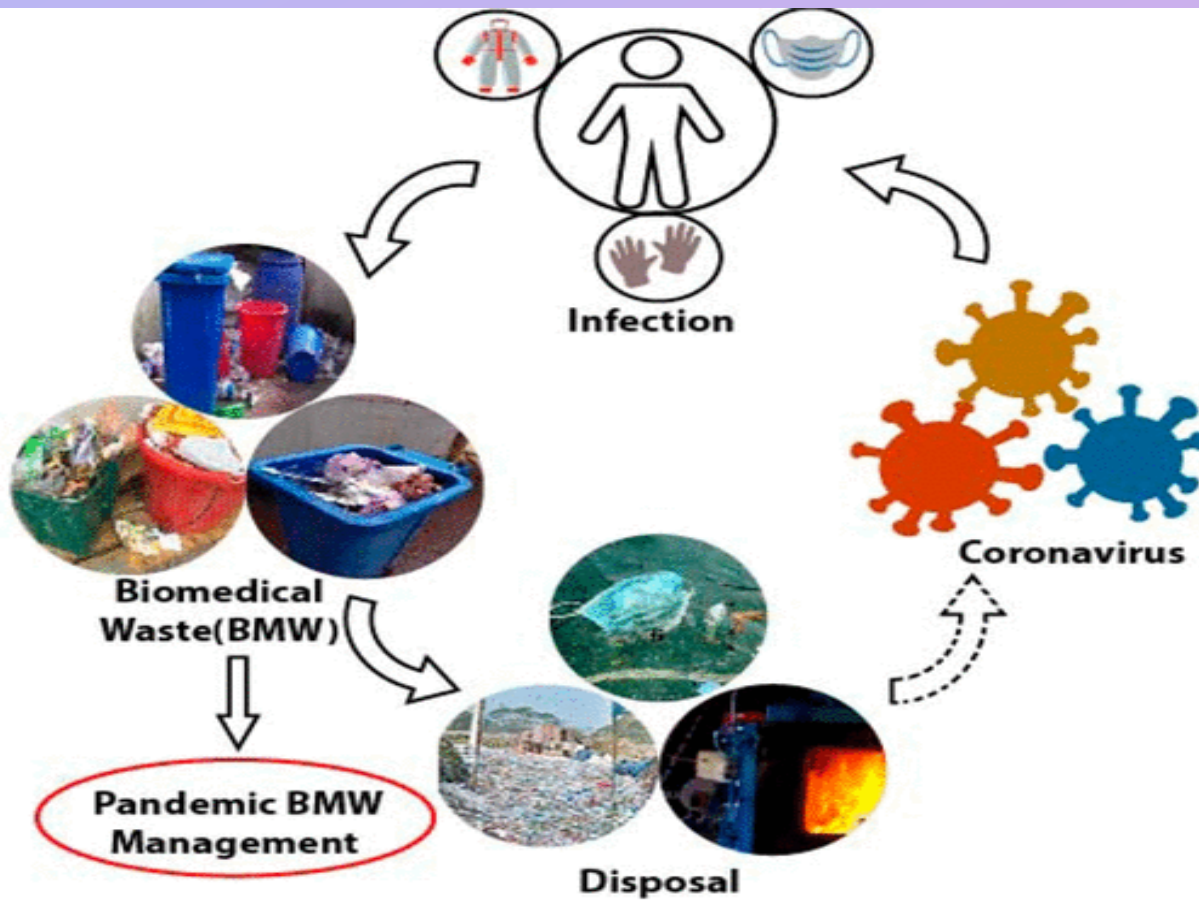




STUDY OF KNOWLEDGE, PRACTICE AND ATTITUDE ABOUT BIO MEDICAL WASTE MANAGEMENT IN A COVID-19 ERA IN A HOSPITAL OF LUCKNOW

Submitted by-
Dr. Anubha Rastogi
MBAHEM-25
IIHMR-U/01/2020-22/1071



About the hospital-

The Vivekananda hospital-

- The Vivekananda Polyclinic & Institute of Medical Sciences is sometimes referred to as the Vivekananda Hospital. It is a multi-facility hospital that was built in Lucknow with the purpose of giving sick and injured people medical care and treatment.
- The 350-bed hospital is equipped to handle emergencies around-the-clock. Every medical requirement of patients is met by the hospital's several departments. This hospital provides a variety of services, including ENT, cardiology, asthma, dermatology, gastroenterology, gynecology, neurology, orthopedics, oncology, pathology, psychiatry, and radiology.
- There are several auxiliary departments accessible at this hospital to support the regular departments. Seven complementary therapies are added to the facility's Allopathic wing. These include Acupressure, Homeopathy, Yoga, Reiki, Naturopathy, and Ayurveda.
- A group of 20 people is in charge of managing biomedical waste. There were 802,912 patient treatments reported overall in a calendar year. The operating room produced the most trash (3.5 kg/day), followed by the ICU, NICU, and medical ward (3.4 kg/day) in that order .

Introduction-

- Biomedical waste is described as trash produced during the diagnosis, testing, treatment, research, and creation of biological waste products for people or animals. Syringes, live vaccinations, laboratory samples, body parts, bodily fluids, sharp needles, cultures, and lancets are examples of biomedical waste. The legislation requires such institutions to adhere to regulations that safeguard the public from coming into touch with biological waste since it can be harmful to human health.
- In addition to being a risk to patients and workers who manage these wastes, hospital waste poses a hazard to public health and the environment. With improper biomedical waste management in mind, the Ministry of Environment and Forests issued the "Biomedical Waste (management and handling) Rules, 1998" in July 1998. According to these Rules (Rule4), it is the responsibility of every "occupier," i.e. a person who has authority over the institution and or its premises, to take all reasonable means to ensure that waste generated is managed in a manner that is safe for human health and the environment..
- The ongoing alteration of the coronavirus's genomic sequence and its widespread transmission have increased the likelihood of verified COVID-19 cases and fatalities. Since there was a paradigm change in the form of the enormous number of wastes created as a result of this pandemic, biological wastes (BMW) affect not just doctors or nurses but also other HCPs including pharmacists, technicians, interns, and therapists in hospitals and all healthcare sectors. Disposable personal protective equipment (PPE) like gloves, surgical masks, N-95 masks, air-purifying respirators, goggles, face shields, safety gowns or suits, and shoe covers were used more frequently than expected

Classification of biomedical waste

Non-hazardous waste -

This constitutes about 85% of the waste generated in most healthcare set-ups. This includes waste comprising of food remnants, fruit peels, wash water, paper cartons, packaging material etc.

Hazardous waste -

Biohazard: Biological hazards, also known as biohazards, refer to biological substances that pose a threat to the health of living organisms, primarily that of humans. This can include medical waste or samples of a microorganism, virus or toxin (from a biological source) that can impact human health. It can also include substances harmful to animals. The term and its associated symbol is generally used as a warning, so that those potentially exposed to the substances will know to take precautions.

Radioactive waste-

It includes waste contaminated with radionuclide; it may be solid, liquid or gaseous waste. These are generated from in vitro analysis of body fluids and tissue, in vitro imaging and therapeutic procedures.

Chemical waste-

It includes disinfectants (hypochlorite, glutaraldehyde, iodophors, phenolic derivatives and alcohol based preparations), X-ray processing solutions, monomers and associated reagents, base metal debris (dental amalgam in extracted teeth).

Pharmaceutical waste-

It includes anesthetics, sedatives, antibiotics, analgesics etc.

Treatment and disposal techniques for biomedical waste -

There are several methods that have been successful in the treatment of infectious waste.

1. AUTOCLAVE-

To sanitize medical equipment, autoclaves are closed chambers that apply heat, pressure, and occasionally steam over time. Since over a century ago, autoclaves have been used to disinfect medical equipment before reusing it .

2. INCINERATION-

Incineration has the benefit of not requiring pre-treatment and being appropriate for modest heating volumes over 2000 Kcal/Kg for single chamber and 3500 Kcal/Kg for double chamber. The garbage must be flammable and have a moisture content of less than 30%.

3.THERMAL INACTIVATION-

To destroy pathogenic organisms, trash is subjected to a process called thermal inactivation. Waste liquid is gathered in a container and heated using heat exchangers or a steam jacket around the container. The temperature and time of treatment are based on the types of pathogens present in the waste.

4. GAS/VAPOUR STERILIZATION-

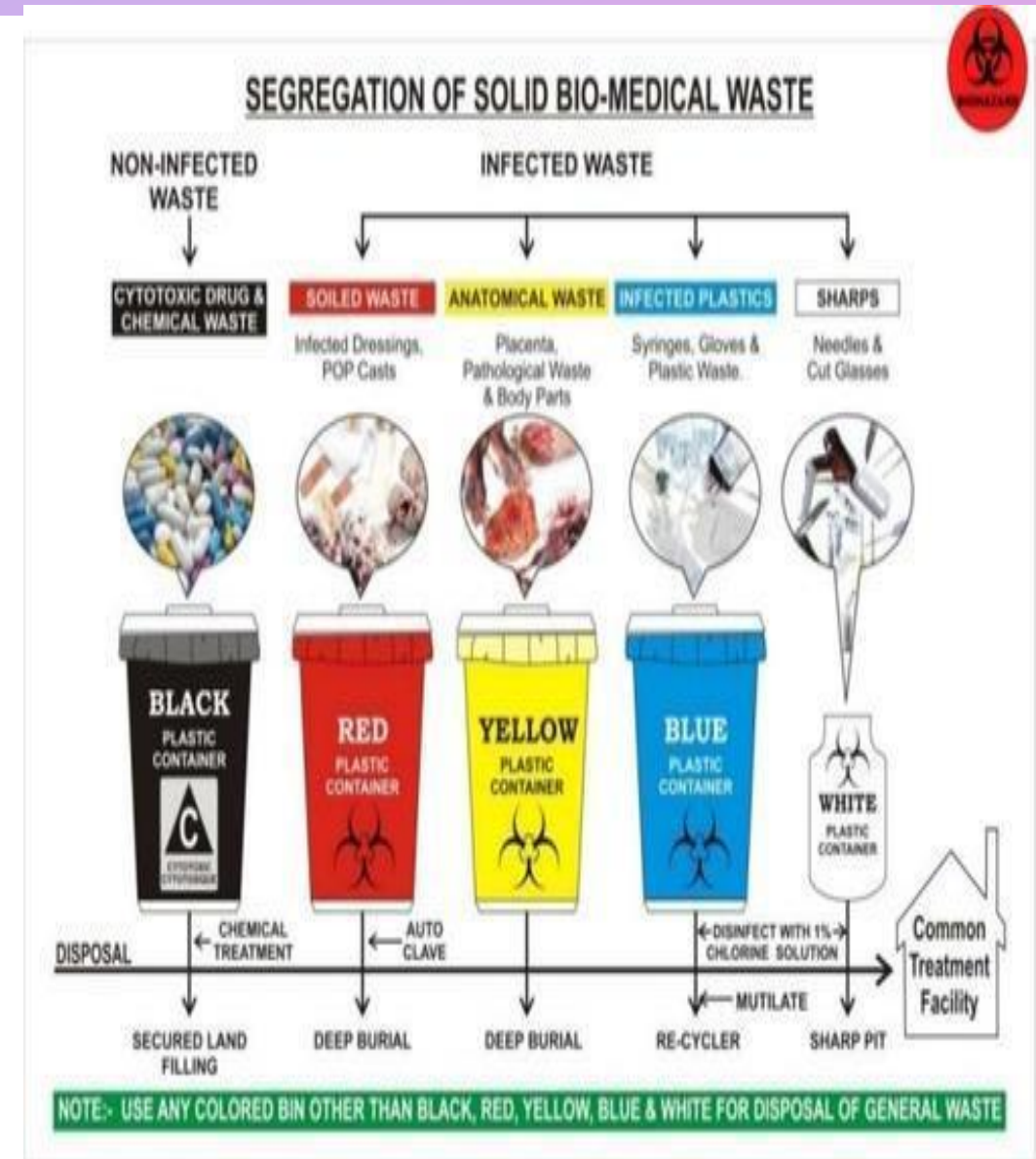
Chemicals that are gaseous or evaporated are used in gas/vapor sterilization. The most often utilized agent is ethylene oxide, however it should be handled with caution because it may cause cancer in humans

5.CHEMICAL DISINFECTION-

For liquid pathogenic wastes, chemical disinfection is the preferred method of treatment. Chemically treated garbage should be disposed of according to state and municipal regulations.

The Biomedical waste management rule, 1998 mainly comprise of:

1. Schedule I- Schedule I comprises biological waste categories. The physio-chemical and biological natures of these components, as well as their toxicity and possible hazards, differ, necessitating alternative methods/options for treatment/disposal. As a result, under Schedule I of the Bio-medical Waste(Management and Handling) Rules, 1998 waste originating from various types of such institutions has been classified into ten separate categories, with treatment and disposal options given for each.
2. Schedule II- Colour coding & type of container for disposal of bio-medical waste .



3.Schedule III- Different labels for bio-medical waste containers and bags shall be required for identification and safe handling Waste .

4.Schedule IV- Label for transport of bio-medical waste containers /bags.

5. Schedule V- Standards for treatment and disposal of bio-medical wastes

6.Schedule VI - Schedule for waste treatment facilities like incinerator/ autoclave / microwave system



OBJECTIVE OF THE STUDY

OBJECTIVE-

- To study the knowledge , attitude and practice among the doctors ,interns, staff workers.
- To provide suggestions for increasing the knowledge on bio medical waste management

METHODOLOGY

Study design- Descriptive cross-sectional

Setting of the study-The study was conducted to assess the knowledge, practice and attitude on BMW management among various healthcare employees, who are involved in caring for COVID-19 patients in healthcare sector, The Vivekananda polyclinic hospital of Lucknow UP .

Sample size-The sample size consists of 150 workers who are working in hospitals who full filled the inclusion criteria of sample selection.

Data collection-Data were collected through scheduled by using semi structured questionnaire and checklist to assess the knowledge ,attitude and practice regarding biomedical waste management

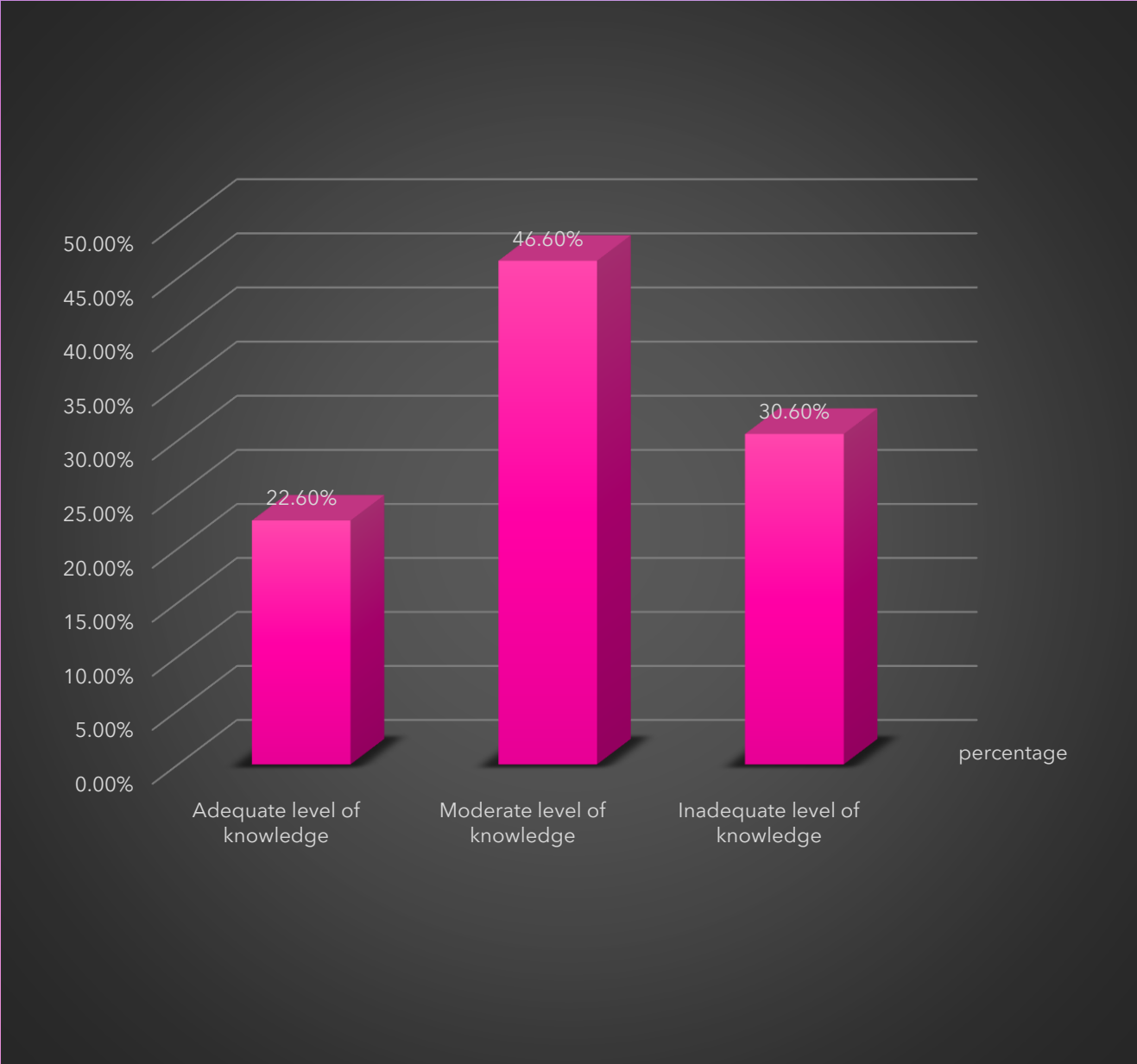
Results and Interpretation

KNOWLEDGE-

This chart depicts the percentage distribution of samples based on the knowledge score of doctors, interns, nurses, lab technicians, and paramedics related biomedical waste management. It was shown that 22.6 percent had adequate level of knowledge, 46.6 percent had moderate level of knowledge, and 30.6 percent had inadequate understanding.

Parameters of Knowledge –

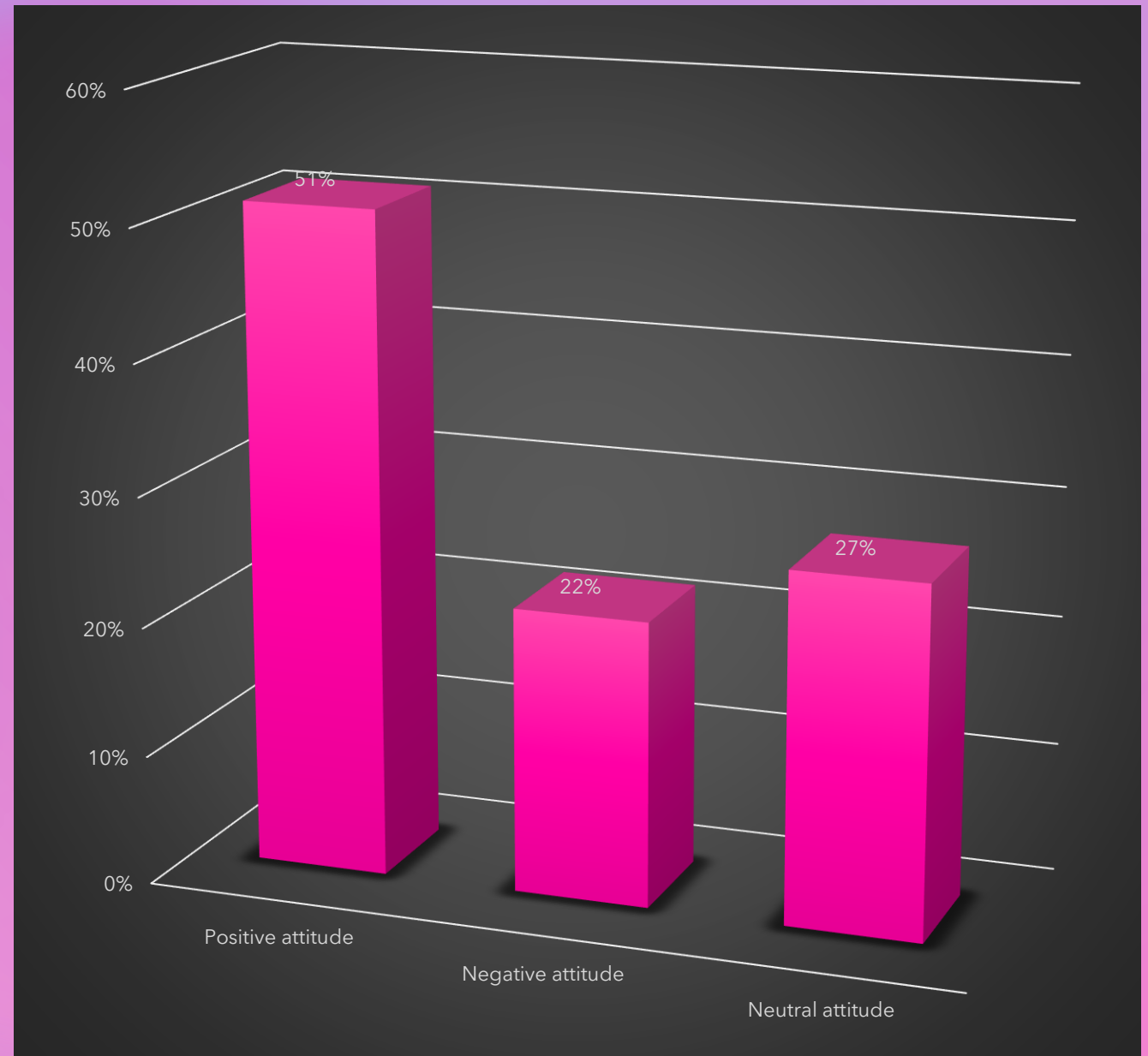
- Adequate level of knowledge-20-50%
- Moderate level of knowledge-40-70%
- Inadequate level of knowledge-25-50%



ATTITUDE-

This chart depicts the percentage distribution of samples based on the attitude score of doctors, interns, nurses, lab technicians, and paramedics toward biomedical waste management. It demonstrates that 51 percent had a positive attitude toward waste management, 22 percent had a negative view, and 27 percent had a neutral opinion.

With the help of likert scale we calculated attitude level - strongly agree, agree, neutral, disagree, and strongly disagree , which was scored as 5, 4, 3, 2; and 1 respectively .



PRACTICE-

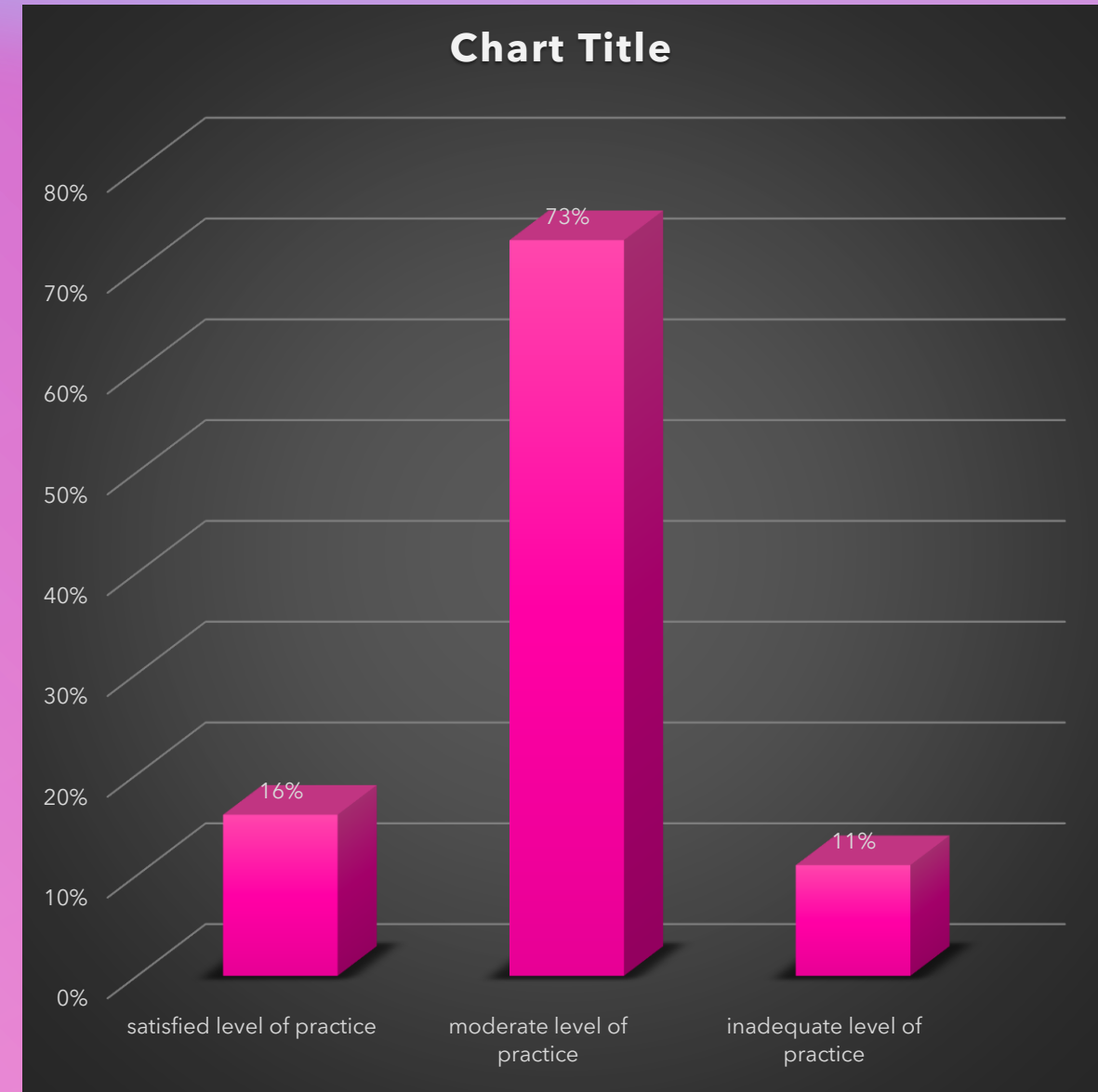
This chart depicts the percentage distribution of samples based on the practice score of doctors, interns, nurses, lab technicians, and paramedics regarding biomedical waste management. It demonstrates that 73 percent of had a moderate level of practice, 11 percent had insufficient practice, and 16 percent had a satisfied degree of practice . As 16% of HCPs utilized and discarded all PPE while working with BMW. Approximately 73 percent of HCPs followed the colour labelling of containers based on the kind of waste during BMW disposal, as well as regulations categorizing trash into non-hazardous, hazardous, and sharp waste. And kept track of BMW records., 11% of HCP avoiding recapping used needles, they avoided using mask and PPE while attending the patient ,and they didn't wear gloves while examining and doing small treatments.

Parameters are-

Satisfied level of practice –less than 40%

Moderate level of knowledge-more than 50%

Inadequate level of knowledge-less than 30%



- As a proportion of samples based on doctors, interns, nurses, lab technicians, and paramedics' understanding of biomedical waste management. It was shown that total there were 150 HCP was surveyed in which ,22.6 percent had acceptable knowledge, 46.6 percent had intermediate knowledge, and 30.6 percent had poor understanding. It indicates that additional information should be increased through hospital-provided training and learning events.
- The majority of the physicians and nurses were more upbeat than others. HCPs agreed that the safe disposal of BMW was required for healthcare locations with the use of teamwork. The 22% of HCPs had a negative perspective because BMW management risked transferring infectious diseases., while 27 percent of those with a neutral attitude said that segregating hospital waste into separate categories was time consuming. Approximately 51% of HCPs strongly agreed that PPE was required while handling BMW and that cleaning and disinfection decreased infection. The majority believed that competent BMW management improved the quality assurance of healthcare sectors and that updated understanding of BMW management was required .
- While treating COVID-19 patients, HCPs generally followed infection control procedures. As many as 16% of HCPs utilized and discarded all PPE while working with BMW. Approximately 73 percent of HCPs followed the color labeling of containers based on the kind of waste during BMW disposal, as well as regulations categorizing trash into non-hazardous, hazardous, and sharp waste. And kept track of BMW records. Regarding sharps-related injury prevention, such as avoiding recapping used needles, HCPs were careful, and HCPs avoided contamination while handling objects from COVID-19 patients and other non-COVID-19 patients

CONCLUSION & RECOMMENDATION

As emerging nations move to become developed nations, the need for healthcare is growing. As a result of these economic improvements, the output of bio-medical waste is also growing quickly. Due to the current COVID 19 pandemic's rapid spread, the healthy environments all over the world have already been transformed badly, with significant death tolls and ongoing lockdowns in practically every region.

Bio-medical waste is a major issue in India. It is occasionally discovered that hospitals are discharging waste into ground or rivers, which is extremely dangerous because it contains hazardous and infected materials like blood, skin, transplanted organs, syringes, and needles, among others. This is due to a lack of awareness and lack of rules and regulations followed.

It is our duty as citizens to develop practical approaches to handling biomedical waste appropriately and to educate healthcare professionals through training sessions. We must try to build systems that correctly handle bio-medical waste so that the impact on rivers and the environment is minimal. It is our responsibility to turn a product into a useable product so that it may be reused.

Direct observation should be done for improvement in practices, Checklist based onsite assessment through direct observation to analyse the impact of educational interventions on the actual practices to be done.

We suggested that intensive training sessions have to be conducted regularly for all health care providers including sanitary staff which will help in better retention of knowledge and instilling a positive attitude towards biomedical waste management by repetitive reinforcement. It would also translate in a behavioural change of attitudes and practices that would help in reducing the incidence of health hazards due to improper BMW management..

REFERENCES-

- Lee et al., 2002,Analyses of the recycling potential of Medical Plastic Wastes. Waste Management. 2002;22(5):461–70.
- Kerkar, S. S., and S. S. Salvi. "Application of eco-enzyme for domestic waste water treatment." International Journal for Research in Engineering Application and Management 5.11 (2020): 114-116.
- Nguyen, L. H., Drew, D. A., Joshi, A. D., Guo, C.-G., Ma, W., Mehta, R. S., ... Chan, A. T. (2020). Risk of COVID-19 among frontline healthcare workers and the general community: A prospective cohort study. MedRxiv. doi: 10.1101/2020.04.29.20084111
- Azage, M. (2013). Healthcare waste management practices among healthcare workers in healthcare facilities of gondar town, northwest ethiopia. Health Science Journal, 7(3).
- Sushma MK, Bhat S, Shetty SR, Babu SG. Bio-medical dental waste management and awareness of waste management policy among private dental practitioners in Mangalore City, India. Tanzania Dent J 2010;16:39-43.
- *Bio-Medical Waste Management Rules*. 2016 Published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-Section (i), Government of India Ministry of Environment, Forest and Climate Change. Notification; New Delhi, the 28th March, 2016. [[Google Scholar](#)].
- WHO. *Review of Health Impacts from Microbiological Hazards in Health-Care Wastes*. Geneva: World Health Organization; 2004.

THANK YOU