

SEGREGATION OF MEDICAL WASTE AND DISPOSAL MANAGEMENT - A SURVEY

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ABSTRACT

Segregation refers to basic separation of different categories of waste generated at some source and thereby reducing the risk as well as cost of handling and disposal. Segregation is the most crucial step in biomedical waste management. There are 4 major types of waste, they are general, infectious, hazardous and radioactive. To create awareness among the college students about the segregation and disposal of medical waste. This study involved the segregation of medical waste and disposal among the age group of 18 to 25 yrs. A set of 15 questionnaires were framed and sent through the online google form link. The questionnaire is based on the knowledge, attitude and information about the segregation and disposal of medical waste. Among 100 medical students 77% were aware about the segregation of the medical waste & 23% of the students were not aware about the segregation of the medical waste. To create awareness among the college students about the segregation of medical waste. From that we can protect our health and environment.

KEYWORDS: Awareness, Knowledge, Medical waste, Segregation

INTRODUCTION

The key to minimising the effective management of healthcare is to identify them and segregate the medical ways in the correct way. appropriate handling of the waste and treatment disposal of waste in the proper way which will protect the public health. segregation refers to the basic separation of the waste in different categories. Wastes which are segregated in the proper way will reduce the risk as well as cost of handling and disposing ('Medical waste: The growing issues of management and disposal', 1991). Segregation of waste is taken in crucial steps such as disposal of medical biomedical waste. management effective segregation will ensure effective biomedical waste management. various types of synthetic polymeric membrane have been fabricated for separation purpose industry and laboratory (Studnicki, 1992).

In the previous literature a study has been conducted in the private hospital whether the biomedical waste is generated in the proper way in that benefit found was that after the implementing the

remedial measures. Segregation process shows a decrease in the amount of infectious waste. (Sharma et al., 2017) In the Dental College the knowledge, attitude and practice about the biomedical waste management survey was conducted. hazardous waste management is concerned for every healthcare organisation. and hazardous waste plays an important role in causing a variety of health problems. I am there should be awareness created among their students about the hazardous waste (Sanjeev et al., 2014) are many types of ways such as plastic waste, hazardous waste biomedical waste, municipal solid waste and each waste has a separate method for disposal. (Badarinarayana, 2003) healthcare waste management among the public health. Waste generated by the health care people are range needles, dressing solid things, body parts, diagnostic samples, blood, chemical and pharmaceuticals, and medical waste, radioactive waste. Each waste has a separate toxic substance which causes problems and causes death. and it is necessary to dispose of the waste in the safety manner. The environmentally sound management aims to protect the human health and environment by minimising the hazardous waste that whenever possible (Chuks, Anayo and Ugbogu, 2013). Awareness about the waste management in the tertiary waste is associated with the waste and disposal management and the cost of secretion of medical waste. The plastic bags are (Hagen, Al-Humaidi and Blake, 2001) disposed of by incineration and deep but here the disinfected container plastic bags are exposed by autoclaving or microwaving or by chemical treatment. The plastic bag or puncture proof container should be disposed of by destruction or by shredding plastic bag should be disposed by the secured landfill. (Reddy, Rao and Subrahmanyam, 2014) Improvement tool because of all the healthcare facilities want to reduce their disposal waste, identify high-value items missing this thing can be discarded and improve safety. when there is a limited resource how to manage the healthcare in the Nablus city the waste management was very poor. for that, the alternative method was used for the treatment. The locally made autoclave integrated with your shredder should be evaluated and implemented. The Nablus city needs immediate improvement so overcome the obstacles the medical waste should play an important role in urgent matters (Al-Khatib, Al-Qaroot and Ali-Shtayeh, 2009). Absorption Bubble separation technique is used for the separation of the waste. (Lemlich, 2012) This technique of micro extraction is used to analyses of the pesticides present in the water and the peel of vegetable matter (Puig and Barceló, 1996; Lemlich, 2012)

Solar disinfection method is a very cheap method to disinfect the infectious medical waste in less economically developed countries. (Puig and Barceló, 1996; Chitnis et al., 2003; Lemlich, 2012) Emission of polycyclic aromatic hydrocarbons from a medical waste incineration. Disposal of general waste and special medical waste both are disposal by incineration and shared by same amount of air pollution in addition to the emission of polycyclic aromatic hydrocarbons are released and add pollution control devices used. (Lee et al., 2002) From the medical waste incineration the toxic substances released. The toxic release from the medical waste incineration and emission such as polychlorinated diazo - dioxin/furan and polycyclic aromatic hydrocarbons and inorganic compounds comprise of ashes and there are many attempts done by various investigators (Singh and Prakash, 2007). plasma pyrolysis is a safe method for the disposal of medical waste. Pyrolysis of organic compounds leads to a solid residue which is rich in carbon content. It is a type of thermolysis. (Nema and Ganeshprasad, 2002).

MATERIALS AND METHODS:

This study was conducted among the age of 18 to 25 years. A well structured questionnaire comprised 14 questionnaires. It was circulated among 100 undergraduate students.

In this study setting is a prospective observational study and the pros are economical, easy to create gathered in large data, quick interpretation and easy to reach and cons is survey fatigue, homogeneous population and the study is approved by the scientific review of Saveetha dental college.

And the simple random method was done. measures taken for that minimise the sampling is based on the internal and external validity for minimizing the error is avoid leading of the question and of the output variable is describe by the pie chart and bar graph and the statical software used in this is SPSS and the independent variable is based on weight height, sex, age, skin tone, education and dependent variable is use is based on wastes type, disposal type, method of disposal. The data was collected and statistically analysed in SPSS. Chi-Square analysis was performed and $p < 0.05$ was considered as statistically significant.

RESULTS AND DISCUSSION:

A survey was conducted about the segregation and disposal of medical wastes.among the college students. In that hundred students responded to the survey. Among the hundred students 63% of students are female and 37% is male (fig-1). Among them 77% students were aware about the segregation of medical waste and 23% students were not aware about the segregation of medical waste(fig-2). the students who answer the survey 65% of the students know about the different types of segregation of medical waste and 35% of them they don't know about the different types of medical waste. In (figure 3) Medical waste 9% said that medical waste which is segregated will help you reduce the blood borne disease.31% said that it will reduce infection and 46% said that it will reduce both infection and blood borne disease.14% said that cause the other infection (figure-4). 14% said that autoclave is the proper way to segregate medical waste 12% said that sterilisation is the proper way to segregate 19% said that recycle is the proper way to segregate.20% said that disposal is a proper way to segregate and 35% said that all the above is a proper way to segregate the medical waste (fig-5).17% said that benefit of waste management is highly lucrative 70% said that it is keep our environment clean and fresh 26% said that it reduce the environmental pollution 40% said that all the above (figure-6).The 34% said that yellow colour bags are used for clinical waste,24% said that black colour bag are used. 28% said that green colour bags are used, 14% said that none of (fig-7). classification of waste is based on 11 % said that it is hazardous , 11 percent that it is recyclable,10% said that organic ,11% said that solid 7% said that it is liquid and 50% said that all the above(fig-8).Medical waste affect the environment by 32% said that it is by none of the above 96% said that it is by air-pollution and 42% said that it is by water pollution(figure-9).56% know that incineration is used in the hospital and 44% said that don't know how it is use(figure 10).45% said that both household and Hospital ways to dispose in the similar way and 55% said that it is not disposed in similar way (figure11).57 % said that disposal of medical waste will produce toxicity 43% said that it will not produce toxicity (figure12).62% said that this hospital waste are disposing medical waste that right Right way and 38% say that hospital are not disposing the waste in the right way (figure 13).36% said improper of medical be will cause infection 42% said that it will injure the children, Waste haulers, recycling workers or animals and 22% said that it will lead to other causes.(fig-14)

In the previous literature the most of the countries experience this type of pollution due to the pathological ways from the hospital due to more pollution and in this study it explain in figure 9 that 26% affect air pollution and 42% of waste will affect the water pollution and 32% of the waste will affect none of the above pollution(Mohankumar and Kottaiveeran, 2007).Biochemical waste are mostly solid waste management in the hospital and they produced a waste for incineration which explain in the figure 8 in the current study(Patil and Pokhrel, 2005).Hospital waste produced toxicity in the increased level by hazardous and infectious waste and in the study figure-12 it will explain about the toxicity(Tsakona, Anagnostopoulou and Gidakos, 2007).In the previous research 225 hospital that survey about the medical waste and disposal method used in the hospital and among that hospital only 72.5% responded to this survey.(Klangsin and Harding, 1998). Due to the improper waste management water will get polluted and there will be a occurence of endemic goitre will appear(Samuel and Devi, 2015). obesity will come

due to the improper food habit when the environment is polluted. We will get polluted food items which will lead to obesity in infertility.(Baheerati and Gayatri Devi, 2018). When we eat the polluted food materials and water there is a chance to get thyroid in the obese patients.(Fathima and Preetha, 2016)Due to more pollution of medical waste there will be no proper sleep pattern they have a different sleep pattern based on the age(Rj and R, 2016).due to the improper segregation of medical equipments will lead to diseases jaundice and kernicterus(Harsha *et al.*, 2015)Improper disposal of medical drugs will lead to disease and they will cause some pathogenesis drugs which are not disposed of in the right way or cause diseases. using the same old will cause many problems which will not cure asthma(Dave and Preetha, 2016).The improper drugs will cause muscular endurance(Abigail *et al.*, 2019). To keep our body physically fit we should not pollute the environment(David *et al.*, 2019). To prevent our tongues from the habitual snores we should drink unpolluted water.(Shruthi and Preetha, 2018). Due to the improper treatment there is a chance for non alcoholic fatty liver disease.(Choudhari and Jothipriya, 2016). A study was conducted about onychocryptosis in that correct disposal will cure the disease(Iyer, Gayatri Devi and Jothi Priya, 2019). Due to the improper medical waste and disposal management there will be pollution and toxicity which will lead to adenoids(R and Sethu, 2018). Due to the improper segregation of the syringes will harm the person sometimes leading to accidents so they need acupuncture for their back pain.(Swathy and Gowri Sethu, 2015). Regeneration of myocardial infarction this is not related to segregation of waste(Renuka and Sethu, 2015) Due to the pollution the expiratory flow rate will lead in peak and cause expiratory problem(Timothy, Gayatri Devi and Jothi Priya, 2019)

The limitation of the study is to increase the sample size and include about the most criteria about the segregation and disposal of waste management and future scope of this study is to increase the technology of disposal which can reduce the toxicity and prevent from other diseases.

CONCLUSION:

From the survey, we concluded that the awareness of segregation of medical waste and disposal is good among the students. So from that we can control the pollution and other diseases which are caused by waste and disposal and management. It is important to conduct awareness camps to educate the public about the risk factor, complication faced by the waste management when it is not properly disposed of. Due to the improper disposal of waste there is a chance for water pollution, land pollution.

AUTHORS CONTRIBUTION:

Structuring the study design and statistical analysis was conceptualized by Jothi Priya and Lakshimnarayanan Arivarasu. Data collection and collection of reviews was done by Divya shri S. Revising and drafting of the manuscript was done by Dr. Vishnu Priya.

CONFLICT OF INTEREST:

The author declares that there was no conflict of interest in the present study.

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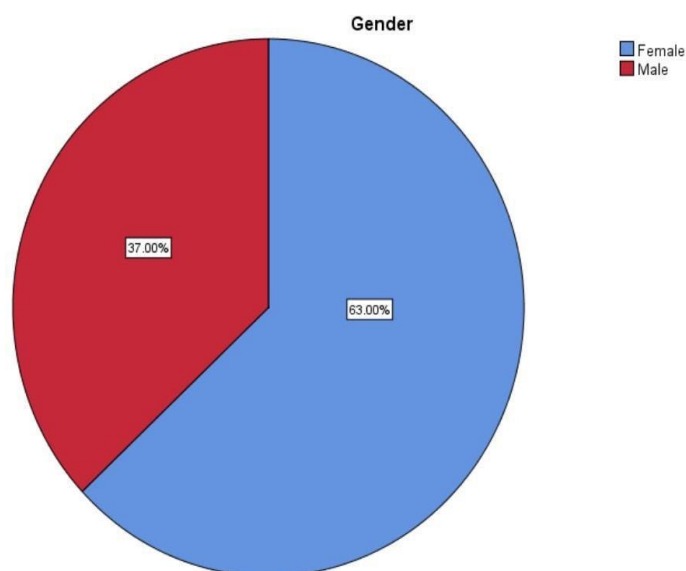


Figure 1- Pie chart represents the percentage distribution of gender. Majority of the participants were females for about 63 % (Blue) and the remaining 37 % (Red) were males.

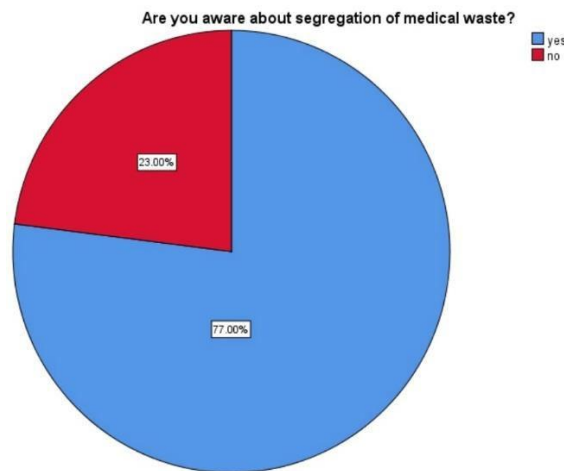


Figure 2- Pie chart represents the percentage distribution of awareness about the medical waste segregation in that majority of the participants for about 77% (Blue) were aware and 23% were not aware (red).

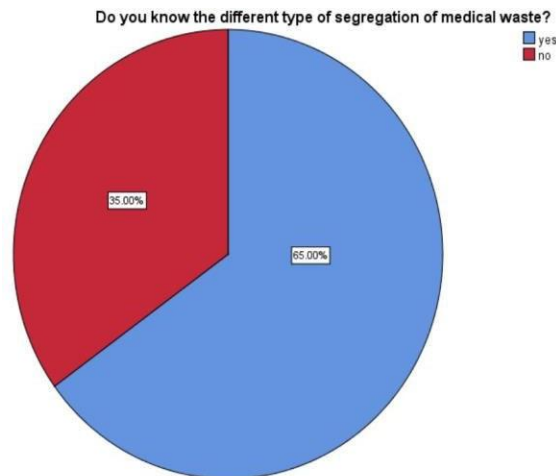


Figure 3- Pie chart represents the percentage distribution of different types of segregation of waste management. Majority of the participants for about 65% (Blue) know about the different types, and 35% (red) don't know about the different types of waste management.

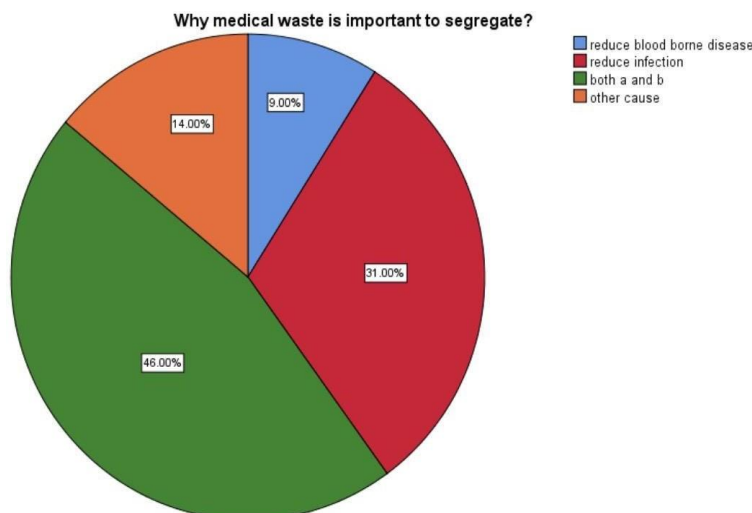


Figure 4- Pie chart represents the percentage distribution about the importance of segregation of waste management. Majority of the participants for about 46 % (Green) said both reduction in blood borne

disease and infections. 9% said that it reduces blood borne disease (blue),31% said that it reduces infection (red).

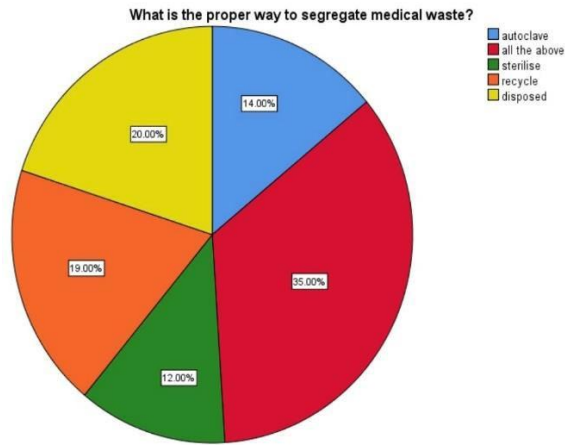


Figure 5- Pie chart represents the percentage distribution of proper way to dispose the medical waste, in that 14% said that autoclave (blue), Majority of the participants of about 35%(red)said that all the above help in proper way to dispose the waste, 12% said that sterilize (green), 19% said that recycle (orange), and 20% said that disposed (yellow).

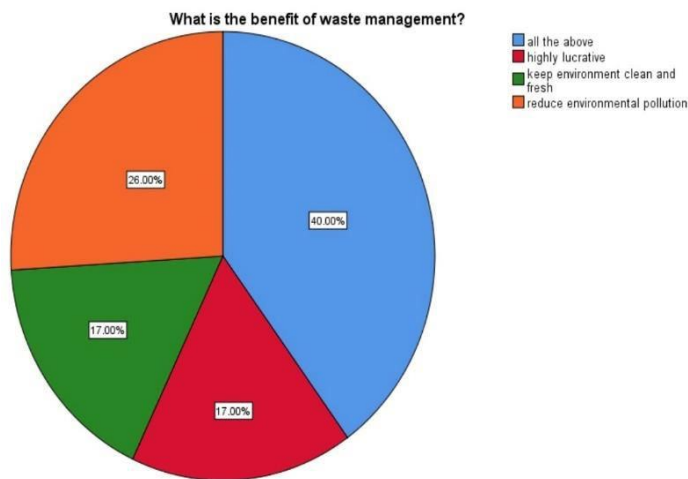


Figure 6- Pie chart represents the percentage distribution of benefits of waste management. Majority of participants of about 40% (blue) said that all the above help in Benifit of waste ,17% highly lucrative (red), 17% said that keeping the environment clean and fresh (green), 26% said that it reduces environmental pollution (orange).

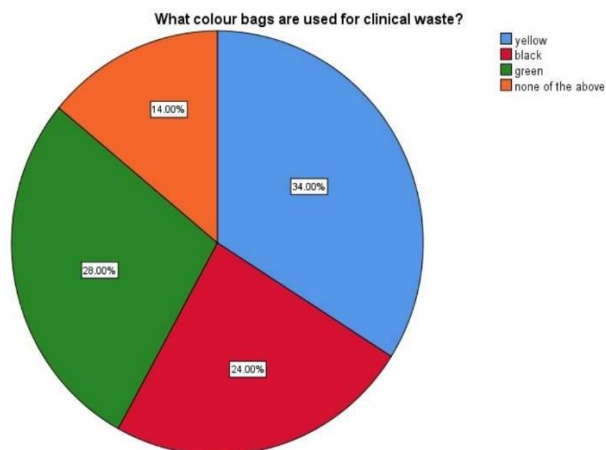


Figure 7- Pie chart represents the percentage distribution of colour of the waste bags which are used for clinical waste. Majority 34% said that the yellow colour bag helps to dispose of medical waste. (blue), 24% said black, 28% said green(green), and 14% said none of the above (orange).

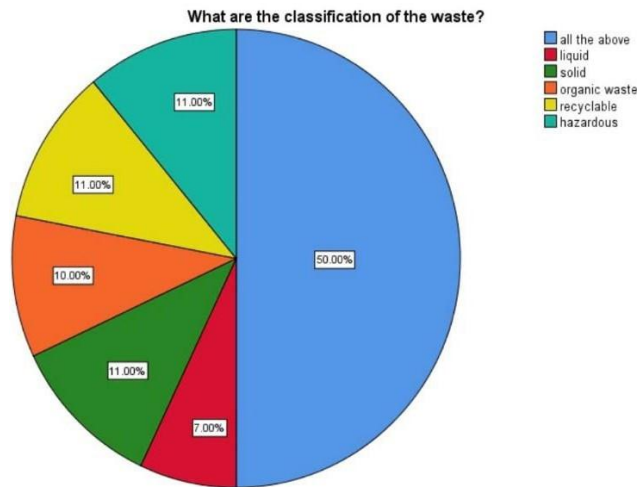


Figure 8- Pie chart represents the percentage distribution of classification of the waste . Majority 50% said that all the above help in classification of waste (blue), 7% said that liquid (red), 11% said that solid (green), 10% organic waste (orange), 11% recyclable (yellow) and 11% hazardous (aqua blue).

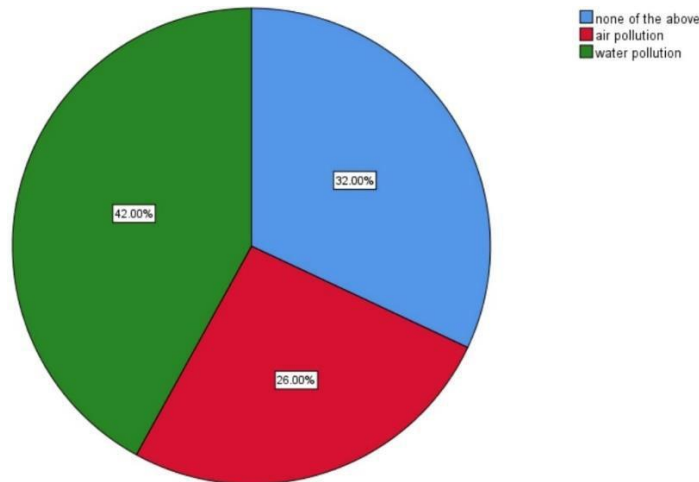


Figure 9- Pie chart represents the percentage distribution of medical waste that affects the environment. In that majority 42% person said that medical waste affect the water pollution (green) 32% said none of the above (blue) and 26% said air pollution (red)

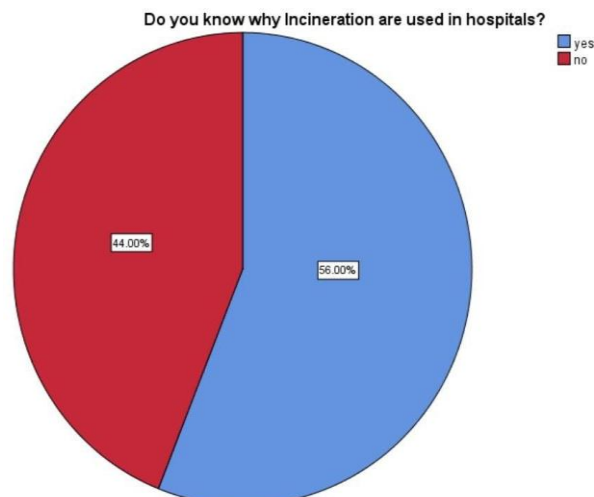


Figure 10- Pie chart represents the percentage distribution of incinerators used in the hospital. Majority 56% used incineration in hospital (blue), 44% said no (red).

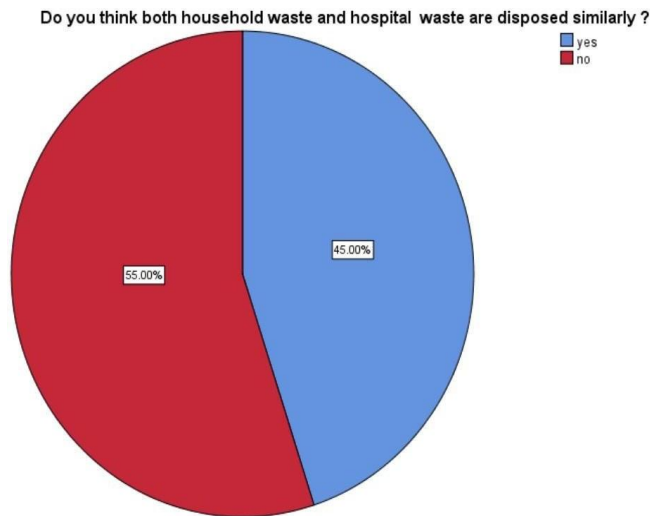


Figure 11- Pie Chart represents the percentage distribution of both the household and hospital waste disposed in the similar way. In that majority 55% said that they are not disposing household and hospital waste in similar way (red) and 45% said yes (blue)

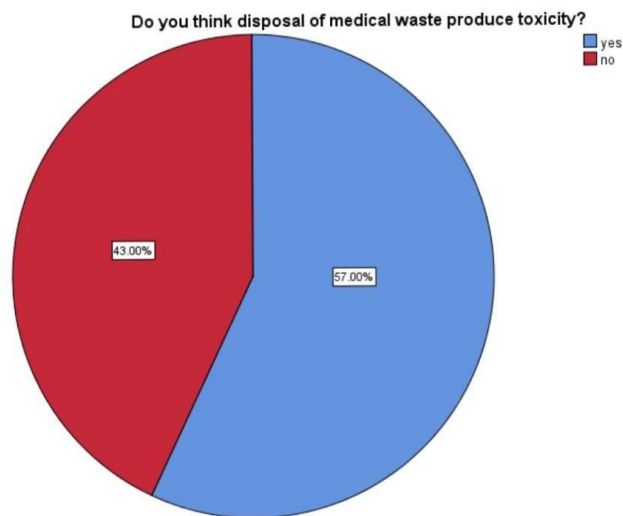


Figure 12- Pie chart represents the percentage distribution of disposal of medical waste that produces toxicity. Majority 57% said that medical waste produces toxicity. (blue) and 43% said no (red).

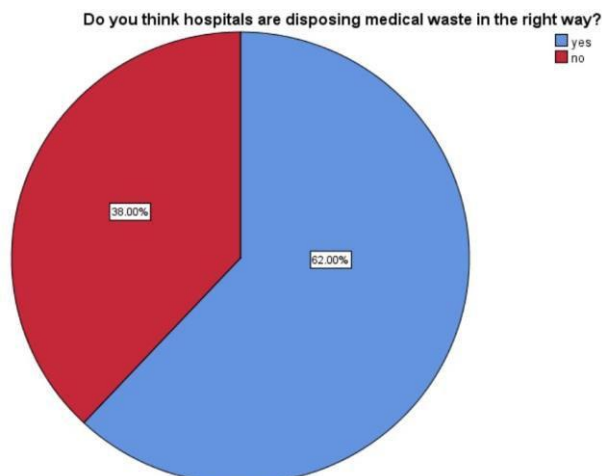


Figure 13- Pie Chart represents the percentage distribution of the hospital waste that is disposed of in the right way. Majority 62% said that hospital waste are disposed in right way.(blue) and 38% said no(red)

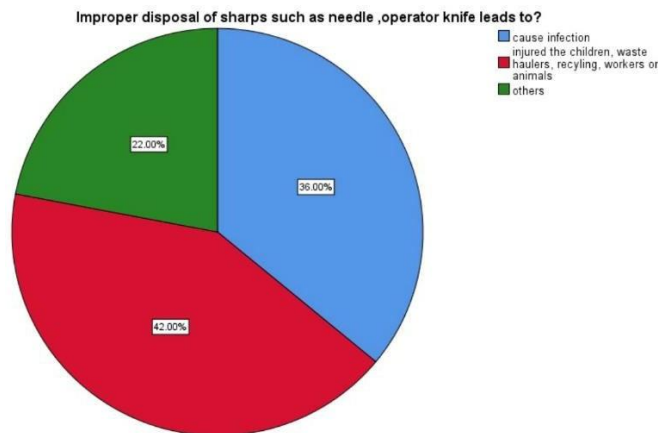


Figure 14- Pie chart represents the percentage distribution of improper waste disposal leads to . Majority 42% said that it cause injury to children,36% said that it causes infection(blue),waste haulers, recycling workers or animals(red), and 22% said that it causes other problems(green).

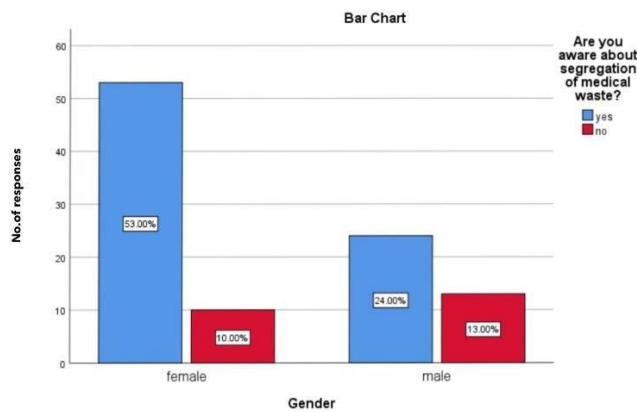


Figure 15: Bar graph representing the association between gender and awareness about the segregation of medical waste. In this X- axis represents the gender and Y- axis represents no.of participants. In this Blue colour denotes yes and Red colour denotes No. Majority of females (53%) were aware about the segregation of medical waste. Pearson's chi square value=4.884 df = 1 p value=0.027 (<0.05) hence statistically significant, hence proving that females have better awareness about the segregation of medical waste than males.

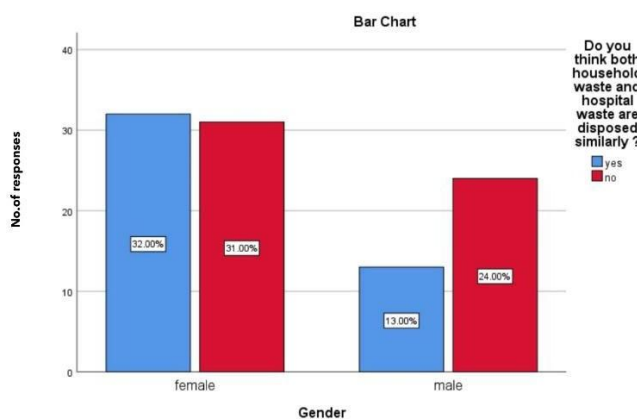


Figure 16: Bar graph representing the association between gender and disposal and segregation of household and hospital waste. In this X- axis represents the gender and Y- axis represents the no.of

participants. Blue colour denotes Yes and Red colour denotes No. Both males and females are aware about the similarity in the disposal of household waste. Chi square tests were done. Pearson's chi square value=0.129 df =1 p= value 2.309 (>0.05), hence it is not statistically significant.

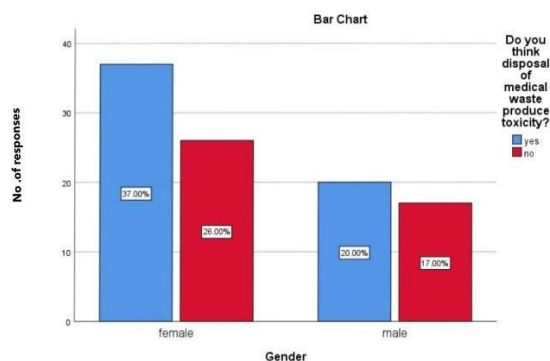


Figure 17: Bar graph representing the association between gender and disposal of waste toxicity. In this X- axis represents the gender and Y- axis represents the no.of participants. In the bar graph, Blue colour denotes yes and Red colour denotes no. Majority of the females (37%) were more aware that medical waste produces toxicity than males. Chi square tests were done. Pearson's chi square value=0.208,df=1, p= value=0.648(>0.05) hence it is not statistically significant.

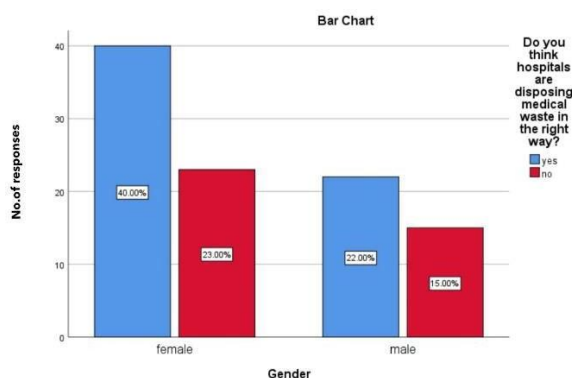


Figure 18: Bar graph representing the association between gender and the right way of medical waste disposal. In this X- axis represents the gender and Y- axis represents the no.of participants. In this Bar graph, Blue colour denotes Yes and Red colour denotes Yes. Majority of females (40%) were more aware about the awareness of disposing of medical waste in the right way when compared to males. Chi square tests were done. Pearson's chi square value=0.161 df = 1 p= value 0.688 (>0.05) hence it is statistically not significant.

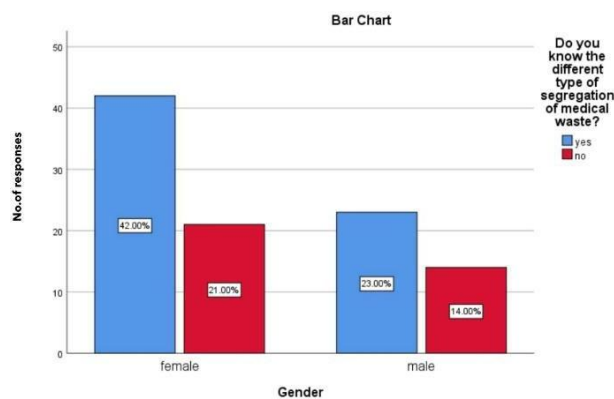


Figure 19: Bar graph representing the association between gender and the different types of segregation of medical waste. In this X- axis represents the gender and Y- axis represents the no.of participants. In this bar graph, Blue colour denotes yes and red colour denotes no. Majority (42%) of females were aware

about the different types of segregation of medical waste. Chi square tests were done. pearson's chi square value= 0.208 df =1 p= value=0.648 (>0.05), hence it is not statistically significant.