

Master of Science in Public Health



*Awareness and Practices of Waste segregation
among Dental Assistants in Public sector Tertiary
care Hospitals of Islamabad*

By

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*Awareness and practices of Waste segregation among
Dental assistants in Public Sector Tertiary Care
Hospitals of Islamabad*

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Declaration

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I understand that plagiarism is the use or presentation of any work by others, whether published or not, and can include the work of other candidates. I also understand that any quotation from the published or unpublished works of other persons, including other candidates, must be clearly identified as such by being placed inside quotation marks and a full reference to their source must be provided in proper form.

This dissertation is the result of an independent investigation. Where my work is indebted to others, I have made acknowledgments.

I declare that this work has not been accepted in substance for any other degree, nor is it currently being submitted in candidature for any other degree.

(Dr. Ayesha Babar Kawish)

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Abstract

Background

Medical waste is the most environmentally hazardous waste because it can hold possibly fatal pathogens and presents a danger of infection transmission from health care facilities to health care providers. Dental surgery units produce a lot of infectious waste such as microbial materials infected tools and pathological waste like blood products, sharps and infectious prosthesis. These hazardous materials, unless made safe might be dangerous to everyone who encounters it.

Objectives

This study was conducted to assess the Awareness and Practices of Waste segregation among Dental Assistants in Public sector Tertiary care Hospitals of Islamabad. It also explored the association between sociodemographic characteristics and outcome variables.

Methodology

A cross-sectional study was carried out at Tertiary hospital of Islamabad. A total of 129 dental assistants were included in the study. An adapted questionnaire was used for data collection. Data was analyzed using SPSS version 26.

Results

A total of 136 respondents were included in this study. Majority of the respondents were male $n=77(56.6\%)$ and were 21-35 years of age group $58(42.6\%)$. Among them $97(71.3\%)$ were married. Overall awareness and practices were satisfactory. Level of education, training on waste management and length of service were found significantly associated with the outcome of study.

Conclusion

Medical waste management is a crucial yet neglected domain in the developing world. Infectious diseases still contribute two third of total burden in low income countries. Dental surgery procedures result in production considerable amount of infectious and domestic waste which is needed to be handled according to guidelines. All dental professionals and paradental staff must be trained and sensitized for efficient handling of materials and equipment.

Keywords

Awareness, Bio-Medical waste, Practices, Dental assistants

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LIST OF ABBREVIATION

| | |
|------|---|
| BMW | Bio-medical waste |
| EU | European Union |
| GDP | Gross Domestic Product |
| MDG | Millennium Development Goal |
| PVC | Polyvinyl Chloride |
| SDG | Sustainable Development Goals |
| SPSS | Statistical Package for Social Sciences |
| WHO | World Health Organization |

CHAPTER 1: INTRODUCTION

Biomedical waste (BMW) is the most hazardous waste because it can hold possibly fatal bacteria and present a risk of infection from healthcare facilities to healthcare providers, patients and the public at large. Medical waste management (MWM) is required to avoid detrimental repercussion to human and animal health to ultimate disposition, including segregation, gathering, transporting, and processing (Akkajit et al. 2020).

Almost, 10%-25% of the total BMW is infectious which may pose serious consequences and environmental threats (WHO, 2013). Amount of hazardous BMW is less than one-fourth of total BMW in proportion. However, if not handled according to the guidelines, this small proportion will convert the whole amount of waste into a harmful bulk (Singh et al. 2007). Hence, the main purpose of waste segregation management is to curtail disease transmission from one patient to other; to health workers from patients and vice versa; prevention of injury to the workers in hospitals and supporting staff.

In the modern world, waste management is being acknowledged as a basic human right and there is an increasing demand to improve its proper disposition. This requirement is associated to at least 12 of the 17 (SDGs). The rise in waste production has resulted in severe shortage of landfills and higher costs. Waste Management is linked to the circular economy, a fundamental concept that have a pivotal role in the 2030 Agenda. The Stockholm Environment Institute's latest report, commissioned by the European Environment Agency indicated that, among the targets with the most substantial synergistic potential to make progress on SDGs implementation, is SDG target 12.4,

which aims toward responsible management of chemicals and waste. (Weitz N. et al. 2019).

Today, the world is facing some emerging threats like the Covid-19 and global warming. The pandemic has shifted the dynamics of medical waste handling, resulting manifold concerns among policymakers and personnel (Mallapu, 2020). Many types of medical and hazardous waste including infected masks, gloves, and other protective equipment, along with a higher volume of non-infected items of the same nature are generated during an outbreak (UNEP, 2020).

Majority of the developing countries are not able to maintain an efficient waste management system due to lack of resource, insufficient facilities including vehicles, infrastructure, improper route planning, and lack of awareness (Spoann V. et al. 2018).

A study by Ikhlayel established that waste management is a complex sustainability issue that requires a clear vision and multi-sectorial approach in addressing its intrinsic association with many environmental and economic drives (Ikhlayel, M. et al.2018)

Formal education is mandatory at all levels of education to achieve sustainable waste management in developing countries. For this purpose professionals with the right knowledge, attitude, skills, and innovation, are required. As far as it is known, no such systematic study has been made in this field, in the context of developing countries. A result from a search in the ScienceDirect database (2000–2020) reveals that 391 review papers have been produced in this area. However, none of these studies have associated the formal education and BMW management practices in developing countries. Thus, it is expected that this review can augment the determination of policy-makers to improve management system in developing countries (Debrah, J. et al. 2021). Additionally, this review helps to decide the important factors that are required to be investigated further in future researches in developing countries like Pakistan.

Dental surgeries produce a lot of infectious waste, such as microbial, infected tools, and pathological waste like blood specimens and blood products. The majority of dental trash can be dealt in the regular waste stream. However, inappropriate infectious waste management, such as mixing normal waste with infectious waste and improper handling or storage, can increase the risk of infectious diseases to spread. Infectious waste are all substances that have come into touch with infectious agents due to negligence and not practicing segregation of potentially dangerous waste from ordinary household wastes. It's also worth mentioning that the operations conducted in healthcare infrastructure and activities (e.g. dental surgery, clinics, medical laboratories, immunization programs, etc.) and the handling and disposal of associate wastes release considerable amount of environmental contaminants which is a global concern. Medical waste management is not properly implemented in many developing countries and there is no clearly defined legislation on operating requirements. Biomedical waste (BMW) that are highly infectious are frequently produced in dental surgery units. As a result, unregulated biomedical waste disposal is becoming a public health concern, particularly in developing nations like Pakistan. Infectious trash accounts for 10 to 25% of all amount of wastes generated in hospitals, and it cannot be dumped of with regular household waste. This is, subjected to a multitude of workplace hazards, and their health could be jeopardized if proper guidelines and procedures are not followed. Negligence by dental professionals may lead to severe health concerns e.g. Hep.B and C transmission and wound infection.

1.1. Rationale

Public sector hospitals in the federal capital have to entertain a heavy influx of patients on daily basis. This burden is not only affecting the quality of services but also causing

huge production of biomedical wastes. Dental surgery is one of the most sophisticated departments in term versatility of instruments and likelihood of transmitting infections. Specially the chair side dental assistants which frequently handle different instruments, materials and oral tissues of the patients. The present study will be conducted to assess the knowledge and practices of waste segregation among the chair side dental assistants. Findings of the study will highlight the gaps and barriers in waste management. These findings will be helpful in developing interventions and negotiating the barriers.

1.2. Objectives:

1. To assess the awareness of dental assistants regarding segregation of biomedical wastes (BMW) in public sector hospitals of Islamabad.
2. To examine the waste segregation practices by dental assistants.
3. To find out the association between awareness and practices with sociodemographic factors.

CHAPTER II: LITERATURE REVIEW

The undesirable by-products of modern healthcare practices and diagnostics have tremendously increased health related risks and environmental consequences. Therefore, biomedical waste handling and disposal procedures used by different countries demand proper guidelines and strict implementation.

Biomedical waste is a global public health problem, especially in lower and middle-income countries. Every year, at least 52 million people die around the world from diseases linked to unregulated medical wastes, including 4 million children. (Rahman et al., 2020).

2.1. BIOMEDICAL WASTE (BMW)

Biomedical waste (BMW) refers to waste generated during the examination, diagnosis, treatment, or vaccination of human or animal research subjects. Additionally, waste generated during the development and testing of biological or health related products are also labelled as BMW. Broadly, biomedical wastes are categorized as Infectious and non-infectious. Human tissue, extracted tooth, body fluids, excreta and products such as urine containers, sharp-edged, and glassware are examples of infectious waste (Rai et al., 2018). Packaging, cardboards, residual food items etc. are categorized as Non-infectious wastes. Other type of biological wastes includes recyclables, expired drugs, radioactive materials, mercury-containing instruments, PVC plastics, and other materials that require particular handling. BMW is approached from the perspective of universal insurance, which comprises classification, quantification, segregation,

storage, transportation and treatment. The 3R's philosophy, which stands for "reduce, recycle and reuse", lies at the heart of BMW ethics. (Messerle et al., 2018).

Rather than disposing of trash, the best BMW management system (BMWM) try to avoid it or recover as much as possible. BMW disposal strategies include preventing, reducing, re-using, recycling, recovering, retreating and finally discarding, in that sequence. As a result, rather than dealing with trash at the "end of the pipe", it should be dealt with at the source. General garbage accounts for 85% of total waste, with hazardous waste accounting for 15%. Hospitals, dental units and primary healthcare facilities are the principal sources of BMWs (Datta et al., 2018).

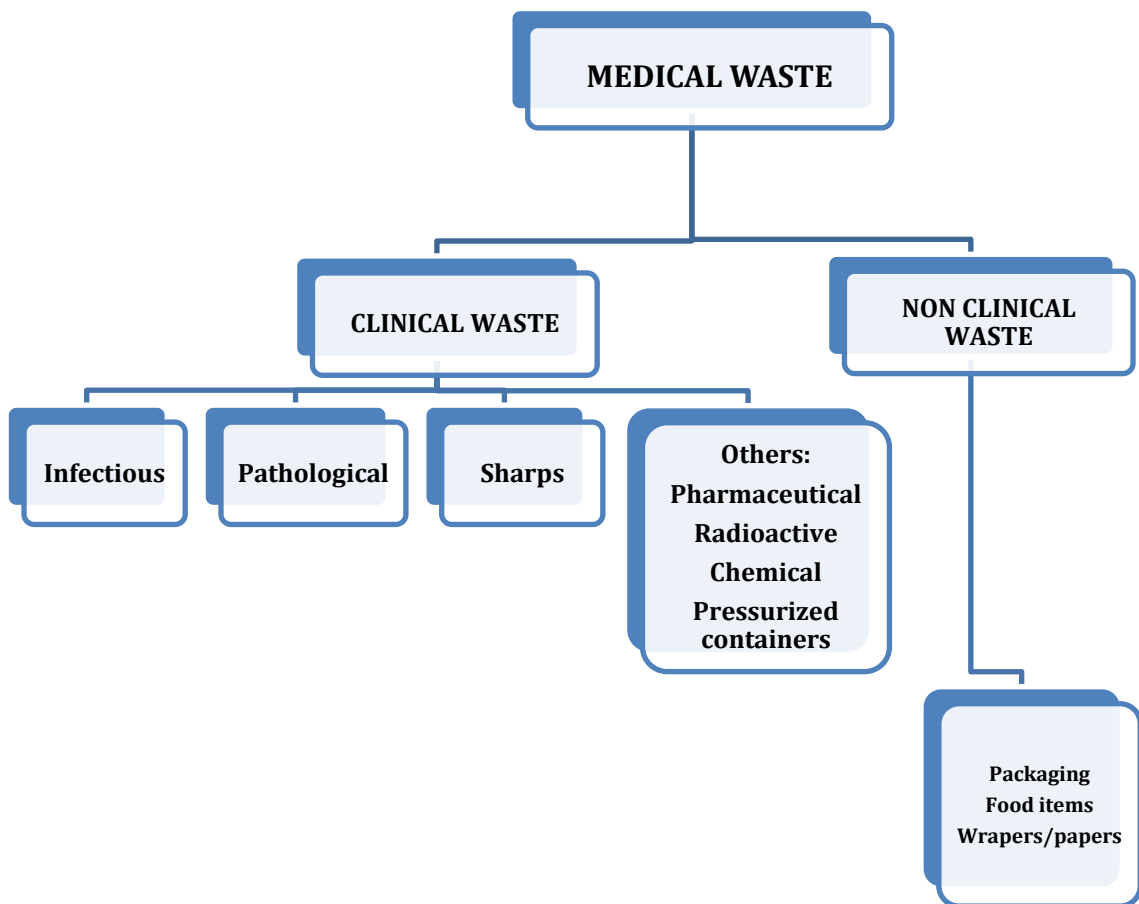


Fig 1: Types of medical wastes

Every day, hospitals in major cities produce more than 30 tons of biomedical waste. The fact that most hospitals, particularly those with heavy influx of patients are causing considerable concerns. The significant amount of medical waste generated is due to the rise of medical sector around the world, as well as a rise in the usage of disposable medical and surgical items. (Manzoor et al., 2019).

Poor medical waste management pollutes the environment, generates unpleasant odors, encourages the growth and proliferation of insects, rodents and worms, and can lead to the transmission of illness such as typhoid, cholera and hepatitis through injuries from contaminated sharps. (Auta et al., 2018)

2.2. MEDICAL WASTE MANAGEMENT

Medical waste management is one of the prime concerns as the world population is growing and demand for medical services also rising. The United States, as the world's leading producer of medical waste, produces about 3.5 million tons each year, with an average disposal cost of \$790 per ton. The massive shift occurred from multi-use medical devices towards safer, single use medical gadgets is increasing medical waste output in developing countries. These developments are resulting in a rapid growth in the volume of medical waste that needs to be safely disposed of in the developing world. (Mbongwe et al., 2018).

Important phases included in the proper biomedical waste management (BMWM) procedure are segregation of wastes, storage, transportation, treatment and disposal.

This calls for extra care and precise consideration. The world health organization (WHO) has developed a BMW guideline to ensure that the wastes from HCF's are safely managed. According to a survey by the World Health Organization, 10-25% of BMW's are potentially harmful. More than 30 hazardous blood borne infections can be transmitted through biomedical wastes. The healthcare industry in the EU accounts for 10% of GDP, 15% of government spending and 8% of the workforce. The healthcare sector in the United States counts for 17.9% of GDP (in 2009), consumes energy in term of billions of dollars and employs millions of people. It also generates 5.9 million tons of garbage yearly, accounting for 8% of total US carbon dioxide emissions (Voudrias et al., 2018).

Individuals who are on the front lines of care, particularly healthcare professionals (HCP's), are at danger. Insufficient infrastructure, unsatisfactory legislation and lack of awareness among healthcare professionals in the waste management framework are important issues in most of the developing countries. Furthermore, the lack of a BMW guideline as well as inappropriate treatment and disposal procedures could hinder waste management efforts (Zamparas et al., 2019).

2.3. DENTAL SURGERY WASTES

Infectious wastes, pathological wastes and chemical wastes are the three main types of wastes generated in dental surgery. Many substances used in laboratories must be handled for clearance, which usually means sending them to the resource conservation and recovery act toxin waste stream. Analyzers, cleansers, reagents, intraoral equipment and test kits all produce waste that must be examined to see if they are harmful (Mashaan et al., 2021).

In the healthcare industry, hazardous materials infections waste is usually referred to as “red bag waste”. “Blood waste, surgical waste, and controlled human body fluids are all eligible for the red bag waste stream. The principal solution for this waste is autoclaving (sterilization) at a licensed disposal facility. Frequently, this trash is compacted and sent to a specialized landfill (Uguz et al., 2016)

In a dental surgery setup common red bag wastes include:

Fluid blood or bulk body fluids

Extracted teeth and associated tissues.

Intraoral scraps, cotton pellets, gauze pieces

Dislodged dental prosthesis.



Figure 2: Dental wastes

Nabizadeh R et al. reports in a study that approximately 71.15% of dental waste consisted of domestic waste, 21.40% was infectious waste, and 7.26% was chemical waste, whereas only 0.18% was toxic waste. According to a study done in Sydney, Australia, it was found that out of 14 dental clinics only 5 were following proper guidelines for the collection and disposal of infectious waste. Another study in New Zealand demonstrated that almost 25% of dental facilities directly threw dental sharps in common bins. A report of a similar study carried out in Hamadan, Iran, revealed all the amalgam waste was disposed into the main sewerage line and used sharps were thrown into the common waste.



Figure 3. Color coded waste bins in Dental surgery

Research carried out in Pakistan reports that most private practitioners disposed amalgam waste in the dustbin or simply into the sewer, only 6 out of 221 dentists, used a sealed container for storage of amalgam waste. Although, dental waste management

protocol is outlined by the government, the knowledge regarding this subject is still lacking which suggests the need for continued dental education programs, and the need for continuous monitoring of the practices. In most developing countries including Pakistan, management of biomedical waste disposal is becoming a major problem and if not addressed promptly it will further worsen the environmental crisis. Although guideline documents devised by the Health Department on dental waste management is available, but practitioners do not have a storage standardization policy and hardly any practitioner coordinates with pollution control boards. A recent study conducted in Karachi found that most practitioners improperly dispose of infectious and sharp waste. 70% had no dental waste management policy document and 74% of participants did not attend any CDE programs on dental waste management (Ali Z. et al 2022)

2.4. Conceptual Framework:

Effective medical waste management is a multisectoral approach. The conceptual framework of this approach is highlighted in this figure:

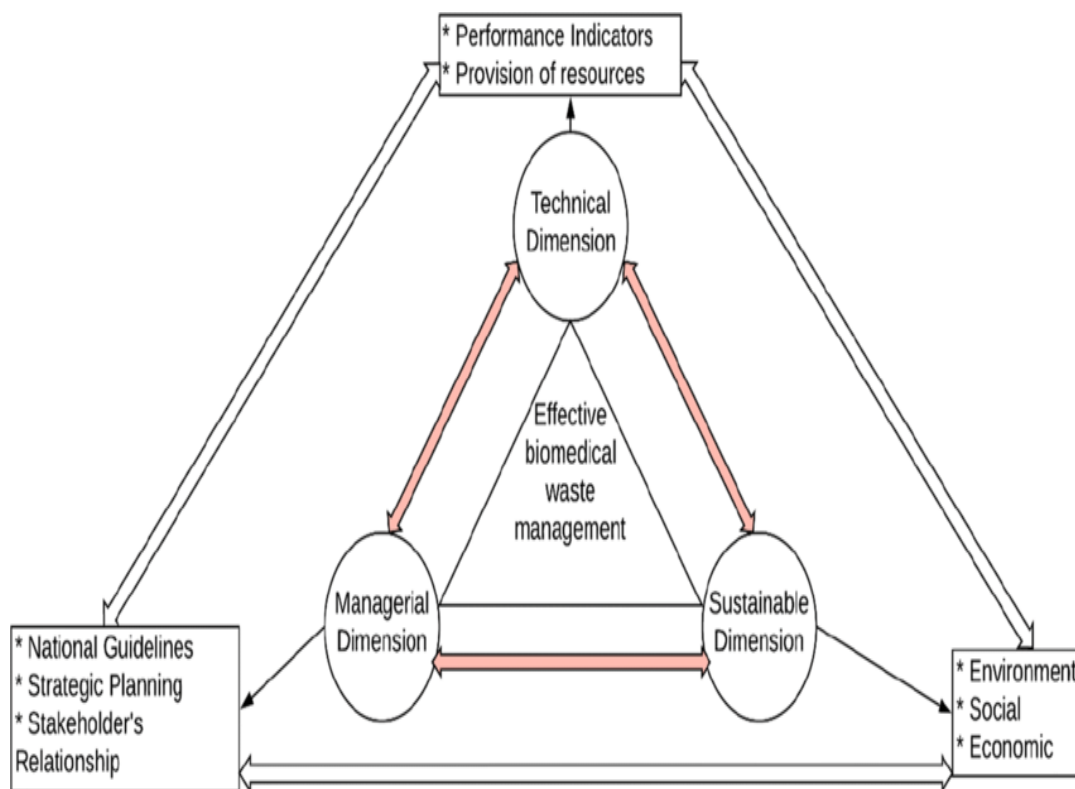


Figure 4: Conceptual Framework of medical waste management

2.5. Operational Definitions:

2.5.1. Biomedical waste (BMW): Waste materials produced during the process of examination, diagnosis and treatment of a patient in the dental surgery room.

2.5.2. Dental assistant: A person who is trained to handle all the dental instruments and materials and assists the dentist. However, he/she is not allowed to perform dental procedures independently.

2.5.3. Practices: Repeatedly engaging in an activity for the purpose of its improvement.

CHAPTER III: METHODOLOGY

3.1. Research Design:

A quantitative research approach using cross-sectional study design was carried out to assess the awareness and practices of medical waste segregation among dental assistants.

3.2 Research Duration:

Study period for the current research was six months (September 2022-March 2023).

3.3 Study Setting:

The study was carried out in the public sector tertiary care hospitals of Islamabad.

3.4. Research Participant:

Study participants were dental assistants in the public sector hospitals, selected on the basis of inclusion and exclusion criteria.

3.4.1. Inclusion Criteria:

1. Male and female dental assistants working in public sector hospitals of Islamabad as permanent employee.
2. Employment period more than six months.
3. Available at the time of sampling.

3.4.2. Exclusion Criteria:

1. Individuals who are not willing to participate.
- 2- Trainees/students

3.5. Sample Size Calculation:

Sample size was 129, calculated by considering an identical study conducted in the tertiary care hospitals of Muzaffarabad AJK (Khan MJ et al. 2017).

3.6. Sampling Strategy:

Desired sample was collected using non-probability consecutive sampling.

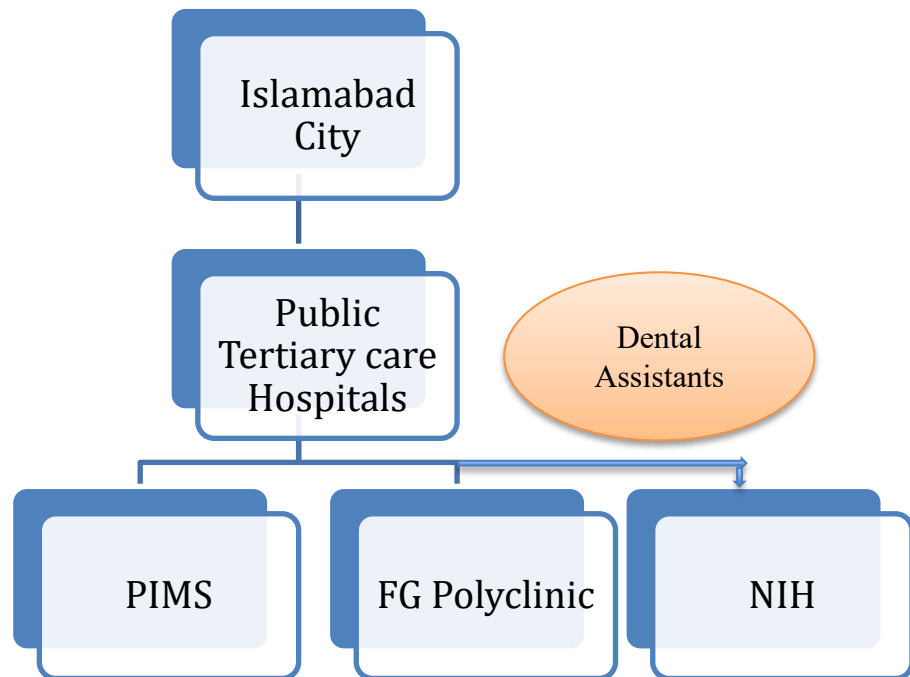


Figure 5: Non-Probability Random Sampling Strategy

3.7. Data Collection Instrument:

3.7.1. Questionnaire Design:

Data was collected using an interview-based questionnaire. A Performa was developed to collect data regarding the sociodemographic characters of the respondents, awareness about dental wastes and related practices. This questionnaire was adapted from a study

“Suleiman health facilities in relation to medical waste management (Sarko Masood Mohammad, 2017)”. Questionnaire is attached as Annexure-I.

3.7.2. Content of Questionnaire:

The questionnaire contained three major sections:

1. First part included questions related to sociodemographic characters.
2. Second part included questions about awareness about biomedical waste. This section has total 15 questions.
3. Third part included 8 questions about practices and options were on a three-point Likert scale i.e. always, sometimes and never.

3.7.3. Study Variables:

The major construct of the questionnaire was to assess awareness and practices of BMW. Both of these outcome variables were measured after computing all elements in each section thus creating a total score for awareness and practices each. Section A of the questionnaire consisted of Independent variables.

3.8. Data Collection Process:

3.8.1. Pilot Testing:

Pilot testing was performed before starting the formal data collection procedure by including data from 20 participants. No major changes were done after pilot testing. One question was added in the awareness section which was about selection of right waste bin for extracted tooth. Pilot testing showed Cronbach alpha value 0.78 (21 items).

3.8.2. Data Collection:

Dental assistants were approached through proper channel in the hospitals. Verbal consent was taken from all assistants and only those individuals were selected who

agreed to take part in the research process and fulfill the inclusion criteria. After taking the consent, the individuals were interviewed and their responses were recorded.

3.9. Data Analysis Procedure:

Code book was developed and data was entered in Statistical Package for Social Sciences

(SPSS) version 26. After careful data entry, data was checked for any error before proceeding to the further analysis. After data cleaning, data transformation was carried out for certain variables. Data analysis were done in two phases; descriptive analysis and inferential analysis.

3.9.1. Data Transformation:

All elements in Section B and Section C were computed to create two new variables i.e. overall awareness and overall practice

3.9.2. Descriptive Analysis:

Descriptive statistics were generated for sociodemographic characteristics and outcome variable. Data was summarized in the form of frequencies and percentages and presented in table form, Bar chart and Pie chart.

3.9.3. Inferential Analysis:

Chi-square was used to find out association between the input variables and outcome variables. P-value less than 0.05 was considered statistically significant.

3.10. Ethical Considerations:

Before starting formal data collection, approval from Institutional Review Board (IRB) of Al-Shifa School of Public Health Rawalpindi, Pakistan has been taken .Permission

letter from the Head of Department of Al-Shifa School of Public Health was obtained regarding access to various hospitals. Participants were explained the purpose of the research and assured confidentiality of their data.

CHAPTER 4: RESULTS

4.1. Demographic Characteristics:

A total of 136 respondents were included in this study. Majority of the respondents were male n=77(56.6%) and were 21-35 years of age group 58(42.6%) Majority of the respondents were married 97(71.3%).

Demographic characteristics of the respondents are shown in table 1.

Table 1: Descriptive summary of Sociodemographic Variables

| S. No | Variable | n (%) |
|-------|---|--|
| 1. | Age <ul style="list-style-type: none">• Below 20• 21-35• 36-50• Above 50 | 6(4.4%) 58(42.6%) 52(38.2%) 20(14.7%) |
| 2. | Gender <ul style="list-style-type: none">• Male• Female | 77(56.6%) 59(43.4%) |
| 3. | Marital Status <ul style="list-style-type: none">• Married• Unmarried• Others | 97(71.3%) 33(24.3%) 6(4.4%) |

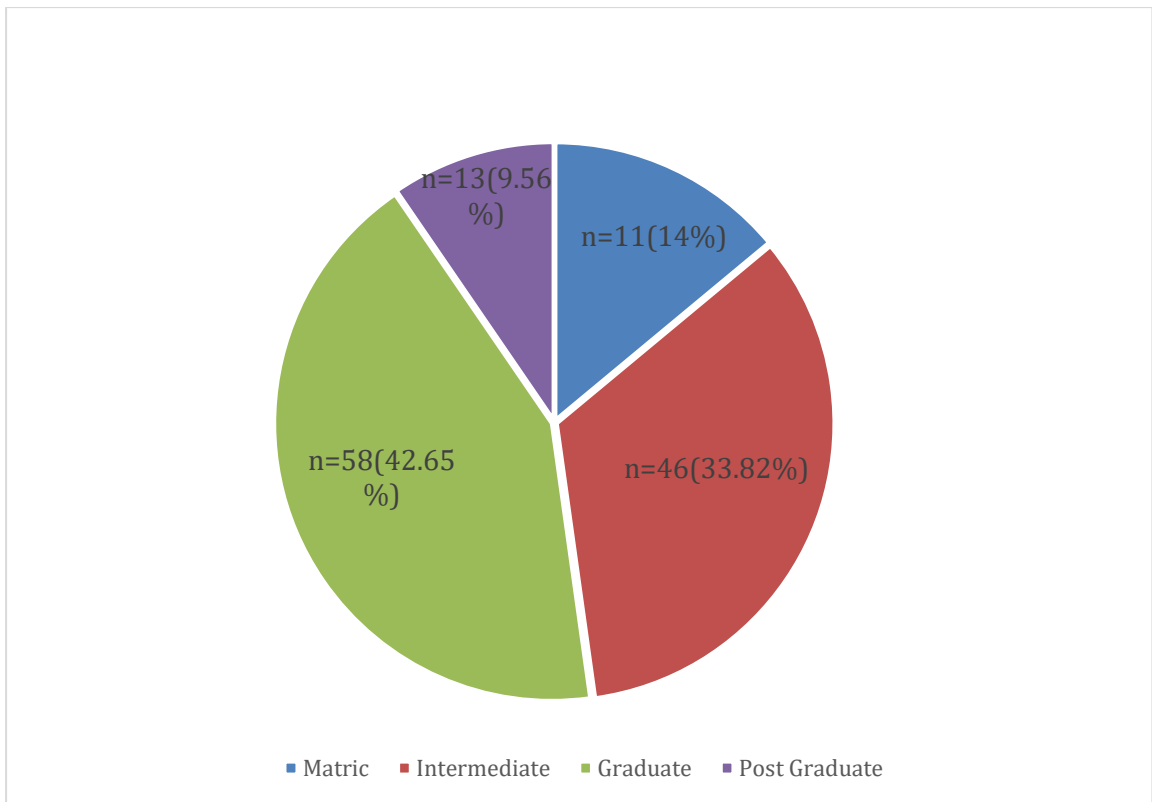


Figure 6: Descriptive statistics of Education level

Among 136 respondents, 11(14%) were matric pass, intermediate were 46(33.82%) Graduates were 58(42.65%) and post graduate were 3(9.56%). Majority of the respondent were Graduates

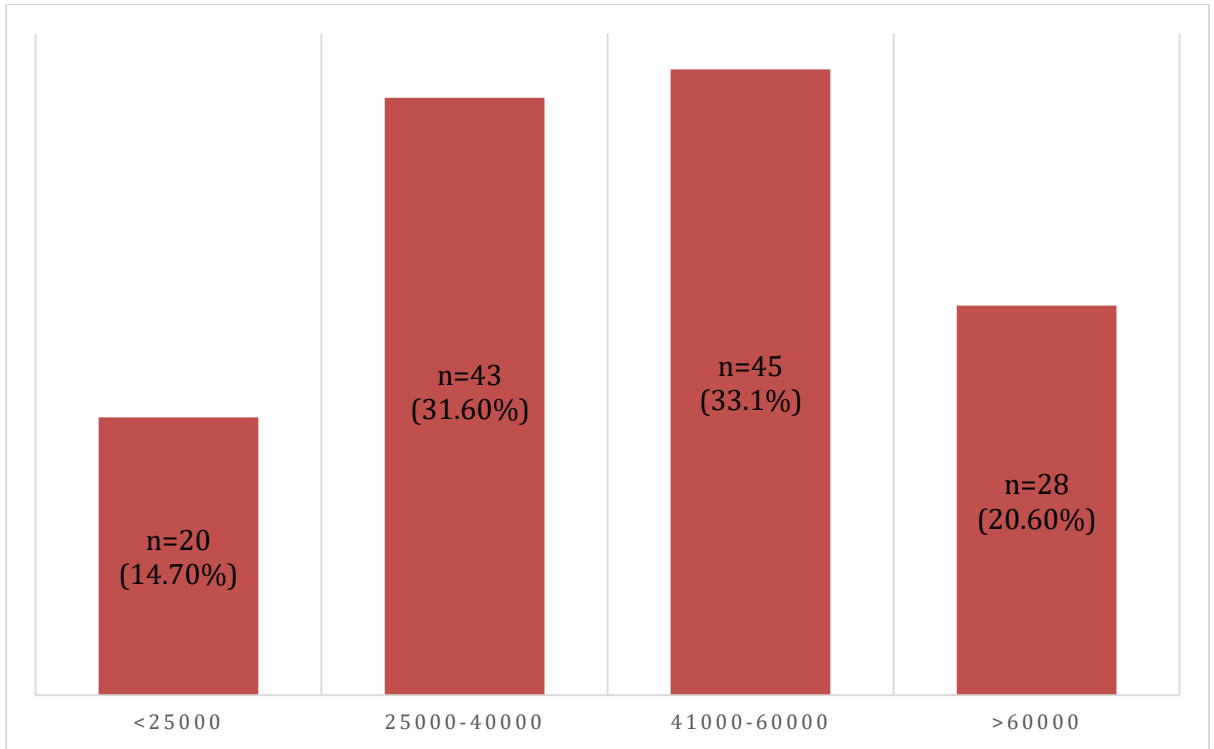


Figure7: Descriptive statistics of Monthly income

Among 136 respondents, less than 25000 family income were 20(14.70%) ,25000-40000 family income was 43 (31.60%), 40000-60000 family income were 45 (33.1%) and above 60000 family income were 95 (26.2%). Majority of respondents have family income more than 60000

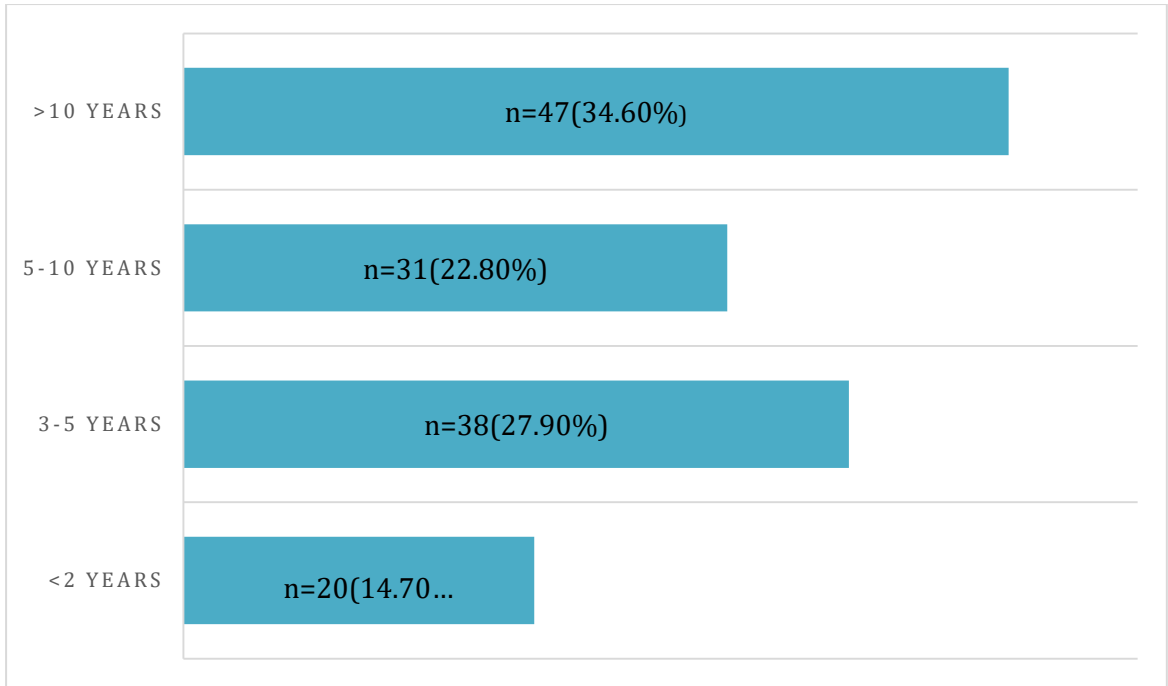


Figure 8: Descriptive statistics of Experience of employment

Among 136 respondents, experience of employment less than 2 years 20(14.7%) 25000 family income were 20(14.70%) ,25000-40000 family income was 43(31.60%), 40000-60000 family income were 45(33.1%) and above 60000 family income were 95(26.2%). Majority of respondents have family income more than 60000.

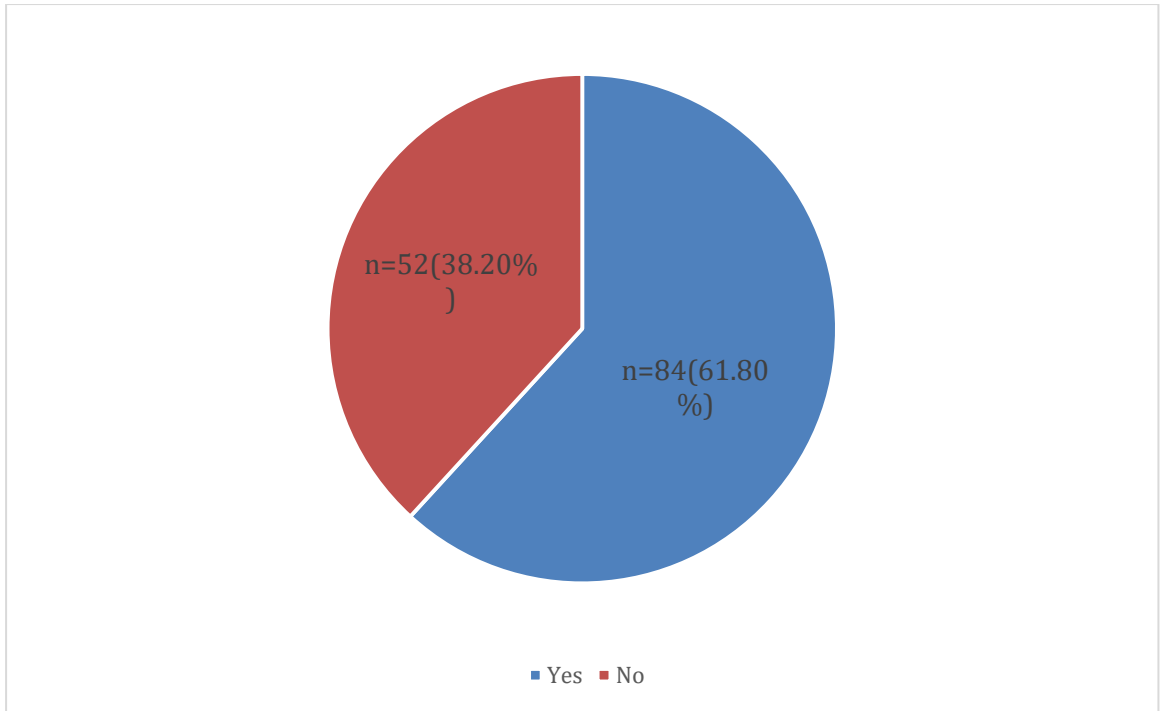


Figure 9: Descriptive statistics of Training attended on waste management

Among 136 respondents, the participants who attended training on waste management 84(61.80%) who have not attended training on waste management 52(38.2%). Majority of respondents attended training on waste management

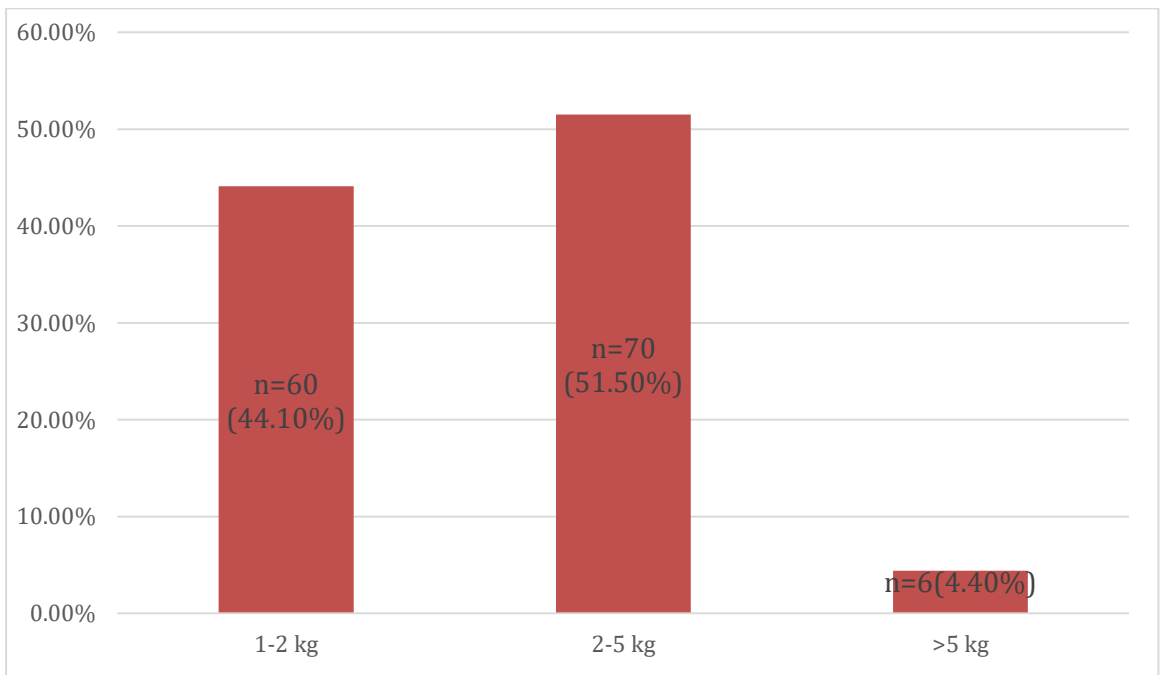


Figure 10: Descriptive statistics of Quantity of medical waste produced on daily basis

1-2 kg of medical waste produces 60(44.1%) on daily basis 2-5 kg waste produced daily 70(51.5%). More than 5 kgs waste produced 6(4.40%). Mostly 2-5 kg of medical waste produced on daily basis.

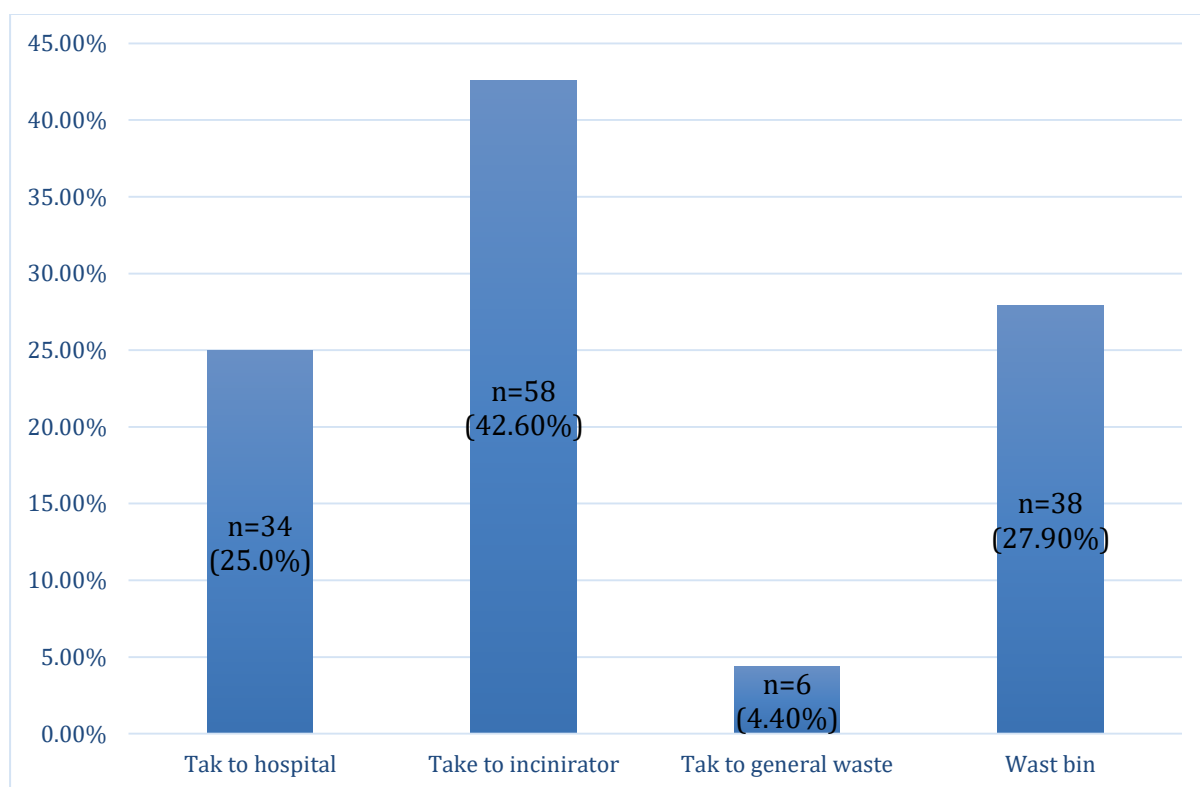


Figure 11: Descriptive statistics of Medical waste disposal at dental surgery

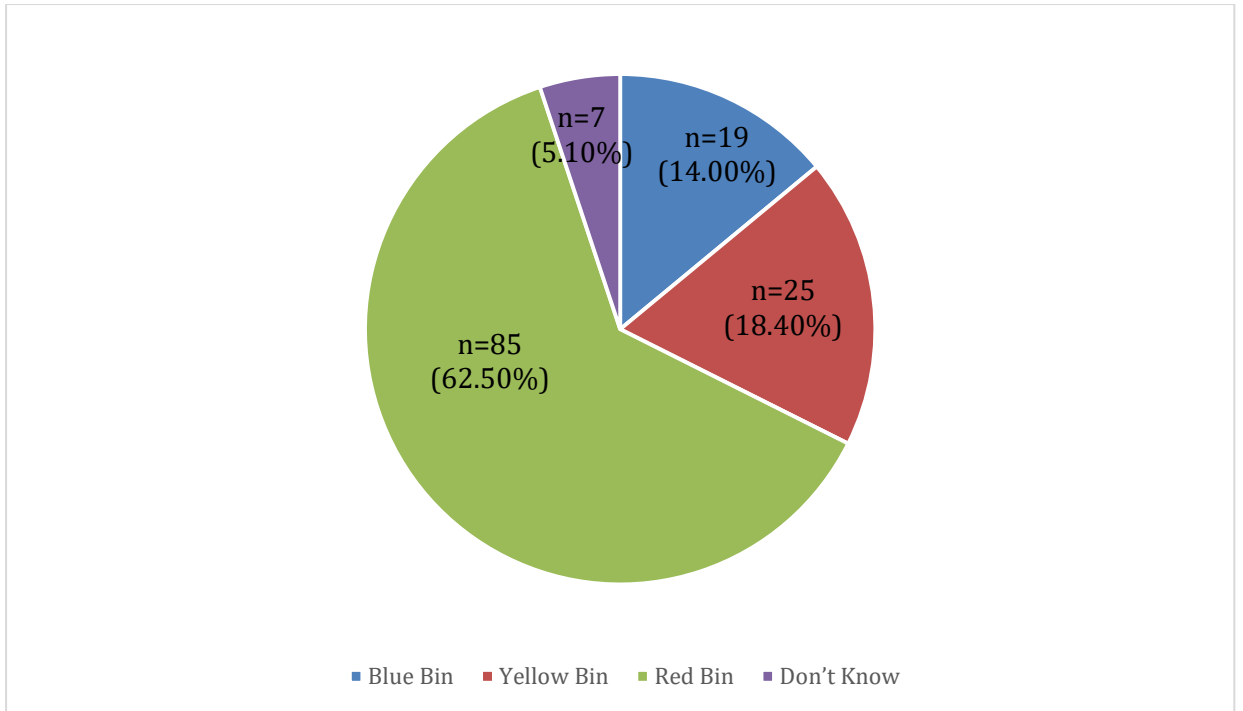


Figure 12: Descriptive statistics of Glassware are disposed in which bin

Among 136 respondents, participants who disposed glassware in Red bin 85(62.5%) in Yellow bin 25(18.4%) in Blue bin 19(14.0%). Majority of people disposed glassware in Red Bin.

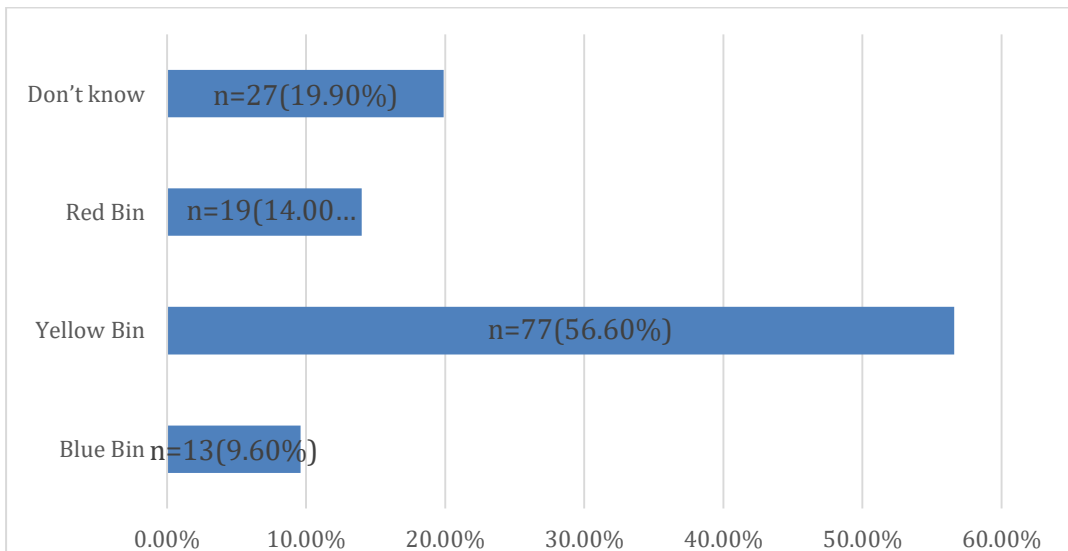


Figure 13: Descriptive statistics of Dental impression materials are discarded in

Among 136 respondents, participants who discarded dental material in Yellow bin 77(56.6%) in Red bin 19(14.0%) in Blue bin 13(9.60). Majority of people disposed Dental impression materials in Yellow color bin.

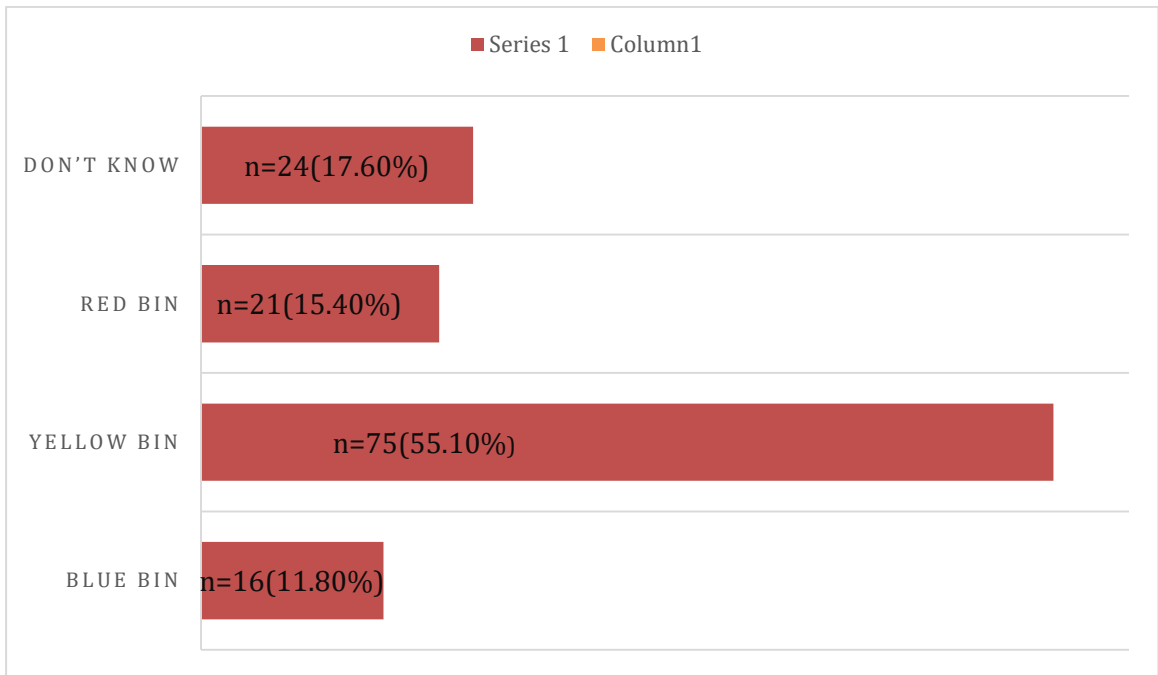


Figure 14: Descriptive statistics of Extracted teeth are discarded in

Among 136 respondents, participants who discarded Extracted teeth in Yellow bin 75(55.1%) in Red bin 19(14.0%) in Blue bin 21(15.40%) in Blue bin 16(11.8%). Majority of people disposed Extracted teeth in Yellow color bin.

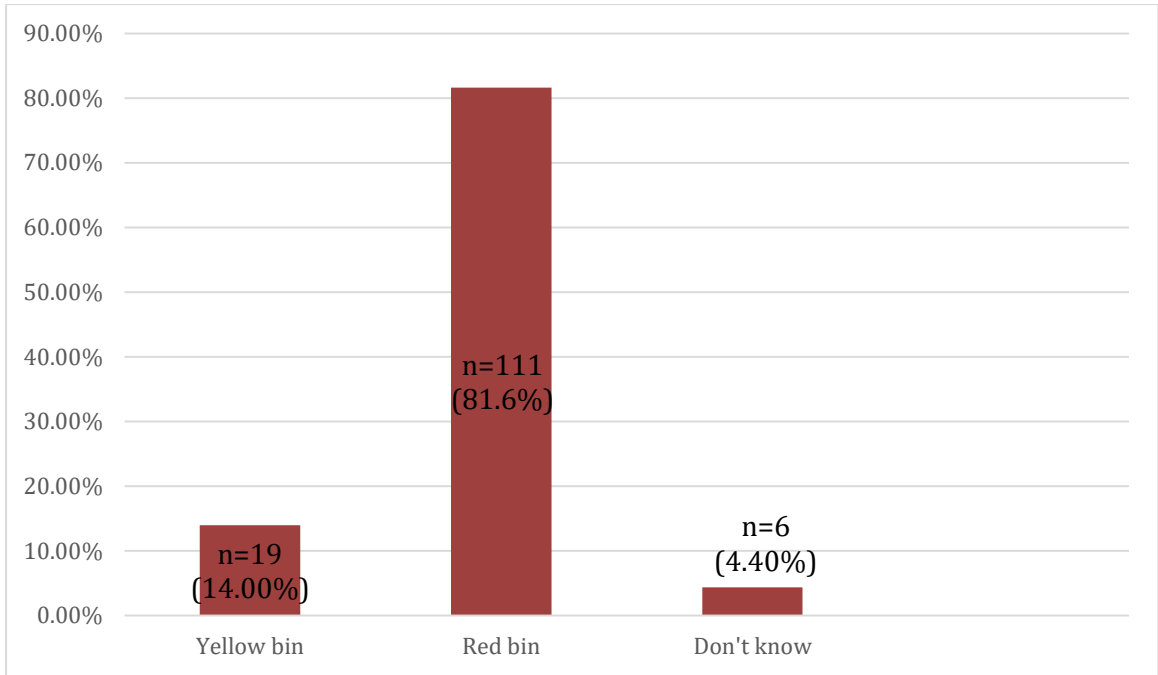


Figure 15: Descriptive statistics of Sharps and needles are disposed in

Among 136 respondents, participants who discarded Sharps and needles in Yellow bin 19(14.00%) in Red bin 11(81.6%) Majority of people discarded Sharps and needles in Red color bin.

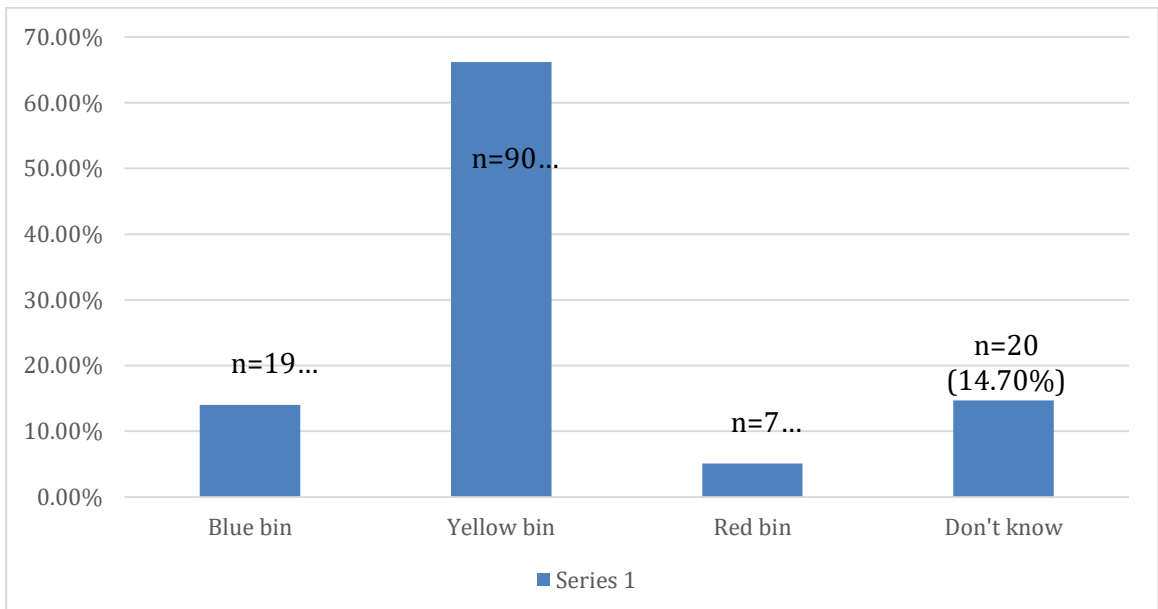


Figure 16: Descriptive statistics of Infectious non-biodegradables disposal

Among 136 respondents, participants who discarded Infectious non-biodegradables in Yellow bin 90(66.2%) in Blue bin 19(14.0%) and in Red Bin 7(5.10%) Majority of people discarded Infectious non-biodegradables in Yellow bin.

Descriptive summary of Awareness about medical waste

A total of 136 respondents were included in this study. Majority of the respondents were male n=77(56.6%) and were 21-35 years of age group 58(42.6%) Majority of the respondents were married 97(71.3%).

Demographic characteristics of the respondents are shown in table 2.

A total of 136 respondents were included in this study. Majority of the respondents 110(80.9%) knows that general waste should be separated from medical waste. Majority of the respondents 130(95.6%) Knows where to put sharps and needles. Majority of the respondents 84(63.8%) knows that final disposal of medical waste is incinerating waste.

Demographic characteristics of the respondents are shown in table 2.

Table 2: Descriptive summary of Awareness about medical waste

| S. No | Variables | Frequency (n) |
|--------------|--|-------------------------|
| 1. | Mixing of general waste with medical waste should be avoid. <ul style="list-style-type: none"> • YES • NO | 110(80.9%) 26(19.1%) |

| | | |
|----|---|-------------------------|
| 2. | Liquid medical waste should not be disposed into toilet bowl <ul style="list-style-type: none"> • YES • NO | 77(56.6%) 59(43.4%) |
| 3. | Knows where to put sharps and needles. <ul style="list-style-type: none"> • YES • NO | 130(95.6%) 6(4.4%) |
| 4. | Knows where to put waste that needs autoclaving <ul style="list-style-type: none"> • YES • NO | 110(80.9%) 26(19.1%) |
| 5. | The final disposal of medical waste is incinerating <ul style="list-style-type: none"> • YES • NO | 84(61.8%) 52(38.2%) |

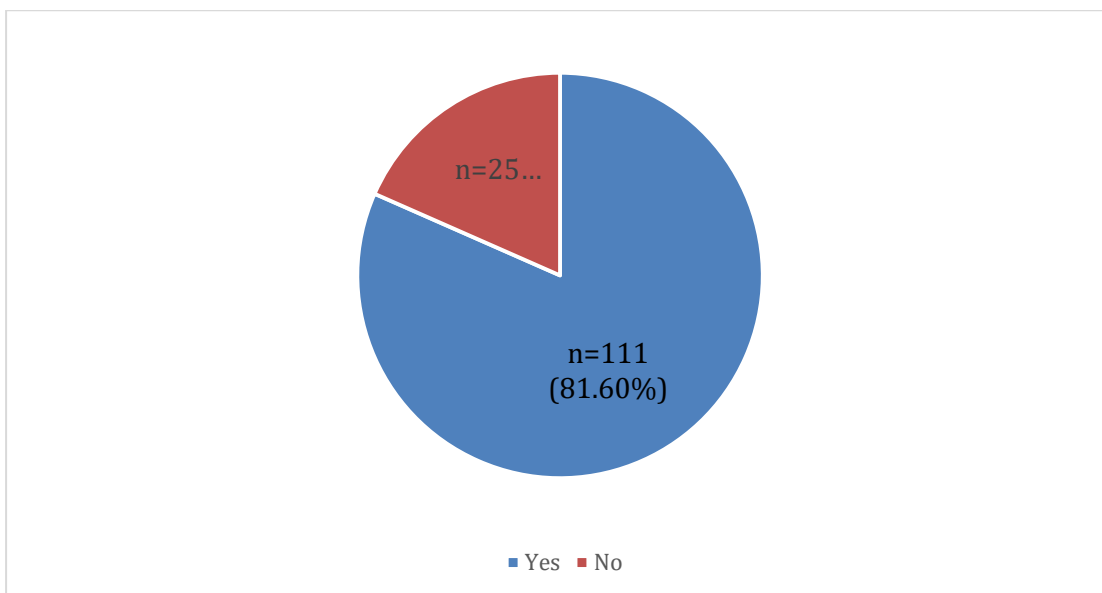


Figure 17: Descriptive statistics for Knowledge of color coding

Among 136 respondents, participants who have idea of color coding for medical waste 111(81.6%) Others who have no idea regarding color coding 25(18.4%)

Table 3: Descriptive summary of Practices of Dental Assistants

| S. No | Variables | Frequency (n) |
|-------|---|-------------------------------------|
| 1. | How often you separate medical waste from general waste in the dental surgery <ul style="list-style-type: none"> • Never • Sometimes • Always | 4(2.9%) 90(66.2%) 42(30.9%) |
| 2. | Do you put needles in the needle discarder? <ul style="list-style-type: none"> • Sometimes • Always | 40(29.4%) 96(70.6%) |
| 3. | Do you clean liquid waste spillage with proper procedure? <ul style="list-style-type: none"> • Never • Sometimes • Always | 47(34.6%) 58(42.6%) 31(22.8) |
| 4. | Do you report needle stick injury? <ul style="list-style-type: none"> • Never • Sometimes • Always | 64(47.1%) 53(39.0%) 19(14.0%) |
| 5. | Do you separate set of instruments for hep Band C patients? <ul style="list-style-type: none"> • Never • Sometimes | 83(61.0%) 53(39.0%) |

| | | |
|----|---|---------------------------------|
| 6. | <p>Do you autoclave metallic dental instruments after each patient?</p> <ul style="list-style-type: none"> • Never • Sometimes | <p>115(84.6%) 21(15.4%)</p> |
|----|---|---------------------------------|

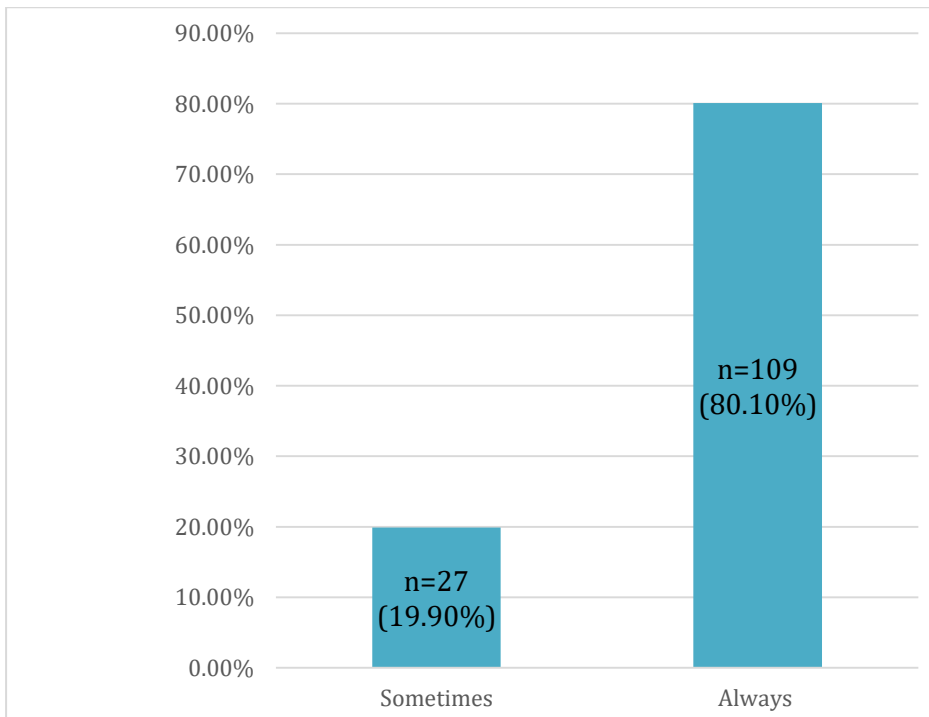


Figure 18: Descriptive statistics of wearing face mask while assisting the dentist?

Out of total 136 respondents, majority of the individuals wear face mask 109(80.1%)
 Respondents who do not use face mask 27(19.90%)

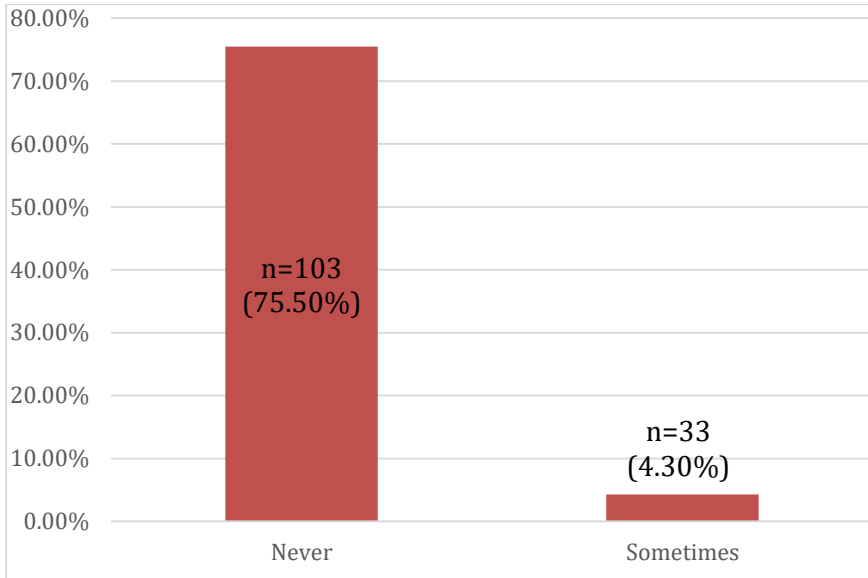


Figure 19: Descriptive statistics of wearing of gloves during dental procedures

Out of total 136 respondents, majority of the individuals do not wear gloves during dental procedures 103(75.5%)

Inferential statistics

Chi square

| Variables | Total awareness level | | | Total Practice level | | |
|-----------|-----------------------------|----------------------------------|------------------------------|-----------------------------|----------------------------------|-----------------------------|
| | Below 9 (Poor Awareness) | 9-11 (Satisfactory Awareness) | Above 11 (Good Awareness) | Below 17 (Poor practice) | 9-11 (Satisfactory Awareness) | Above 20 (Good practice) |
| | | | | | | |

| Gender | | | | | | |
|------------------------------|---------------|------------|-----------|---------------|-----------|------------|
| Male | 15(18.8%) | 50 (62.5%) | 15(18.8%) | 20(25.0%) | 34(42.5%) | 26(32.5%) |
| Female | 11(19.6%) | 40(71.4%) | 5(8.9%) | 15(26.8%) | 24(42.9%) | 17(30.4%) |
| P-VALUE | .276 | | | .956 | | |
| Age of respondent | | | | | | |
| <20 years | 21(22.8%) | 56(60.9%) | 15(16.3%) | 24(26.1%) | 36(39.1%) | 32(34.8%) |
| 21-35 | 2(7.1%) | 24(85.7%) | 2(7.1%) | 5(17.9%) | 19(67.9%) | 4(14.3%) |
| 36-50 | 2(14.3%) | 10(71.4%) | 2(14.3%) | 5(35.7%) | 3(21.4%) | 6(42.9%) |
| >50 | 1(50.0%) | 0(.0%) | 1(50.0%) | 1(50.0%) | 0(.0%) | 1(50.0%) |
| P-VALUE | .114 | | | .058 | | |
| Education of respondent | | | | | | |
| Matric | 7(36.8%) | 12(63.2%) | 0(.0%) | 0(.0%) | 6(31.6%) | 13(68.4%) |
| Intermediate | 0(.0%) | 33(71.7%) | 13(28.3%) | 14(30.4%) | 32(69.6%) | 0(.0%) |
| Graduate | 6(10.3%) | 45(77.6%) | 7(12.1%) | 21(36.2%) | 20(34.5%) | 17(29.3%) |
| Post graduate | 13(100.0%) | 0(.0%) | 0(.0%) | 0(.0%) | 0(.0%) | 13(100.0%) |
| P-VALUE | 0.0001 | | | 0.0001 | | |
| Marital status of respondent | | | | | | |
| Married | 34(26.2%) | 53(16.7%) | 43(33.1%) | 34(26.2%) | 53(40.8%) | 43(33.1%) |
| Unmarried | 1(16.7%) | 5(83.3%) | 0(.0%) | 1(16.7%) | 5(83.3%) | 0(.0%) |
| P-VALUE | .201 | | | .009 | | |
| Monthly income of respondent | | | | | | |

| | | | | | | |
|---|--------------|------------|-----------|--------------|-----------|-----------|
| <25000 | 19(18.4%) | 67(65.0%) | 17(16.5%) | 29(28.2%) | 44(42.7%) | 30(29.1%) |
| 25000-40000 | 0(.0%) | 13(92.9%) | 1(7.1%) | 1(7.1%) | 11(78.6%) | 2(114.3%) |
| 41000-60000 | 3(25.0%) | 9(75.0%) | 0(.0%) | 2(16.7%) | 3(25.0%) | 7(58.3%) |
| >60000 | 4(57.1%) | 1(14.3%) | 2(28.6%) | 3(42.9%) | 0. (0%) | 4(57.1%) |
| P-VALUE | .013 | | | .009 | | |
| Experience of employment of respondent | | | | | | |
| <2 years | 0(.0%) | 20(100.0%) | 0(.0%) | 7(35.0%) | 13(65.0%) | 0(.0%) |
| 3-5 years | 0(.0%) | 32(84.2%) | 6(15.8%) | 0(.0%) | 25(65.8%) | 13(34.2%) |
| 5-10 years | 6(19.4%) | 25(80.6%) | 0(.0%) | 7(22.6%) | 20(64.5%) | 4(12.9%) |
| >10 years | 20(42.6%) | 13(27.7%) | 14(29.8%) | 21(44.7%) | 0(.0%) | 26(55.3) |
| P-VALUE | .0001 | | | .0001 | | |
| Training/course attended on waste management | | | | | | |
| Yes | 26(31.0%) | 52(61.9%) | 6(7.1%) | 13(15.5%) | 28(33.3%) | 43(51.2%) |
| No | 0(.0%) | 38(73.1%) | 14(26.9%) | 22(42.3%) | 30(57.7%) | 0(.0%) |
| P-VALUE | .0001 | | | .0001 | | |

Interpretation

Chi square test was performed to check the association between sociodemographic factors and awareness and Practices about medical waste in Public Sector Tertiary Care Hospitals of Islamabad. After checking assumptions of chi square, results showed that those variables having p-value greater than 0.05 indicates no association. Whereas, p-value of 0.0001 which is less than 0.05 is statistically significant and showed strong evidence to reject null hypothesis

Results of chi square analysis for independence indicated significant association between Education with awareness and practices of medical waste **p-value=0.001**. Results showed that Experience of employment have statistically significant association with awareness and practices on medical waste **p-value .0001**. it was observed that the respondents who attended training on waste management have significant association with awareness and practices on medical waste **p-value .0001**.

CHAPTER 5: DISCUSSION

Medical waste is generated by health care facilities such as hospitals clinics blood banks and laborites which may cause infection to any person encountering it this may consist wholly or partly of human Or animal tissue, blood or any other body fluids, excretion, drugs or pharmaceutical products, swabs or dressing, syringes or needles or other sharp instruments it is waste which unless rendered safe may prove hazardous to any person coming into contact with it therefore medical waste can be considered as being of the greatest environmental concern since it can harbor potentially harmful microorganisms and carriers the risk of transmission of infections from health care facilities to health care workers patients and public to prevent harem full consequences to human health the community and the environment proper medical waste management is needed with entails managing waste from their generation through separation collection transport and treatment to their final disposal in Many developing countries MWM is not properly carried out and there are no clearly defined regulations and lack of operational standards it has been reported that disposal of medical waste mixed with municipal solid waste is likely to occur in clinics due to small quantity of medical waste generated the high cost of collection and disposal and lack of enforcement from the local authorities (Pensiri Akkaji et al.,2020)

Present study revealed that the respondents who attended training on waste management have significant association with awareness and practices on medical waste **p-value .0001**

The previous study conducted in Muzaffarabad in 2017 showed that Junior staff practiced significantly more than paramedical staff and doctors. This could be due to a lack of training, as in our study, fewer doctors and paramedics wanted to receive

training on proper waste management at the hospital than junior staff This is consistent with a previous report that found that improper waste management was influenced more by local health personnel's ignorance. (M. Junaid Khan et al.,2017)

Present study revealed that Education with awareness and practices have significant association on medical waste **p-value .0001** Previous study conducted in India found that 76% of respondents have adequate knowledge about waste management (Sarko muhammad et al.,2017)

The main actor of poor management of biomedical waste is the lack of adequate knowledge attitude and practices A previous study conducted in India concluded that poor knowledge about medical waste management is essential for proper waste disposal (Alok Sharma et al.,2013)

5.1. Strength:

- The current study has used validated and internationally accepted tools for assessment of Awareness and practices of waste segregation among Dental assistants
- The current study is somehow successful in assessing assessment of Awareness and practices of waste segregation among Dental assistants
- This study is unique in a sense that, for the first time, it assessed both Awareness and practices of waste segregation among Dental assistants in Islamabad.
- The current study included a diverse sample comprising individuals from different socioeconomic groups, educational background and ethnic groups.

5.2. Limitation:

Despite the sincere efforts of the researcher, few limitations were still present in the current study.

- It was a time bound research.

- This study explored Awareness and practices of waste segregation among dental assistants from public sector hospitals only.

5.3. Conclusion:

Dental assistants have adequate knowledge, attitude and practices regarding the medical waste management They do sufficient practices to save themselves from the dangerous effects of medical waste and to manage the medical waste .Practices of medical waste management found to be significantly associated with level of education, period of employment and training on waste handling.

Recommendations and way forward

As the current study included only public sector hospitals of Islamabad, therefore further research is needed to obtain generalizable results including the private sector.

Based on the results of this study, it is recommended that:

- All paradecimal staff must be given training on medical waste management.
- Waste management guidelines should be available in printed form displayed in the surgery room
- Adequate number of color coded waste bins must be ensured in the hospitals
- Periodic evaluation of dental assistants and related staff for communicable diseases.
- Immunization of all staff against common preventable diseases.
- Encourage use of disposables instead of reusable items whenever feasible.

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| | | | | | |
|----|--|--|--|--|--|
| 13 | Sharps and needles are disposed in? | | | | |
| 14 | Infectious no biodegradable are disposed in? | | | | |

| | Question/item | Yes (1) | No (0) |
|----|---|------------|-----------|
| 15 | Waste generated from healthcare activities are medical waste? | | |
| 16 | Mixing of general waste with medical waste should be avoided? | | |
| 17 | Knows color coding for medical waste? | | |
| 18 | Liquid medical waste should not be disposed into toilet bowl. | | |
| 19 | Knows where to put sharps and needles | | |
| 20 | Knows the consequences of needle prick injury | | |
| 21 | Knows where to put waste that needs autoclaving. | | |
| 22 | The final disposal of medical waste is incinerating. | | |

SECTION-C (PRACTICES OF DENTAL ASSISTANTS)

| | Questions/items | Always (1) | Sometimes (2) | Never (3) |
|----|--|---------------|------------------|--------------|
| 23 | How often you separate medical waste from general waste in the dental surgery? | | | |
| 24 | Do you wear face mask while assisting the dentist? | | | |
| 25 | Do you wear gloves while performing dental procedures? | | | |
| 26 | Do you put needles in the needle discarder? | | | |
| 27 | Do you clean liquid waste spillage with proper procedure? | | | |
| 28 | Do you report needle-stick injury? | | | |
| 29 | Do you use separate set of instruments for Hep.B and C positive patients? | | | |
| 30 | Do you autoclave metallic dental instruments after each patient? | | | |

.....**THANK YOU**.....

ANNEX-II

INFORMED CONSENT FORM

Title of study: Awareness and practices of waste segregation among dental assistants in public sector hospitals of Islamabad.

Principal investigator: Tahira Bukhari, MSPH student, Al Shifa School of public health Rawalpindi.

Purpose: Biomedical waste is an important aspect of dental surgery. Proper handling and safe disposal of infectious wastes is mandatory to avoid cross infection and transmission of lethal pathogens. Adequate training and explicit guidelines are required to serve this purpose. The present study will assess the knowledge of dental assistants regarding segregation of wastes and practices in the operating room. This study will also examine the socio-demographic factors which are associated with waste management practices. This will eventually help to develop interventions for satisfactory handling of wastes. **Procedure:** Data will be collected from dental assistants using a questionnaire to collect demographic information, knowledge of waste segregation and practices at the chairside/operating sites. Participants are required to complete the questionnaire.

Time required: It is anticipated that it will take approximately 5 to 7 minutes to complete the questionnaires.

Voluntary participation: Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or

destroyed. **Confidentiality:** Data will be completely anonymous and reported in aggregate form. Your name will not appear anywhere. After data collection, the questionnaires will be password-protected. Once submitted the researcher will not be able to withdraw responses due to anonymity and de-identified data.

Risks: There will be no serious risk associated with this study.

Benefits: There are no direct benefits associated with participation in this study but your participation will help the researcher to find out the gaps in waste management practices. It will help the other researchers to carry out more work on this topic to highlight main issues. Further, this will help the higher authorities to devise future projections to improve this situation.

Payment: You will receive no payment for participating in the study. Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty.

Contact information: If you have questions about the study, please contact the following individual:

Syeda Tahira Bukhari

tahirabukhari@hotmail.com

Contact # 03412345678

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Name of Participant _____

Signature of Participant _____

Date _____ (DD/MM/YY)

Statement by the researcher/person taking consent:

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands it. I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of this Informed Consent Form (ICF) has been provided to the participant.

Name of Researcher/person taking the consent _____

Signature of Researcher /person taking the consent _____

Date _____ (DD/MM/YY)

ANNEXURE-III (IRB Letter)



**AL-SHIFA SCHOOL OF PUBLIC HEALTH
PAKISTAN INSTITUTE OF OPHTHALMOLOGY
AL-SHIFA TRUST, RAWALPINDI**

MSPH-IRB/14-05
27th Sep, 2022

TO WHOM IT MAY CONCERN

This is to certify that **Syeda Tahira Bukhari** D/O **Syed Muhammad Movveed Bukhari** is a student of Master of Science in Public Health (MSPH) final semester at Al-Shifa School of Public Health, PIO, Al-Shifa Trust Rawalpindi. He/she has to conduct a research project as part of curriculum & compulsory requirement for the award of degree by the Quaid-i-Azam University, Islamabad. His/her research topic which has already been approved by the Institutional Review Board (IRB) is "Awareness and practices of waste Segregation among dental assistants in public sector tertiary care hospitals of Islamabad".

Please provide his/her necessary help and support in completion of the research project. Thank you.

Sincerely,

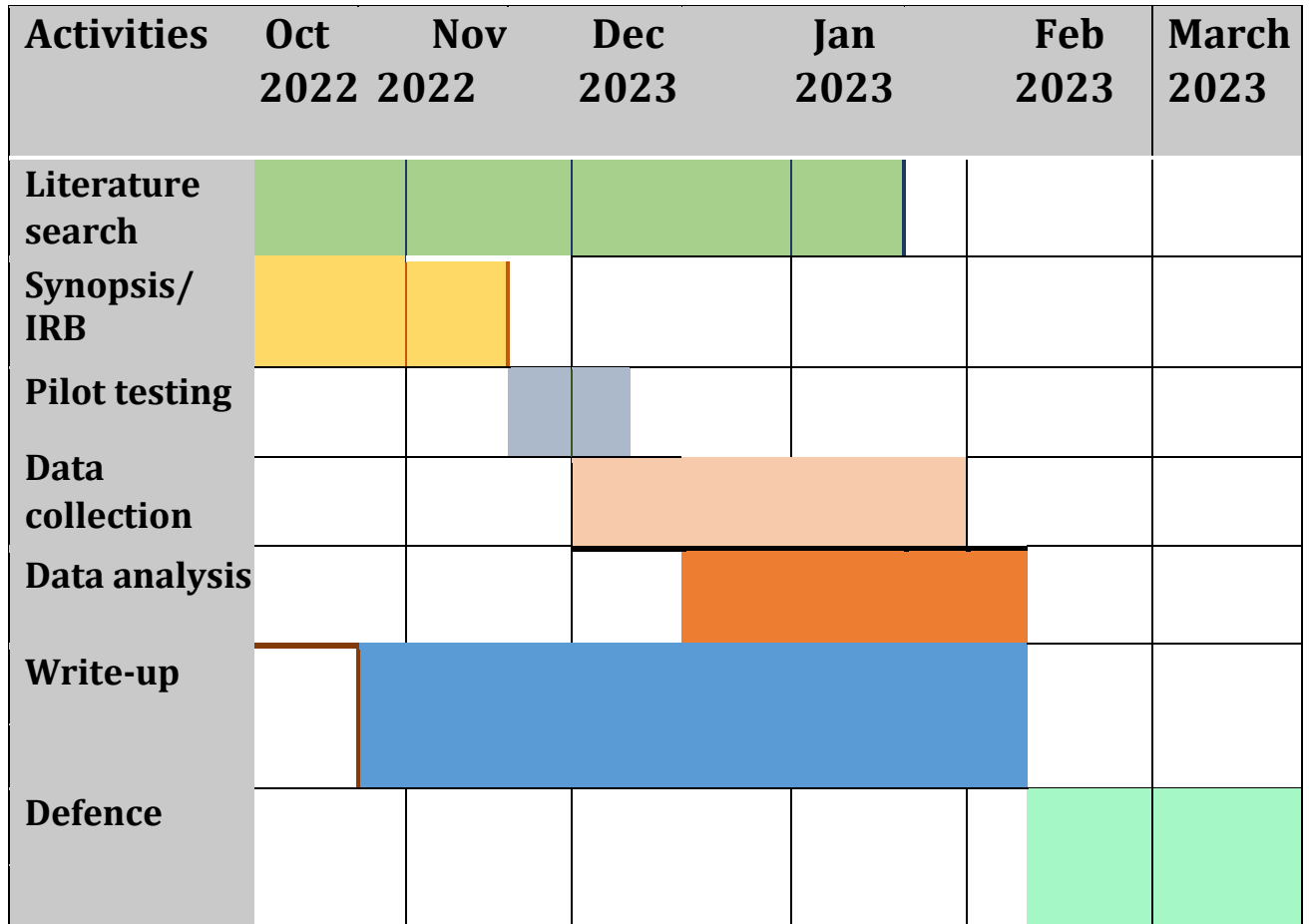
Dr. Ayesha Babar Kawish
Head
Al-Shifa School of Public Health, PIO
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Scanned with CamScanner

ANNEX-IV (TIMELINE)

GANTT CHART



ANNEX-V (BUDGET)

| Budget item | Transport | Stationery and internet | Printing | Publishing |
|-------------------|-------------|-------------------------|-------------|------------|
| Pilot testing | 500 Rs/- | 5000 Rs/- | 5000 Rs/- | - |
| Data collection | 10,000 Rs/- | 7,000 Rs/- | - | - |
| Thesis writeup | 1,000 Rs/- | 5,000 Rs/- | 8,000 Rs/- | 8,000 Rs/- |
| Total expenditure | 16,000 Rs/- | 17,000 Rs/- | 13,000 Rs/- | 8,000 Rs/- |
| Grand total | 54,000 Rs/- | | | |