Knowledge, Attitude and Practice of Waste Management among Post Graduate Students in Thiruvananthapuram District

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SUBMITTED BY

Name: Jefin Sam Thankachan

Exam Code: 91520103

Candidate code: 91521115014

Subject code: SW 2.4.5

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CERTIFICATION OF APPROVAL

This is to certify that this dissertation entitled "Knowledge, Attitude and Practice of Waste Management among Post Graduate Students in Thiruvananthapuram District" is a record of genuine work done by Jefin Sam Thankachan, fourth semester Master of Social Work student of this college under my supervision and guidance and that it is at this moment approved for submission

Dr. Francina P.X

Department of Social Work

Loyola College of Social Sciences

Sreekariyam, Thiruvananthapuram

Recommended for forwarding to the University of Kerala

Rev. Dr. Sabu P Tomas SJ

Head, Department of Social Work

Loyola College of Social Sciences

Sreekariyam, Thiruvananthapuram

Forwarded to the University of Kerala

Dr. Saji P. Jacob

Principal

Loyola College of Social Sciences

Sreekariyam, Thiruvananthapuram

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Declaration

I, Jefin Sam Thankachan do hereby declare that the Dissertation titled "Knowledge, Attitude and Practice of Waste Management among Post Graduate Students in Thiruvananthapuram District" is based on the original work carried out by me and submitted to the University of Kerala during the year 2021-2023 towards partial fulfilment of the requirements for the Master of Social Work Degree Examination. It has not been submitted for awarding any degree, diploma, fellowship or other similar title of recognition before.

Jefin Sam Thankachan

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Abstract

The current global situation revolves around a significant issue known as Waste Management. The improper handling of waste is resulting in numerous negative impacts on the environment and public health. People's understanding and outlook towards waste management play a role in how they manage their waste. Despite possessing knowledge about proper waste management methods, a considerable number of individuals still resort to burning plastic and thoughtlessly discarding it in public areas. It is imperative to urgently address and prioritize this matter. This study investigates the Waste Management Practices and Attitudes of Post Graduate Students in Thiruvananthapuram District, aiming to gain valuable insights into their Knowledge, Attitude, and practices regarding waste management. Data was collected from 107 post-graduate students in Thiruvananthapuram, using a self-structured questionnaire through convenience sampling. The findings reveal that a significant proportion of respondents demonstrate good knowledge about waste management, including proper disposal, recycling, and treatment. However, awareness of specific government initiatives for waste management remains limited, necessitating further education and awareness campaigns. The study highlights a positive attitude towards waste management among the majority of respondents, with females showing a higher positive attitude compared to males. Different academic disciplines also influence attitude levels. Recycling of paper, plastic, and glass was the most common practice, yet several barriers hinder effective waste management practices, emphasizing the need for targeted strategies. The study further categorizes the level of waste management practices, with the majority exhibiting a good level of practice. The study emphasizes the significance of implementing and improving waste management measures to enhance practices comprehensively. These findings provide a basis for designing targeted interventions and awareness campaigns to promote sustainable waste management practices among Post Graduate students. Further research can explore the effectiveness of specific strategies and initiatives to enhance waste management behaviours and attitudes in this academic cohort. Overall, understanding waste management practices among this educated group can contribute to a broader societal effort in addressing waste-related challenges.

Keywords: Waste management, Environmental consciousness, attitude, waste management practice

Chapter I

Introduction

Chapter 1: Introduction

1.1 Overview of the Chapter

This chapter serves as an initial introduction, offering a comprehensive overview of the research topic. It encompasses essential elements such as the study's background, problem statement, and significance. Additionally, it presents an outline of the overall research structure, providing a breakdown of the content covered in each chapter.

In this chapter, the background of the study provides important contextual information by discussing the existing knowledge, theories, and practices relevant to the research topic. By examining previous research and relevant literature, it establishes the groundwork on which the current study is based. The problem statement identifies the gap in knowledge that the research aims to address. It clearly presents the research question or objective, indicating the specific area the study intends to investigate. Furthermore, the chapter emphasizes the significance of the study, explaining its importance and the value it adds to the existing body of knowledge. It also discusses potential practical implications, theoretical advancements, or social impacts resulting from the research findings. Lastly, the chapter includes a section outlining the structure of the entire research, providing an overview for the reader.

This overview helps the reader understand the logical progression and flow of the study, enabling effective navigation through the research. Overall, this introductory chapter offers a comprehensive background, highlights the problem being addressed, emphasizes the significance of the research, and provides a clear outline of the subsequent chapters.

1.2 Background of the Study

Waste is defined as any substance or material that is discarded or left in the environment by the producer or possessor. When managed effectively, waste holds economic value (Muljaningsih, 2018), to the extent that many countries now view waste as a valuable resource for materials and energy (Cucchiella, 2017). Understanding the composition of waste enables the development of strategies for separation, collection, and treatment options such as recycling and composting, thereby diverting waste from landfills (Nolasco et al, 2021). Failing to manage waste properly leads to negative consequences. During the prehistoric period, waste was primarily seen as a nuisance and there was no

significant emphasis on proper waste management. This was due to the smaller population size and the ample availability of land for waste disposal. The environment was capable of absorbing the volume of waste produced without experiencing significant degradation. The volume of waste generation saw a significant increase starting in the sixteenth century, primarily due to the migration of people from rural areas to cities as a consequence of the industrial revolution (Wilson, 2007).

Waste contributes to various problems, including health issues, unpleasant odors, fire hazards, and pollution of the atmosphere, soil, water, and visual surroundings, leading to social and economic losses (Dharmasiri, 2019). Waste poses serious threats to air, water, and soil. Burning waste in open areas releases toxic gases like carbon dioxide and carbon monoxide, which have detrimental health effects. Improper disposal of waste pollutes water bodies and encourages the proliferation of flies and rodents. It also alters soil properties and negatively impacts plant growth. Additionally, waste diminishes the aesthetic value of the environment and disrupts the natural landscape (Dharmasiri, 2019). Considering these factors, waste should be recognized as a cultural problem that affects our quality of life. To mitigate the adverse environmental effects of waste, proper waste management practices are essential ((Naria, 2018). Alam (Alam, 2013) conducted a study that focused on the effects of waste on both the environment and human health. The study specifically examined the origins and quantities of different types of waste, as well as the methods of waste disposal. Additionally, it emphasized the negative consequences that arise from inadequate waste management practices, particularly in relation to human health.

Waste management is crucial due to its detrimental impact on the environment and public health. The history of waste control and management, as revealed by Hilburn (Hilburn, 2015) has been complex and enduring. The Greeks made the first recorded attempt at waste management in the 4th century AD, facing challenges such as population growth, limited space, and hygienic complexities, which posed obstacles to aligning the waste management system. According to (Narayana, 2009) waste collection and transportation have always been fundamental practices in waste management. However, rapid urban development and population growth led to deteriorating sanitation conditions, making garbage a dangerous threat to human health

and environmental hygiene. During the 14th to 16th centuries, Europe experienced plagues caused by vermin in unsanitary urban environments.

India is currently experiencing a transition from an agrarian-based economy to an industrial and services-oriented economy. In urban areas, the population currently accounts for approximately 31.2% of the total population. There are approximately 7940 urban centers in the country, accommodating a staggering 380 million people. Among these urban centres, there are three megacities, namely Kolkata, Delhi, and Mumbai, each with populations exceeding 10 million. Additionally, there are 53 cities with populations exceeding 1 million and 415 cities with populations of around 100,000. These statistics highlight the rapid urbanization and concentration of populations in various cities and urban centers across India (Census. Provisional population totals, India. 2011) and also experiencing a period of unparalleled economic growth, increasing ambitions, and rapidly evolving lifestyles. These factors will lead to higher expectations regarding public health and overall quality of life. Over the years, the amount of waste produced per person in India has risen from 0.44 kg/day in 2001 to 0.5 kg/day in 2011. This rise is primarily driven by lifestyle changes and the improved purchasing power of urban Indians.

The growth of urban populations and the subsequent increase in per capita waste generation have caused a 50 percent surge in waste production by Indian cities in just a decade since 2001. Among the 53 Indian cities with a population of one million or more, they collectively generate 86,000 TDP (31.5 million tons per day) of Municipal Solid Waste (MSW) at a per capita waste generation rate of 500 grams/day. The total MSW generated in urban India is estimated to be 68.8 million tons per year (TPY) or 188,500 tons per day (TPD) of MSW. This drastic rise in waste generation within a decade has strained the availability of natural resources, infrastructure, and budgetary resources. Major cities are responsible for collecting approximately 70-90 percent of the MSW produced, while smaller cities and towns collect less than 50 percent. More than 91 percent of the formally collected MSW is disposed of in landfills and dumps. Additionally, it is estimated that around 2 percent of the uncollected waste is openly burned on the streets. Furthermore, approximately 10 percent of the collected MSW is either openly burned or involved in landfill fires (Lok Sabha Secretariat , 2020).

It is evident that a majority of cities in India are falling behind in meeting the minimum standards of waste management, which encompass collection, segregation, transportation, treatment, and disposal of waste. There is a lack of proper segregation between organic waste and dry waste recyclables (Gupta, 2007). Additionally, internal roads and arteries, except for main roads, are not adequately swept. The transportation of waste in open trucks and autos, coupled with unscientific waste disposal, has unfortunately become the norm rather than the exception. The

principles of reduce, reuse, and recycle, despite being integral to the municipal solid waste (MSW) policy framework, are seldom put into practice (Trankler, 2004).

Although there have been improvements in the waste policy framework over the years, implementation still remains unsatisfactory. The introduction of more stringent and comprehensive Solid Waste Management Rules in 2016 was a step in the right direction. Specific norms for certain sectors, particularly industrial and hazardous wastes, have also been established. Furthermore, there has been an increase in public interest litigations and rulings by judicial courts at various levels, as well as the involvement of the National Green Tribunal (NGT). These developments indicate a growing awareness and concern regarding solid waste management issues in the country.

The process of rapid urbanization, coupled with shifts in consumption patterns and social behaviour, has led to a significant increase in the generation of municipal solid waste in Kerala. This increase has surpassed the environmental capacity to absorb waste and has exceeded the management capabilities of the existing waste management systems. It is estimated that the municipalities in the state of Kerala generate more than 0.21 kg of waste per capita per day. (Varma, 2016)

It is worth noting that between 2001 and 2011, the number of 'towns' in Kerala (as defined by the Census), increased fivefold. However, it is important to mention that many of these towns do not have formal local government bodies. Out of the five Municipal Corporations in Kerala, all of them have waste processing plants. However, as of 2013, only 27 out of the 60 Municipalities had such facilities, according to Ahluwalia and Tiwari (Tiwari, 2013). This situation can be attributed, to some extent, to the scarcity of available land and the high population density in the state.

Thiruvananthapuram, serving as both the state capital and the southernmost district, holds a prominent position due to its abundant natural resources. It acts as a hub for numerous governmental and nongovernmental institutions and is recognized as one of Asia's largest IT centres. The district also boasts various proposed and upcoming projects (Anilkumar, 2014)

As per the Census 2011 data, Thiruvananthapuram district covers approximately 5.60% of the total state area and is home to approximately 10.31% of the state's total population. Out of this population, 46.33% reside in rural areas, while 53.66% live in urban areas. The district has an impressive literacy rate of 92.66%. Moreover, Thiruvananthapuram contributes to 11% of the state's income, and the majority of its residents engage in the secondary and tertiary sectors for their livelihoods.

Numerous investigations have been carried out to examine the varieties and projected volumes of waste produced in every district of Thiruvananthapuram City Corporation. It has been estimated that the urban area generates an aggregate of 290-300 tons of solid waste on a daily basis. (Ambat, 2000).

The lack of space and proper waste management practices are identified as the primary reasons why waste is not segregated and often ends up being dumped on roadsides. People are generally unwilling to segregate their waste, except for newspapers. Many hospitals dispose of their waste in dumper placer containers or burn it within their premises. Approximately 55% of households engage in waste reduction, reuse, and recycling practices. Among low-income and middle-income households, around 60% of the waste is burned, while the remainder is sold for a nominal price. An encouraging finding is that 88% of the population recognizes their role in solid waste management, indicating a shift in attitude. People prefer a door-to-door waste collection system and are willing to pay for an improved solid waste collection service (Ambat, 2000).

1.3 Statement of the Problem

India is a republic country located in South Asia, known for its remarkable diversity in terms of religion, language, and culture. The society of this vast subcontinent is highly varied and complex, with a rich heritage that is among the oldest in the world. India is the seventh largest country in terms of land area and the second most populous country, with a population of over 1.4 billion. It is also recognized as the largest democracy

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globally. The increasing population in India is a significant contributing factor to the generation of waste.

The rapid urbanization and globalization, constant change in consumption pattern and social behaviour have increased the generation of different types of waste in Kerala beyond the assimilative capacity of our environment and management capacity of the existing waste management systems (Tiwari, 2013) Therefore, there is an urgent necessity of improved planning and implementation of comprehensive waste management systems for upgrading the environmental scenario of the State.

Thiruvananthapuram, the capital city of Kerala, was renowned for being one of the cleanest cities in India in the past. However, due to rapid urbanization, lack of proactive planning, mismanagement, and limited public participation in waste disposal matters, the city has lost its earlier reputation. The knowledge, attitude and practice about waste management is very important in the modern scenario especially those who managing the home are managing the household waste also. In this context the proposed study is an investigation to assess the knowledge, attitude and practice about waste management among Post Graduate students are the policy makers and implementers

1.4 Significance of the Study

Waste management, also known as waste disposal, encompasses all the activities and actions required to handle waste from its creation to its final disposal. It involves the management of various types of waste, including solid waste, liquid waste, and radioactive substances, each requiring different methods and expertise. Waste management entails the administration of activities related to the collection, separation at the source, storage, transportation, transfer, processing, treatment, and disposal of waste. It also encompasses efforts to reduce waste through material efficiency, waste reduction, and the recovery and reuse of discarded materials.

Waste management practices vary depending on the development status of a nation, the urban or rural nature of an area, and whether the waste originates from residential or industrial sources. Inadequate waste management and the improper treatment and disposal of effluents can pose potential risks to public health. When designing waste and effluent disposal systems, factors such as prevailing weather conditions, seasonal

variations, topography, separation distances from residents and public facilities, the quantity and concentration of effluents, and the characteristics of the receiving water environment must be assessed. The objective is to ensure that waste and effluent disposal systems do not create any nuisance or pose risks to public health and safety.

Waste Management is one of the serious issues that are to be studied, discussed and also to be practice in our daily life. It needs scientific knowledge how waste to be collected, treated and disposed personally and also in publicly. Kerala is one of the states having high population density. The rate of waste generation in Kerala is increasing. The effective waste management is a critical challenge to authorities of Kerala. Higher growth of population and lack of proper waste management mechanism increases the incidence of this problem. The Thiruvananthapuram district is experiencing a rise in its urban population, as more people are moving from rural areas to urban centres. While this migration can lead to increased production of goods and services, it also brings about several challenges. These challenges include congestion, pollution, higher demand for housing, inadequate access to clean water and sanitation facilities, limited recreation areas, public transportation issues, and healthcare concerns. Thiruvananthapuram, being a major tourist attraction with expanding industries and a growing population, has encountered a range of issues over the past four decades. These problems include insufficient and deteriorated water transmission and distribution facilities, dysfunctional or limited sewerage and sanitation facilities, subpar urban infrastructure, poorly maintained drainage systems prone to heavy siltation and clogging, inadequate solid waste management, and pollution associated with religious practices, as well as an overcrowded urban road network.

So, all waste management system will work effectively only if the people and the society have minimum level of knowledge and awareness regarding the issues of waste. The youth are the change makers of the society. They are more energetic and creative so that they can play a significant role in waste management. The college students play a crucial role in managing wastes in their environment and also lots of initiatives and new ideas developed by college students in their colleges. Many studies have indicated that the students are the important sources creating changes in the society. Thiruvananthapuram is one of leading education centres in Kerala So, this study is relevant in the sense that it would lead to understand the knowledge level of waste

management, attitude towards the waste and how they practice waste management in daily life among the Post Graduate students.

1.5 Chapterisation

The whole study is divided into six parts and they are as follows,

- Chapter I Introduction: The chapter gives an overview about the background and significance of the study. It also elaborates on the statement of the problem.
- Chapter II Literature Review: The chapter summarizes the findings from different studies based on similar themes. It also includes theoretical framework which supports the study.
- Chapter III Methodology: The methodology followed in the present study is given in this chapter including the aim, objectives, universe and unit, details on data collection and analysis etc.
- Chapter IV Data Analysis: The results of analysed data are presented in this chapter as tables and figures. It is divided into socio-demographic details, the level of knowledge of the participants, level of attitude of the participants, level of practices of waste management of participants The socio-demographic details were presented using figures and tables, which effectively showed the distribution and characteristics of the Post graduate students and the frequency, level and crosstabulations are represented in tables with the valid percentage and frequency. interpretations of graphs and tables were also given below the same
- Chapter V Discussions: Detailed description of the results derived after data analysis is given in this chapter. The probable reasons for the results are also given in the chapter.
- Chapter VI Findings, Suggestions and Conclusions: The chapter summarizes major findings of the study. It also put forwards suggestions, implications and recommendations for further research. Conclusion of the whole research is also given.

1.6 Summary of the Chapter

This chapter presents a comprehensive overview of the study's background, including topics such as such as concept of waste, classification of waste, Disposal v/s management, waste management, waste management in India and Kerala, Knowledge Attitude and Practice (KAP), knowledge of waste management, Attitude towards waste management and waste management practices. The chapter clearly states the problem, highlighting the existing gap in knowledge and the need for further research in this area. Lastly, the chapter provides a detailed outline of the research structure, giving an overview of the study's framework.

CHAPTER II

LITERATURE REVIEW

Chapter 2: Literature Review

2.1 Overview of the Chapter

The analysis of prior and current studies that are relevant to the research at hand, as well as the identification of research gaps in those earlier studies, are two key tasks that has to be undertaken while conducting as research. It aids in gaining a comprehensive understanding of the issue and raises the standard of empirical investigation. This chapter is written to establish the requirement of the current study by reviewing previous studies based on similar themes. Thematic analysis is used to conduct a review of the literature and different themes discussed under the review of literature include

- Waste and Waste Management
- Knowledge, Attitude and Practice
- Knowledge of Waste Management
- Attitude towards Waste Management
- Practices of Waste Management

2.2 Waste and Waste Management

2.2.1 The concept of Waste

Wastes are an inevitable by-product of human activity (Brunner, 2014). In recent times, the rate and quantity of waste generation have been on the increase. As the volume of wastes increases, so also does the variety of the waste increases (Vergara S. E., 2012). Today the world is growing rapidly so that lots of waste generation in different sectors are growing. Proper management was not a major issue as the population was small and a vast amount of land was available to the population. Today the living standard and health care facilities are developing and the same time population also increasing. This creates the limitation of availability of land and the deposition of waste management becoming a serious issue. What exactly is waste is a crucial subject in today's waste management. Waste is a worthless by-product of human activity that really contains the same material as a beneficial product (White, 1995).

2.2.2 Classification and Types of Waste

Waste can occur in many various forms, and there are many ways to characterize waste. The physical states, physical qualities, reusable potentials, biodegradable potentials, source of production, and level of environmental effect are some typical features utilised in the classification of waste. White et al. (White, 1995) stated that waste can be classified broadly into three main types according to their physical states; these are liquid, solid and gaseous waste. Although it is clear that several classifications exist in different countries. The most commonly used classifications are illustrated below.

- Physical state
    - Solid waste
    - Liquid waste
    - Gaseous waste
- Source
    - Household/Domestic waste
    - Industrial waste
    - Agricultural waste
    - Commercial waste
    - Demolition and construction waste
    - Mining waste
- Environmental impact
    - Hazardous waste
    - Non-hazardous waste

According to Agarwal.et. al (Dr. Raveesh Agarwal, 2015) classified waste into wet waste (Biodegradable) and dry waste (non-Biodegradable)

Wet waste (Biodegradable) includes the following:

- Kitchen waste including food waste of all kinds, cooked and uncooked, including eggshells and bones
- Flower and fruit waste including juice peels and house-plant waste
- Garden sweeping or yard waste consisting of green/dry leaves
- Sanitary wastes

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- Green waste from vegetable & fruit vendors/shops
- Waste from food & tea stalls/shops etc

Dry waste (non-biodegradable) includes the following:

- Paper and plastic, all kinds
- Cardboard and cartons
- Containers of all kinds excluding those containing hazardous material
- Packaging of all kinds
- Glass of all kinds
- Metals of all kinds
- Rags, rubber
- House sweeping (dust etc.)
- Ashes
- Foils, wrappings, pouches, sachets and tetra packs (rinsed)
- Discarded electronic items from offices, colonies viz. cassettes, computer diskettes, printer cartridges and electronic parts.
- Discarded clothing, furniture and equipment

2.2.3 Disposal v/s Management

Disposing of waste has become a significant and challenging issue worldwide, affecting human communities everywhere. Simply getting rid of solid waste out of sight does not solve the problem; instead, it indirectly exacerbates the issue manifold, reaching a point where it becomes uncontrollable for everyone. The well-known consequences of this practice include health hazards, pollution of soil, water, air, and food, unpleasant surroundings, and the loss of valuable resources that could be extracted from solid waste. This is why it is crucial to prioritize proper waste management globally. Waste management has become a topic of concern both on a global and national scale. The more advanced human settlements become, the more complex waste management becomes. While there is an ongoing search for effective solutions, it is increasingly recognized that relying solely on technological advancements without human intervention is not sustainable and, in fact, further complicates matters.

The ideal approach to handling waste is through the management that encompasses proper segregation and scientific recycling of all its components. This method ensures that solid waste is appropriately sorted and recycled, promoting efficient resource utilization and minimizing environmental impact. waste management is a widely recognized term that refers to the application of techniques aimed at ensuring the systematic implementation of various functions involved in handling waste. These functions include collection, transportation, processing, treatment, and disposal of waste.

Over time, waste management has evolved significantly from the primitive practice of simple dumping to a more sophisticated range of options. These options include re-use, recycling, incineration with energy recovery, advanced landfill design and engineering, and the utilization of alternative technologies. The aim of this development is to establish an overall waste management system that is not only the most environmentally friendly but also economically sustainable for a specific region. Furthermore, it seeks to ensure that the waste management practices are socially acceptable and align with the values and expectations of the local community.

2.2.4 Waste Management

Human interactions with the environment (human activities) have always resulted in waste production. However, (Giusti, 2009) reported that waste production and management was not a major issue until people began living together in communities. (Marchettini et.al, 2007) pointed out that, these continuous flows of waste resulting from human activities, overburdened the environment. (Vergara S. E., 2012) reported that proper planning and control is required in other to prevent the negative impact of waste on the environment. As a result, a proper organisation of waste management has become an essential task needed to safeguard the environment (Ghiani, 2014)

The collection, transportation, processing, recycling or disposal, and monitoring of waste items is known as waste management (Demirbas, 2011). Collection, transportation, pre-treatment, processing, and residue abatement are all components of a typical waste management system. The complete set of tasks involved in handling, treating, disposing of, or recycling waste products makes up the waste management system.

Recycling is an essential principle in solid waste management, which refers to the process that separates various wastes and processes some wastes as raw materials for the production of new materials (Wilson CD, 2007)

2.2.5 The 3Rs: Reduce, Reuse, and Recycle

To safeguard the environment, mitigate pollution, and preserve natural resources, it is crucial to minimize waste by practicing waste reduction, reuse, and recycling. These practices, collectively referred to as the 3Rs (Reduce, Reuse, and Recycle), have transcended their initial status as mere marketing slogans and have evolved into a lifestyle for numerous individuals.

The concept of "Reduce" involves recognizing that we don't necessarily require all the products we consume, ranging from clothing to food. Opting for a minimalistic approach emphasizes quality rather than quantity. It is essential to question whether products with short lifecycles, which quickly become waste, genuinely contribute to our well-being and happiness or if they are merely indulgences. The Institute for European Environmental Policy asserts that our current consumption patterns are unsustainable. By 2050, each European will need to reduce their utilization of natural resources for sustenance, housing, transportation, and leisure by 80%. Achieving this goal will require a combination of both efficiency and sufficiency (Institute for European Environmental Policy (2019). Reaching Sustainable Consumption in Europe by 2050. Institute for European Environmental).

"Reuse" entails discovering alternative purposes for items that would otherwise be discarded, thereby enhancing their value and preventing them from ending up in landfills or recycling centres. Instead of immediately disposing of a product, we should consider whether it can be reused or repaired. This approach not only conserves energy, time, money, and resources but also contributes to environmental protection. Essentially, it is crucial for each individual to minimize their consumption of disposable materials and actively make an effort in this regard (Ellen MacArthur, 2017).

Recycling plays a significant role in resource conservation and cost reduction for various products. It involves the process of selectively collecting materials for reuse or transformation into new products. The quantity of recycled waste has experienced a

substantial increase, nearly tripling from 37 million tons (equivalent to 87 kg per person) in 1995 to 107 million tons (equivalent to 239 kg per person) in 2019 (Eurostat., 2021).

2.3 Waste management in India

The solid waste policy in our country delineates the obligations and tasks associated with maintaining a hygienic waste management system for both urban areas and citizens. This policy was established in September 2000. Drawing upon the March 1999 Report presented by the solid waste management committee to the Supreme Court, it strongly advised regulatory bodies to adhere to the suggestions and recommendations outlined in the report. Additionally, this policy serves as a comprehensive manual for adhering to the municipal solid waste regulations. Presently, India ranks among the countries with the highest amount of waste disposal, resulting in the contamination of Indian soil and land with hazardous substances such as chemicals and plastics. The aforementioned report, along with the associated rules and regulations, is founded on the principle that the best approach to maintaining clean and tidy cities is to prevent them from becoming dirty in the first place. Consequently, towns equipped with waste bins placed on streets generally exhibit cleanliness and tidiness. The authorities strongly advocate for daily doorstep collection of wet waste, especially food waste, which can be composted. This method is considered highly beneficial for India.

2.4 Status of Waste Management System in Kerala

The Supreme Court of India has made a ruling stating that all local governments in India with a population exceeding one million should establish appropriate facilities for managing the waste generated within their jurisdictions. Additionally, the Supreme Court mandated that waste management systems be implemented in municipalities by December 31, 2003.

In terms of waste management, only a few states in the country have taken measures to tackle this issue. Kerala is one of the states that has initiated efforts to address waste management through a program called Clean Kerala Mission, which was launched in 2002. The primary objective of this initiative is to create a waste-free Kerala.

2.5 Knowledge, Attitude and Practice

The concept known as KAP, which stands for Knowledge, Attitude, and Practice, is a theoretical framework utilized to study human behaviour and focus on specific topics. The World Health Organization (WHO) defines KAP as a means of examining a community's behaviour regarding a particular topic by assessing their knowledge (K), attitude (A), and actions (P) (WHO, 2015). Initially employed in the 1950s to explore the reception, understanding, and implementation of family planning across diverse populations worldwide (Launiala, 2009), KAP surveys are based on the notion that knowledge shapes attitude, and both knowledge and attitude serve as foundations for behavior. These surveys serve three primary purposes: to assess the current knowledge, attitude, and practice of a population, to gain insights for designing targeted interventions, and to evaluate the effectiveness of interventions or programs (Vandamme, 2009) . While KAP surveys have faced criticism in the past regarding reliability, validity, and measuring the intensity of opinions or attitudes (Vandamme, 2009), they are generally accepted as a framework for assessing public understanding, awareness, willingness, and involvement in specific issues (Launiala, 2009; Vandamme, 2009).

Gaining an understanding of the levels of knowledge, attitude, and practice is crucial for effectively raising awareness, as it allows for a more targeted and tailored approach to community programs. When evaluating the KAP of a community, it is beneficial to divide the community into smaller sub-categories. In this particular case, the sub-categories can be defined as the connection between knowledge, attitude, and practice regarding waste management among students. As stated by the WHO (2015), the KAP survey can be utilized for planning, implementing, and evaluating advocacy efforts, as well as for communication and social mobilization. In the context of this study, the KAP survey will be employed to examine waste management practices.

Several studies have recognized the potential of the Knowledge, Attitude, and Practice (KAP) framework as a theoretical approach in waste management, particularly in enhancing community participation (Ahmad, 2015). These studies have highlighted the value of employing the KAP framework to better understand the knowledge levels, attitudes, and behaviours of individuals within a community regarding waste management. By gaining insights into these factors, interventions and initiatives can be

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designed to effectively promote community engagement and participation in waste management practices.

When analysing studies on waste management, (Gusti, 2016) conducted research with primary school students and discovered a correlation between their knowledge of sustainable waste management, their attitudes towards it, and their intention to engage in sustainable waste management behaviour. Similarly, (Molina, 2021) found that senior high school students possessed adequate knowledge about solid waste management and practiced proper waste management techniques. However, (Desa, 2012) revealed that first-year university students demonstrated appropriate behaviours regarding solid waste management. Conversely, (Almasi et.all, 2019) observed that while participants had high levels of knowledge and positive attitudes towards source reduction, waste separation, and recycling, their actual implementation of these practices was low. Additionally, nearly half of the participants expressed dissatisfaction with waste collection services. Supporting this, (Baba, 2018) investigated public opinions on solid waste management and found that a majority of the participants expressed dissatisfaction with waste management in the country.

2.5.1 Knowledge of Waste Management

Based on the research conducted by Arora and Agarwal (Arora, 2011), which focused on students residing in a specific hostel within Rajasthan University, the study investigated variables related to waste management knowledge, attitudes, and practices. The main objective of the study was to assess the perspectives of university students regarding waste management. This assessment involved a sample of three students who completed a self-administered questionnaire. The collected data were analysed using a t-test.

The outcomes of the study indicated varying levels of knowledge, attitude, and practice among the participants. Specifically, knowledge was found to be low, attitudes were less favourable, and practices were moderate. Interestingly, the study did not find a significant correlation between knowledge and attitude. However, a robust correlation was observed between practice and knowledge. (Arora, 2011) on the variables comprising of waste management knowledge, attitude, and practices. The study's primary goal was to determine university students' attitudes about waste management

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were examined using a sample of three students, a self-administered questionnaire, and a t test to analyse the data. The results showed low, less favourable, and moderate knowledge, attitude, and practise, respectively; while there was no association between knowledge and attitude, there was a strong correlation between practise and knowledge.

Another study was carried out in the Applied Science University campus, which is located in the northern part of the Jordanian Capital Amman by Shatnawi (Shatnawi, 2018) shows that a significant majority of students lack knowledge regarding solid waste handling and management. Specifically, more than 80% of the students surveyed do not possess information about solid waste management. Additionally, approximately two-thirds of the respondents are unaware of the process of waste collection and disposal. Alarmingly, around 60% of the participants have limited understanding of the health and environmental consequences associated with improper handling and management of solid waste. These findings indicate a significant knowledge gap among students in terms of their awareness and understanding of solid waste management practices and the potential impacts of mismanagement

2.5.2 Attitude towards Waste Management

Having the right attitude among people regarding waste management is vital, especially after acquiring the necessary knowledge. How individuals approach waste, where they choose to dispose of it, and how they handle it all become integral aspects of their attitude towards waste management. Additionally, generating awareness among the public through various strategies can significantly impact promoting a positive attitude towards waste management. It is worth noting that the level of knowledge plays a crucial role in shaping individuals' attitudes in this regard. (M.Y.Rahmaddin, 2015)

In their study Eneji, (Eneji, 2016) examined waste disposal and waste management practices. The study tested hypotheses at a significance level of 0.05. The results indicated that residents of Calabar South hold a highly negative attitude towards waste management and disposal. Furthermore, the study found a significant correlation between indiscriminate waste disposal and the health status of residents in the Calabar South Local Government Area. Based on these findings, the study concluded that the residents' negative attitude towards waste management and disposal has a substantial impact on their overall health status.

2.5.3 Waste Management Practices

The management of waste is heavily influenced by factors such as knowledge, attitude, and the available space within households. In urban areas, the fast-paced lifestyle and limited space often result in improper waste management practices. Burning waste and indiscriminate dumping in public spaces are prevalent methods of waste disposal in urban settings. On the other hand, the quantity of waste generated in rural areas is generally lower compared to urban areas. However, despite the difference in waste volume, the practices for waste management in rural areas are similar to those in urban areas. It is essential to address these challenges in waste management, taking into account the constraints of urban living and promoting awareness and responsible waste disposal practices in both rural and urban communities (Gopi.M, 2022)

In their study conducted in Owerri municipal, Imo state, Nigeria Adogu et.al (Adogu et. al, 2015) found that a high percentage of respondents were aware of waste management, with 90% indicating their knowledge of the subject. Furthermore, 97.55% of the respondents displayed a positive attitude towards waste management and the protection of environmental health. The study also revealed that household waste primarily consisted of food residues (97.1%) and vegetable wastes (95.4%). Poor waste management practices were prevalent, with 66.3% of the sampled population resorting to open dumping and 62.4% practicing burning as disposal methods. The most common means of waste transportation to the dumping site was the use of wheelbarrows. The study identified that respondents' education and gender had a significant impact on their attitude, practice, and knowledge regarding waste management ($p < 0.05$).

2.6 Research Gap

The existing literature reviews majorly discuss about the waste, waste management, types of waste, waste management in India and also the Kerala context, Knowledge, Attitude and Practice, The knowledge, attitude and practice towards waste management. All these studies highlight the problems of waste, types of waste, waste management and its efficiency and the levels of Knowledge, Attitude and Practice among different target groups in the society.

In Kerala context lots of studies were conducted on Municipal Solid Waste and Management and discuss different problems and strategies taken by the government

and their efficiency. While coming to Thiruvananthapuram, the capital city, the rapid urbanization and so many development programmes are increasing day by day. There is a significant increase in migration for getting good education and occupation. So currently the waste and waste management are one of the major issues in Thiruvananthapuram. But the above-mentioned literature review doesn't pay much attention to Knowledge, Attitude and Practices towards waste management among the youth and students

As a result, the primary goal of this research study is to close this knowledge gap. This study focuses specifically on Post Graduate students in Thiruvananthapuram that were covered in the literature reviews. By restricting the geographical area and concentrating on only Post graduates, this study seeks to understand the knowledge, attitude and practices towards waste management among Post graduate students in Thiruvananthapuram district

2.7 Summary of the Chapter

This section provides a comprehensive review of the existing literature, encompassing analyses of comparable studies and relevant works cantered around the subject matter of the research. The literature review incorporates a range of topics pertinent to the study's focus, including the understanding of waste, categorization of waste, the distinction between disposal and management, the broader field of waste management, as well as a specific exploration of waste management within the context of India and Kerala. Additionally, the review delves into the concept of Knowledge Attitude and Practice (KAP), specifically examining knowledge pertaining to waste management, attitudes towards waste management, and the actual practices associated with waste management.

This chapter serves to explicitly outline the research problem, emphasizing the existing gaps in knowledge within this domain and underscoring the necessity for further exploration and investigation in this particular field.

CHAPTER III

METHODOLOGY

Chapter 3: Methodology

3.1 Overview of the Chapter

A well-defined research methodology is an essential and most important component of a research study. This chapter describes on the methodology used for the present study. It gives details about the sample for the study, the research design, method and tools used for data collection and the statistical techniques used for data analysis.

3.2 Title of the Study

Knowledge, Attitude, and Practice of Waste Management among Post Graduate Students in Thiruvananthapuram District

3.3 Objective

3.3.1 General Objective

To get an in-depth understanding of the knowledge, attitude, and practice of waste management among Post Graduate students.

3.3.2 Specific Objective

1. To understand the knowledge of Post Graduate students about waste management practices

2. To know the attitude of students towards waste management.

3. To understand the waste management practices of Post Graduate students

3.4 Variables

Independent Variables

- Gender
- Discipline (Stream of study)
- Category of college
- Residential area

Dependent Variables

- Knowledge of the Waste Management
- Attitudes towards Waste Management
- Practices of Waste Management

3.5 Definition of Concepts

Theoretical definition

Waste: Materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose (Environmental glossary, UN Statistical division)

Waste Management: Waste management is the process of monitoring, collection, transportation, processing, disposal or recycle of all thrown away materials in order to decrease their effects on our health, our surroundings and the environment and enhance the quality of life. (Bacinschi, 2010)

*Knowledge***:** Knowledge is the consciousness, identification, and applied it for the development of the humankind. It is created in the human minds and increases when people are involved in its acquisition and dissemination. (Nasimi, 2013)

*Attitude***:** define an attitude as 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour (Eagly, 1993)

*Practice***:** repeating of an act, behaviour, or sequence of activities, frequently to better performance or learn an ability or trade (N.Sam, 2013)

Operational definition

*Waste***:** This study, 'Waste' refers to any discarded or unwanted materials, substances, or products that are no longer intended for use or have completed their intended life cycle. This includes solid waste, such as paper, plastics, metals, and organic matter, as well as liquid waste, hazardous waste, and electronic waste. Waste may be generated

from various sources, including households, industries, institutions, and commercial establishments

*Waste Management***:** In this study, 'waste management' refers to the systematic handling, disposal, and control of waste materials generated by Post Graduate students. It encompasses various activities aimed at minimizing waste generation, promoting recycling and reuse, ensuring proper segregation and collection of waste, and implementing appropriate disposal methods.

*Knowledge***:** In this study, knowledge refers to the understanding and awareness of waste management principles, processes, and practices among college students. It encompasses their factual knowledge about waste reduction, recycling, composting, hazardous waste disposal, and other relevant aspects of waste management.

Attitude: In this study, 'Attitude' refers to Post Graduate students' opinions, preferences, or willingness to engage in waste management practices.

Practice: In this study, 'practice' refers to the actions and perceptions related to waste management of colleges and students participating in the study. It involves specific actions taken by the students in their daily lives regarding waste management, such as proper disposal of waste, reducing waste generation, recycling, composting, or any other practices that contribute to sustainable waste management.

3.6 Research Design

The study follows quantitative method. Cross sectional study has been used for the respective research. The purpose of using Cross sectional study is based on the nature of research being carried out which is focusing on a large number of respondents at a point of time. Hence survey design will help to collect data from a large number of respondents within a short period.

3.6.1 Universe and Unit of Study

Universe: All regular Post Graduation students from government, aided, and private colleges in the Thiruvananthapuram district under Kerala University Thiruvananthapuram district.

Unit of study: An Individual Post Graduation student in Thiruvananthapuram district under Kerala University

Sample Size: 107 Post Graduation Students from Aided, Private and Government colleges, currently studying in Thiruvananthapuram district under Kerala University

3.6.2 Sampling Design

The research employed a non-probability sampling technique for the study. This approach was chosen because in non-probability sampling, not every unit within the target population has an equal likelihood of being selected. In this specific case, the samples were gathered using convenience sampling.

Inclusion Criteria

- Regular Post-Graduate Students are only included
- Post-Graduate Students Registered in Kerala University.
- Post Graduate Students from Government, Aided and Self-Financing Colleges in Thiruvananthapuram District are only selected.
- Both male and female students are included

Exclusion Criteria

- Students other than Post Graduation are excluded.
- Students from districts other than Thiruvananthapuram are excluded.
- Students other than Kerala University are excluded

3.6.3 Data Collection

The data was collected from both primary and secondary sources. Primary data was collected from Post Graduate Students in Thiruvananthapuram district under Kerala University. The socio-demographic details and details about the waste management was collected and also collected the Knowledge, Attitude and Practice of waste management by using a self-prepared questionnaire. Data was collected using google forms

3.6.4 Pre-Test

Researcher conducted a pre-test among sample of 10 respondents who are currently pursuing their Post graduate in the Thiruvananthapuram district. Based on the feedback and responses collected from the pre-test participants, the researcher made necessary modifications to the tool for conducting the study. By conducting the pre-test and incorporating the valuable insights gained from the participants, the researcher increased the reliability and validity of the tool, making it more suitable for the target population of post graduate students in Thiruvananthapuram.

3..5 Data Analysis

The data was analysed using descriptive statistics to find out the frequencies, Pearson's Coefficient was used to measure the relationship among the variables and One-way ANOVA was used to measure the differences among the variables. The data analysis carried out using statistical package of social sciences (SPSS) 22 version.

Ethical Consideration

- The data is collected after obtaining informed consent from the participants.
- The participants were informed about their right to withdraw from the study.
- The confidentiality of information and the participant details to be maintained by the researcher.
- The researcher has not resorted to any unlawful means/ plagiarism to present data.
- The data collected will be used for only academic purposes.

3.5 Assumptions, Limitations and Scope

Assumptions

- Researcher assumes that the respondents would have genuinely responded to the questionnaire.
- The researches assume that since the data was collected on anonymous basis the respondents would have given genuine response.

Limitation

- The research was conducted in a small period of time.
- Limited number of participants was available for the study.
- The study was focused on Thiruvananthapuram district of Kerala due to time constraints.

Scope

- Studies can be undertaken among college students not only in post graduate. This can enhance the generalizability and the findings and provide a broader understanding of the experiences of college students in Thiruvananthapuram.
- Qualitative or mixed method studies can be undertaken on the same topic.

3.6 Summary of the Chapter

The methodology chapter described the about the way in which the research is conducted. It included the aim of the study and objectives of the study. It also explained the hypothesis framed for studying the objectives framed. It also described the method and design followed in the study and the inclusion and exclusion criteria of the study. The way in which data was collected and analysed and the tools and functions used to collect and analyses data was also mentioned in the chapter. The chapter also included scope, assumptions and limitations with regard to the study undertaken.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

Chapter 4: Data Analysis and Interpretation

4.1 Overview of the Chapter

The data analysis chapter presents the results of analysis done using the data collected from respondents. The data analysed using descriptive statistics will used to examine the frequencies of different variables and provide a summary of the data. This will help in assessing the level of knowledge, attitude and practices of waste management by the post graduate students. The data are derived and presented in diagrams and tables. These visual representations will help to understand the results and make it easier to understand interpret and discuss them in the subsequent chapters.

The chapter is divided into following sections,

4.2. Demographic profile of participants which include personal and academic profile.

4.3. The knowledge of post-Graduation students about waste management practices

4.4. The attitude of post-Graduation students towards waste management.

4.5. The practice of post-Graduation students in waste management

4.2 Socio Demographic profile of the Respondents

The demographic profile of the respondents describes personal and job variables of the respondent. It includes age, sex, stream, semester, name of the college, category of college and residential area.

Personal Profile of Respondents

Age of the Respondent

Figure 1 showing the age of the respondent
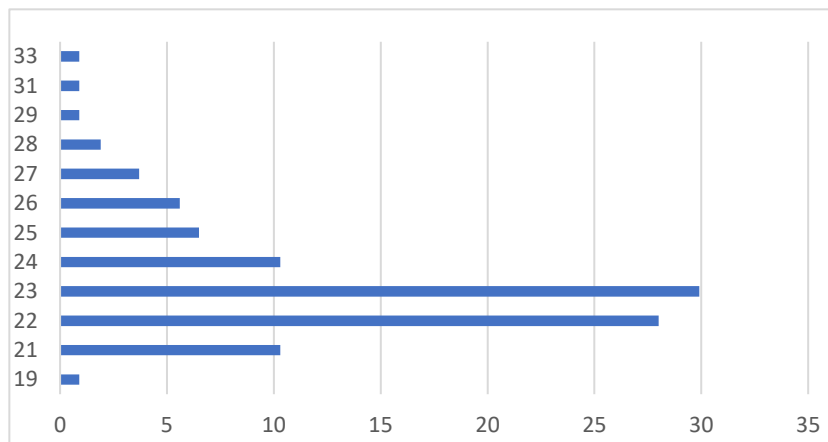
Figure 1 shows the age of the respondents. Among the respondents 29.9% belonged to the age 23 and 28% belonged to the age 22. The age categories of 21, 24, and 25 also have notable percentages, with 10.3%, 10.3%, and 6.5% respectively. The remaining age categories (26, 27, 28, 29, 31, and 33) have smaller percentages, ranging from 5.6% to 0.9%.

Gender of the Respondent

Figure 2 showing the Gender of the respondent
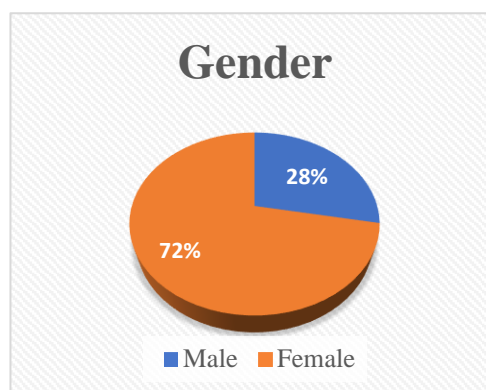
Figure 2 shows the Gender of the respondent. In the study 72% of the respondents were females and 28% were belonging to male category. No response was there for the option others.

Residential Area

Figure 3 showing the semester of the respondent
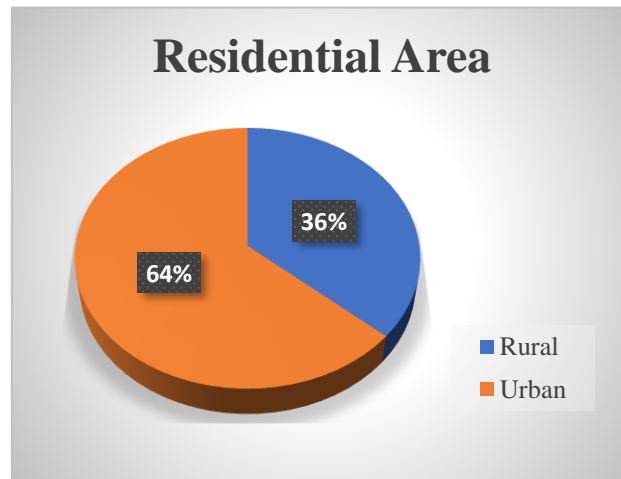
Figure 3 shows the Residential Area of the respondents, the majority of individuals (63.6%) reside in urban areas. Rural areas, on the other hand, are home to 36.4% of the individuals in the sample.

Academic Profile of Respondent

The stream of the Respondent

Figure 4 *showing the stream of the respondent*
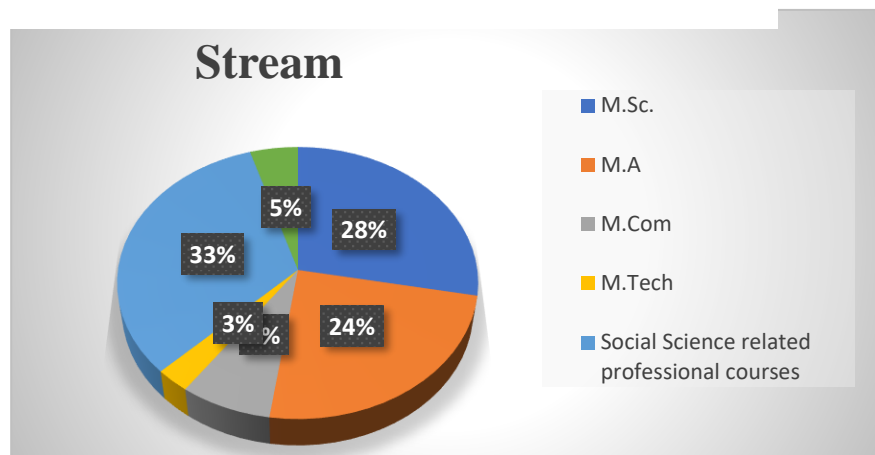
Figure 4 shows the stream of the respondent, the most common stream is "Social Science related professional courses," which accounts for 32.7% of the individuals. Other significant disciplines include M.Sc. (28%), M.A (24.3%), and M.Com (7.5%). M.Tech and "Others" have relatively lower representation in the sample.

Semester of the Respondent

Figure 5 showing the semester of the respondent
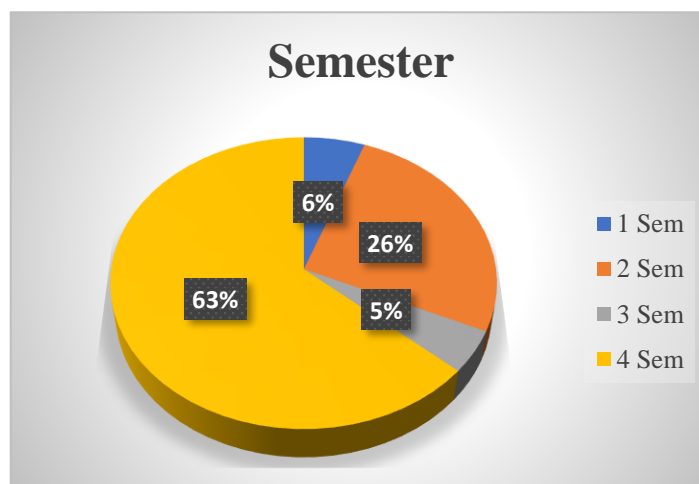
Figure 5 show the semester of the respondent, the majority of individuals (63.6%) are in their fourth semester. The second semester has the next highest representation at 26.2%. The first and third semesters have lower representation in the sample at 5.6% and 4.7% respectively

Type of College

Figure 6 showing the type of college
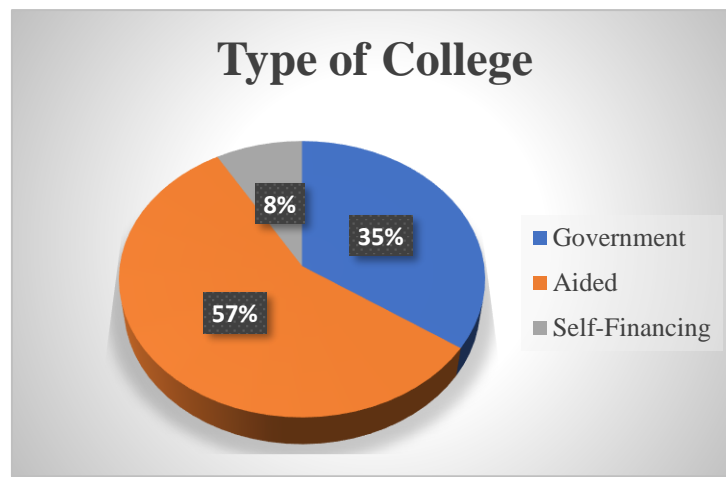
Figure 6 shows the type of college, the majority of colleges (57.0%) fall under the aided category. Government colleges make up 34.6% of the sample, while self-financing colleges account for 8.4% of the sample

4.3 The knowledge of post-Graduation students about waste management practices

The term waste management

Figure 7 showing the term waste management

the term waste management

- Proper disposal of waste materials — 6%
- Recycling of waste materials — 8%
- collection and treatment of waste materials — 12%
- none of the above — 1%
- All of the above — 73%
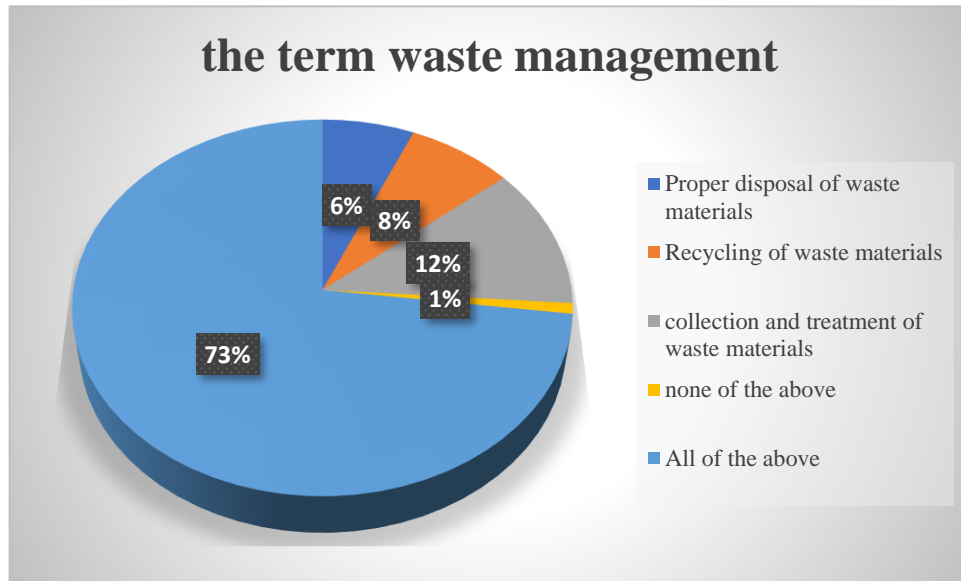
Figure 7 shows the distribution of respondents self-reported answer about the waste management. Based on the data, the proper disposal of waste materials: 7 respondents (6.5%) mentioned that waste management refers to the proper disposal of waste materials. Recycling of waste materials: 8 respondents (7.5%) indicated that waste management involves the recycling of waste materials. Collection and treatment of waste materials: 13 respondents (12.1%) mentioned that waste management involves the collection and treatment of waste materials. None of the above: 1 respondent (0.9%) stated that waste management does not fall under any of the provided options. All of the above: 78 respondents (72.9%) expressed that waste management encompasses all of the mentioned aspects including proper disposal of waste materials, recycling of waste materials, and the collection and treatment of waste materials. The majority of respondents (72.9%) indicated that waste management encompasses all of these aspects

The waste deposit is seen in the public space

Figure 8 showing the waste deposit are seen in the public space
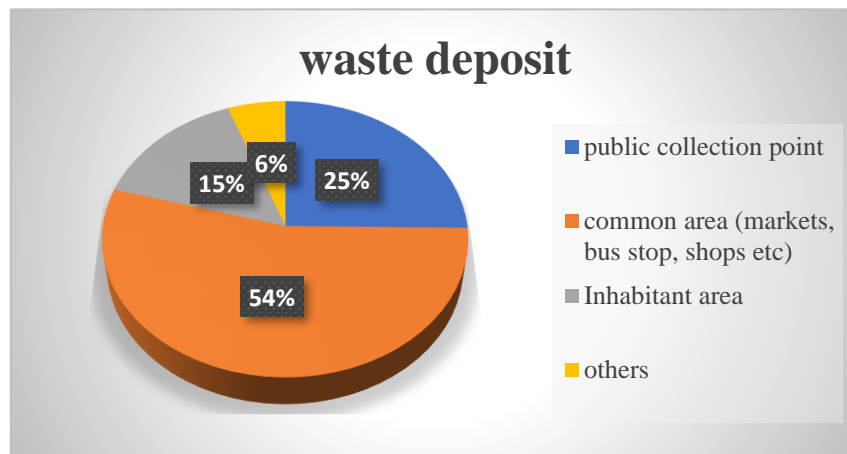
Figure 8 shows the distribution of respondents self-reported answer about the waste deposit are seen in the public space. Based on the data that public collection point: 27 instances (25.2%) were reported as the location where waste is being deposited in public. Common area (markets, bus stop, shops, etc.): 58 instances (54.2%) were mentioned as the primary location for waste deposition in public places. Inhabitant area: 16 instances (15.0%) were reported as the location where waste is being deposited in the residential areas of the public. Others: 6 instances (5.6%) fell under unspecified or different locations for waste deposition in public places. From this information, it can be concluded that the most common location for waste deposition in public places is the common area, including markets, bus stops, shops, and similar locations. Public collection points and residential areas also contribute to waste deposition, albeit to a lesser extent.

The initiative programmes taken by the government for waste management

Figure 9 showing the initiative programmes taken by the government for waste management
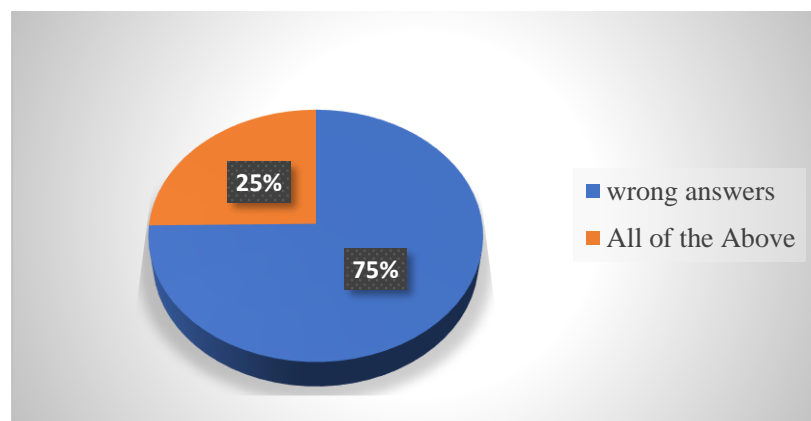
Figure 9 shows the distribution of respondents self-reported answer about the initiatives taken by the government for waste management. From the data Wrong answers: 80 respondents (74.8%) provided incorrect or inappropriate answers regarding the initiative programs taken by the government for waste management. All of the Above: 27 respondents (25.2%) believed that all the options listed in the question (which are not specified) were initiative programs taken by the government for waste management. From this information, it can be concluded that there is a lack of awareness or understanding among the respondents regarding the specific initiative programs taken by the government for waste management. A significant number of respondents provided incorrect answers, while a smaller proportion believed that all the options mentioned were government initiatives. Further education and awareness campaigns could help clarify the actual initiatives taken by the government and improve understanding in this area.

Level of Knowledge of Respondents

Figure 10 showing the Level of Knowledge of Participants
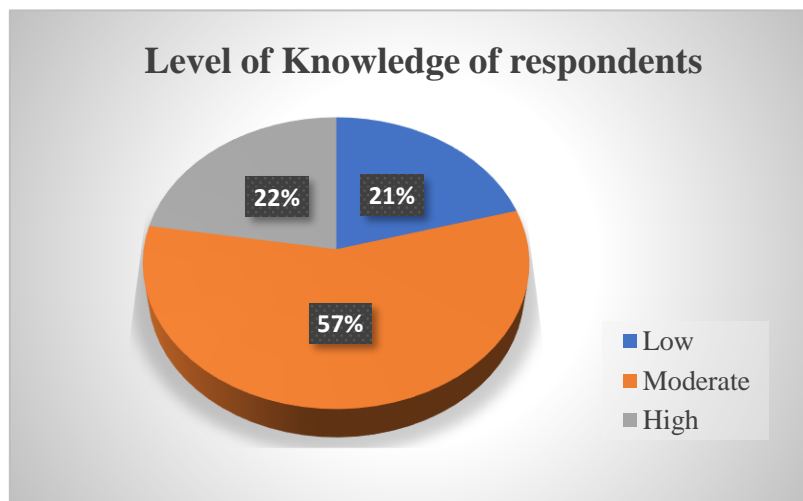
Figure 10 shows the distribution of respondents self-reported levels of knowledge. Based on this data, the majority of respondents (57.0%) indicated having a moderate level of knowledge, while a smaller proportion reported low (20.6%) or high (22.4%) levels of knowledge.

Cross Tabulation between Gender and Level of knowledge towards waste management

Table 1 shows the Cross Tabulation between Gender and Level of Knowledge

Gender * Level of Knowledge Crosstabulation					
		Low	Moderate	High	Total
Sex	Male				
	Gender	30.0%	53.3%	16.7%	100.0%
	Level of Knowledge	40.9%	26.2%	20.8%	28.0%
	Female				
	Gender	16.9%	58.4%	24.7%	100.0%
	Level of Knowledge	59.1%	73.8%	79.2%	72.0%
Total					
	Gender	20.6%	57.0%	22.4%	100.0%
	Level of Knowledge	100.0%	100.0%	100.0%	100.0%

Table 1 shows the crosstabulation between gender and level of knowledge by the respondents. Among the male respondents, 9 individuals (30.0%) reported having a low level of knowledge, 16 individuals (53.3%) reported a moderate level, and 5 individuals (16.7%) reported a high level. The total count of male respondents is 30. Among the female respondents, 13 individuals (16.9%) reported a low level of knowledge, 45 individuals (58.4%) reported a moderate level, and 19 individuals (24.7%) reported a high level. The total count of female respondents is 77. A higher proportion of female respondents (58.4%) reported having a moderate level of knowledge compared to male respondents (53.3%).

Table Cross Tabulation between Discipline and Level of Knowledge of Waste Management

Table 2 shows the Cross Tabulation between Discipline and level of knowledge

Discipline (Stream) * Level of Knowledge Crosstabulation

			Level of Knowledge			
			Low	Moderate	High	Total
Discipline (Stream)	M.Sc.	Level of Knowledge	45.5%	24.6%	20.8%	28.0%
	M.A	Level of Knowledge	22.7%	26.2%	20.8%	24.3%
	M.Com	Level of Knowledge	18.2%	6.6%	0.0%	7.5%
	MTech	Level of Knowledge	0.0%	3.3%	4.2%	2.8%
	Social Sciences related professional courses	Level of Knowledge	13.6%	34.4%	45.8%	32.7%
	Others (MBA, Medical related courses)	Level of Knowledge	0.0%	4.9%	8.3%	4.7%
Total		Level of Knowledge	100.0%	100.0%	100.0%	100.0%

Table 2 shows the crosstabulation between discipline and level of knowledge by the respondents. The majority of individuals with Low knowledge are pursuing M.Sc. (45.5%) and M.A. (22.7%) disciplines. Individuals with Moderate knowledge are primarily enrolled in Social Science related professional courses (34.4%) and M.A. (26.2%) programs. For those with High knowledge, the highest percentage is in Social Science related professional courses (45.8%), followed by M.Sc. (20.8%) and M.A. (20.8%) disciplines. M.Com. and MTech. programs have a lower representation in all levels of knowledge compared to other disciplines. Among the "Others" category

(MBA, Medical related courses), individuals with High knowledge constitute the largest percentage (8.3%).

4.4 The attitude of post-Graduation students towards Waste Management

Level of Attitude of Respondents

Figure 11 showing the Level of Attitude of the respondents towards Waste Management
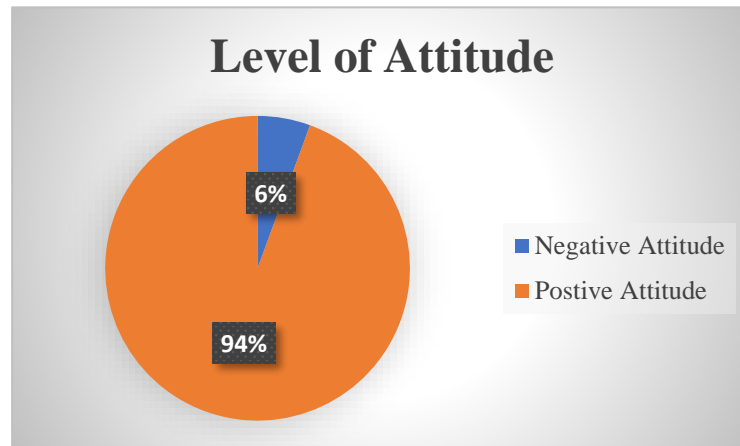
Fig 11 show that the distribution of respondents self-reported level of attitude towards waste management. Based on this data, the majority of respondents (94.4%) reported having a positive attitude, while a smaller proportion (5.6%) indicated a negative attitude.

Cross Tabulation between Gender and Level of Attitude towards Waste Management

Table 3 Cross Tabulation between Gender and Level of Attitude

Gender * Level of Attitude Crosstabulation

		Negative Attitude	Positive Attitude	Total
Sex Male				
	Gender	6.7%	93.3%	100.0%
	Level of Attitude	33.3%	27.7%	28.0%
Female				

		Negative Attitude	Positive Attitude	Total
Total	Gender	5.2%	94.8%	100.0%
	Level of Attitude	66.7%	72.3%	72.0%
	Gender	5.6%	94.4%	100.0%
	Level of Attitude	100.0%	100.0%	100.0%

Table 3 shows the crosstabulation between gender and level of attitude by the respondents. Among males, there are 2 individuals with a Negative Attitude (6.7%) and 28 individuals with a Positive Attitude (93.3%). Among females, there are 4 individuals with a Negative Attitude (5.2%) and 73 individuals with a Positive Attitude (94.8%). Overall, there are 6 individuals with a Negative Attitude (5.6%) and 101 individuals with a Positive Attitude (94.4%) across both sexes. Looking at the distribution within each level of attitude, among those with a Negative Attitude, males constitute 33.3% and females constitute 66.7% of the total. Among those with a Positive Attitude, males constitute 27.7% and females constitute 72.3% of the total.

Cross Tabulation between Discipline and Level of Attitude towards Waste Management

Table 4 Cross Tabulation between Discipline and Level of Attitude

Discipline (Stream) * Level of Attitude Crosstabulation			Level of Attitude		
			Negative Attitude	Positive Attitude	Total
Discipline (Stream)	M.Sc.	Discipline (Stream)	13.3%	86.7%	100.0%
		Level of Attitude	66.7%	25.7%	28.0%
	M.A	Discipline (Stream)	0.0%	100.0%	100.0%
		Level of Attitude	0.0%	25.7%	24.3%
	M.Com				

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		Negative	Positive	Total
	Discipline (Stream)	12.5%	87.5%	100.0%
	Level of Attitude	16.7%	6.9%	7.5%
MTech	Discipline (Stream)	0.0%	100.0%	100.0%
	Level of Attitude	0.0%	3.0%	2.8%
Social Sciences related professional courses	Discipline (Stream)	2.9%	97.1%	100.0%
	Level of Attitude	16.7%	33.7%	32.7%
Others (MBA, Medical related courses)	Discipline (Stream)	0.0%	100.0%	100.0%
	Level of Attitude	0.0%	5.0%	4.7%
Total	Discipline (Stream)	5.6%	94.4%	100.0%
	Level of Attitude	100.0%	100.0%	100.0%

Table 4 shows the crosstabulation between discipline and level of attitude by the respondents. Among individuals with a Negative Attitude, the majority are in the disciplines of M.Sc. (66.7%) and M.Com. (16.7%). Among individuals with a Positive Attitude, the highest percentage is in the disciplines of Social Sciences related professional courses (33.7%), M.Sc. (25.7%), and M.A. (25.7%). MTech. and Others (MBA, Medical related courses) have a relatively lower representation in both Negative Attitude and Positive Attitude categories. Looking at the distribution within each discipline, the majority of individuals in M.Sc., M.Com., and Social Sciences related courses have a Positive Attitude, while M.A. has an equal distribution between Negative Attitude and Positive Attitude. Across all disciplines, the overall distribution shows that 5.6% of individuals have a Negative Attitude and 94.4% have a Positive Attitude.

4.5 The waste management practices of post-Graduation students.

Figure 12 showing the frequency and percentage of respondents who engage in different waste management practices
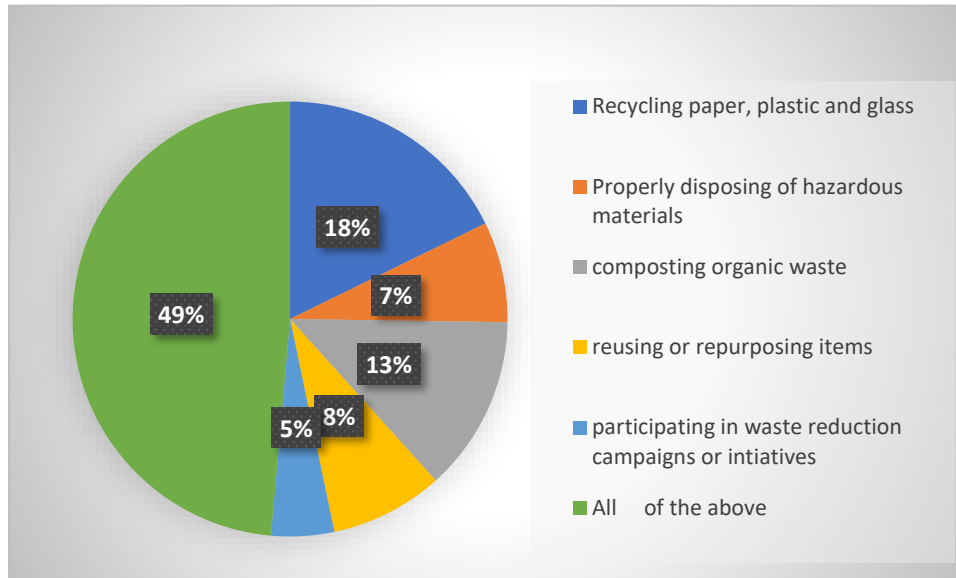
Figure 12 show that the distribution of respondents. The data provided shows the frequency and percentage of respondents who engage in different waste management practices. Recycling paper, plastic, and glass: 19 respondents, accounting for 17.8% of the total, properly disposing of hazardous materials: 8 respondents, accounting for 7.5% of the total, Composting organic waste: 14 respondents, accounting for 13.1% of the total, Reusing or repurposing items: 9 respondents, accounting for 8.4% of the total, Participating in waste reduction campaigns or initiatives: 5 respondents, accounting for 4.7% of the total, All of the above: 52 respondents, accounting for 48.6% of the total. From the percentages, we can see that the majority of respondents (48.6%) engage in all of the waste management practices listed. The most common individual practice is recycling paper, plastic, and glass, with 17.8% of respondents participating in this activity. The least common practice is participating in waste reduction campaigns or initiatives, with only 4.7% of respondents taking part in such activities.

Figure 13 show that the distribution of respondents. The data provided represents the frequency and percentage of respondents' reasons for not engaging in waste management practices. Lack of convenient waste disposal options: 24 respondents, accounting for 22.4% of the total, cited this as a reason for not engaging in waste management practices. Insufficient knowledge about proper waste management practices: 3 respondents, accounting for 2.8% of the total, mentioned this as a barrier. Lack of awareness about the importance of waste management: 7 respondents, accounting for 6.5% of the total, indicated this as a reason. Limited access to recycling or composting facilities: 24 respondents, accounting for 22.4% of the total, cited this as a constraint. Time constraints: 8 respondents, accounting for 7.5% of the total, mentioned this as a factor. All of the above: 41 respondents, accounting for 38.3% of the total, indicated that they face all of the mentioned barriers to waste management. From the percentages, it's evident that a significant proportion of respondents (38.3%) face multiple barriers, as they selected "All of the above" as their reason for not engaging in waste management practices. The most common individual barriers are "Lack of convenient waste disposal options" and "Limited access to recycling or composting facilities," both with 22.4% of respondents citing them as obstacles. The data highlights various challenges that people may encounter when trying to practice

proper waste management, including issues related to convenience, knowledge, awareness, and access to appropriate facilities. Understanding these barriers can help in devising strategies to promote waste management and encourage sustainable practices among the population.

Figure 14 showing the frequency and percentage of respondents' preferences for improving waste management practices Increased access to recycling or composting facilities:
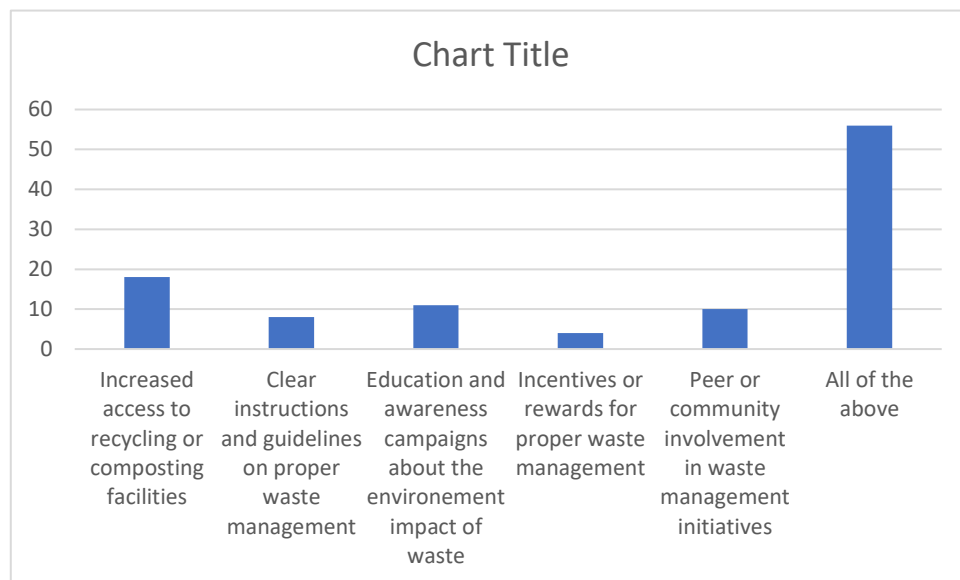
Figure 14 show that the distribution of respondents. The provided data represents the frequency and percentage of respondents' preferences for improving waste management practices Increased access to recycling or composting facilities: 18 respondents, accounting for 16.8% of the total, would like to see increased access to such facilities, Clear instructions and guidelines on proper waste management: 8 respondents, accounting for 7.5% of the total, prefer having clear instructions and guidelines for waste management. Education and awareness campaigns about the environmental impact of waste: 11 respondents, accounting for 10.3% of the total, would like to see more educational campaigns on waste's environmental impact. Incentives or rewards

for proper waste management: 4 respondents, accounting for 3.7% of the total, think that incentives or rewards would be beneficial for promoting proper waste management, Peer or community involvement in waste management initiatives: 10 respondents, accounting for 9.3% of the total, prefer involving the community or peers in waste management initiatives. All of the above: 56 respondents, accounting for 52.3% of the total, indicated that they would like to see all of the mentioned improvement measures. From the percentages, it's evident that a significant majority of respondents (52.3%) believe that implementing all of the mentioned improvement measures would enhance waste management practices. The most common individual improvement measure preferred is "Increased access to recycling or composting facilities," with 16.8% of respondents supporting it. The data highlights various strategies and preferences that respondents have for improving waste management practices, such as enhancing access to recycling and composting facilities, providing clear guidelines, raising awareness through educational campaigns, and involving the community in waste management initiatives. Implementing these measures could help encourage more sustainable waste management practices and promote environmental consciousness among the population.

Level of Practice of Respondents

Figure 15 showing the Level of the practice of Respondents towards Waste Management
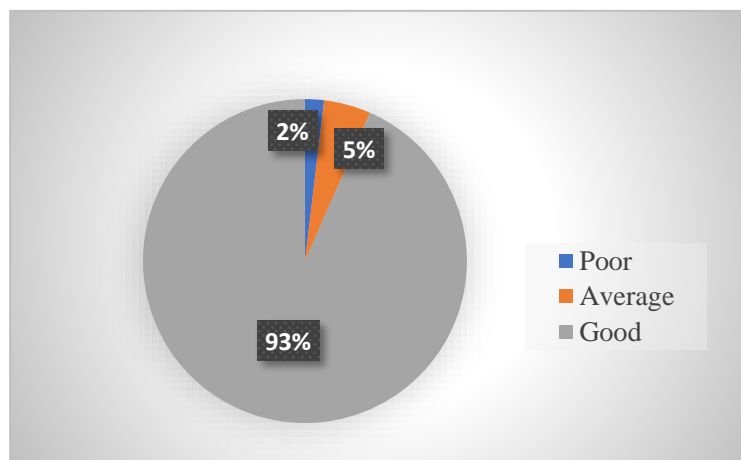
Figure 15 show that the distribution of respondents self-reported level of attitude towards waste management. Based on this data, the majority of individuals (93%) are categorized as having a good level of practice, while a smaller percentage have an Average level (5%) and the smallest percentage have a Poor level (2%) of practice.

Cross Tabulation between Gender and Level of practice of Waste Management

Table 5 Cross Tabulation between Gender and Level of practice

Gender * Level of Practice Crosstabulation

		Level of Practice			
		Poor	Average	Good	Total
Sex Male					
	Gender	0.0%	10.0%	90.0%	100.0%
	Level of Practice	0.0%	60.0%	27.0%	28.0%
Female					
	Gender	2.6%	2.6%	94.8%	100.0%
	Level of Practice	100.0%	40.0%	73.0%	72.0%
Total					
	Gender	1.9%	4.7%	93.5%	100.0%
	Level of Practice	100.0%	100.0%	100.0%	100.0%

Table 5 shows the crosstabulation between gender and level of practice by the respondents. Among males, none of them are categorized as having a Poor level of practice. 10% have an Average level of practice, and 90% have a good level of practice. Among females, 2.6% have a Poor level of practice, 2.6% have an Average level of practice, and 94.8% have a good level of practice. Overall, the distribution shows that 1.9% of individuals have a Poor level of practice, 4.7% have an Average level of practice, and 93.5% have a good level of practice across both sexes. Looking at the distribution within each level of practice, among those with a Poor level of practice, females constitute 100% of the total. Among those with an Average level of practice, males constitute 60% and females constitute 40% of the total. Among those with a good level of practice, males constitute 27% and females constitute 73% of the total

Cross Tabulation between Discipline and Level of Practice of Waste Management

Table 6 Cross Tabulation between Discipline and Level of Practice

Discipline * Level of Practice Crosstabulation

| | | Level of Practice | | | |
		Poor	Average	Good	Total
Discipline (Stream)	M.Sc.					
		Discipline (Stream)	6.7%	10.0%	83.3%	100.0%
		Level of Practice	100.0%	60.0%	25.0%	28.0%
	M.A					
		Discipline (Stream)	0.0%	0.0%	100.0%	100.0%
		Level of Practice	0.0%	0.0%	26.0%	24.3%
	M.Com					
		Discipline (Stream)	0.0%	12.5%	87.5%	100.0%
		Level of Practice	0.0%	20.0%	7.0%	7.5%
	MTech					
		Discipline (Stream)	0.0%	0.0%	100.0%	100.0%
		Level of Practice	0.0%	0.0%	3.0%	2.8%
	Social Sciences related professional courses	Discipline (Stream)	0.0%	2.9%	97.1%	100.0%
		Level of Practice	0.0%	20.0%	34.0%	32.7%
	Others (MBA, Medical related courses)	Discipline (Stream)	0.0%	0.0%	100.0%	100.0%
		Level of Practice	0.0%	0.0%	5.0%	4.7%
Total						
		Discipline (Stream)	1.9%	4.7%	93.5%	100.0%
		Level of Practice	100.0%	100.0%	100.0%	100.0%

Table 6 shows the crosstabulation between discipline and level of practice by the respondents. Among individuals with a Poor level of practice, the majority are in the discipline of M.Sc. (100%). Among individuals with an Average level of practice, the highest percentage is in the discipline of M.Com. (20%), followed by Social Science related professional courses (20%). Among individuals with a good level of practice, the highest percentage is in the disciplines of M.Sc. (83.3%) and Social Science related professional courses (97.1%). M.A., MTech., and Others (MBA, Medical related

courses) have no individuals categorized as having a Poor, Average, or good level of practice. Looking at the distribution within each level of practice, M.Sc. has the highest representation in the Poor and Good levels, while M.Com. has the highest representation in the Average level. Across all disciplines, the overall distribution shows that 1.9% of individuals have a Poor level of practice, 4.7% have an Average level of practice, and 93.5% have a good level of practice.

Cross Tabulation between Residential area and level of practice of Waste Management

Table 7 shows Cross Tabulation between Residential area and level of practice

Residential Area * Level of Practice Crosstabulation						
			Poor	Average	Good	Total
Residential Area	Rural					
		Residential Area	0.0%	2.6%	97.4%	100.0%
		Level of Practice	0.0%	20.0%	38.0%	36.4%
	Urban					
		Residential Area	2.9%	5.9%	91.2%	100.0%
		Level of Practice	100.0%	80.0%	62.0%	63.6%
Total						
		Residential Area	1.9%	4.7%	93.5%	100.0%
		Level of Practice	100.0%	100.0%	100.0%	100.0%

Table 7 shows the crosstabulation between Residential area and level of practice by the respondents. Among individuals from Rural residential areas, none of them are categorized as having a Poor level of practice. 2.6% have an Average level of practice, and 97.4% have a good level of practice. Among individuals from Urban residential areas, 2.9% have a Poor level of practice, 5.9% have an Average level of practice, and 91.2% have a good level of practice. Overall, the distribution shows that 1.9% of

individuals have a Poor level of practice, 4.7% have an Average level of practice, and 93.5% have a good level of practice across both residential areas.

Looking at the distribution within each level of practice, among those with a Poor level of practice, individuals from Urban residential areas constitute 100% of the total. Among those with an Average level of practice, individuals from Rural residential areas constitute 20% and individuals from Urban residential areas constitute 80% of the total. Among those with a good level of practice, individuals from Rural residential areas constitute 38% and individuals from Urban residential areas constitute 62% of the total.

4.6 Summary of the Chapter

The data analysis chapter included interpretations of socio demographic details, the level of knowledge of the participants, level of attitude of the participants, level of practices of waste management of participants The socio-demographic details were presented using figures and tables, which effectively showed the distribution and characteristics of the Post graduate students and the frequency, level and crosstabulations are represented in tables with the valid percentage and frequency. interpretations of graphs and tables were also given below the same

CHAPTER V

DISCUSSION

Chapter 5: Discussion

5.1 Overview of the Chapter

The present study aimed on understanding the knowledge, attitude and practice towards waste management. It was conducted among the post-Graduate students in Kerala focusing Thiruvananthapuram district as study unit. The study followed cross sectional study and the data was collected from 107 participants. The data was collected using self-made questionnaire and SPSS 22 version was used to conduct the data analysis thus formulating the needed information on the data collected. This chapter aims to discuss about the results of the data analysis done. All the objectives of the study were analysed and interpreted. Major findings from each of the analysis as described as follows

5.2 Socio-Demographic Profile of the Respondents
Personal Profile

The objective one was to understand the socio-demographic features of the respondents. The socio-demographic details of the respondents revealed that, among the respondents participated 29.9% belonged to the age group of 23, 28% in the age 22, 10.3% in the age 21 and 24, 6.5% in the age 25 and ranging from 5.6% to 0.9% belonged to the age 26, 27, 28, 29, 31, 33.

Among the respondents, 72% were females and 28% were male. Both males and females participated in the study, but majority of participants were females

Academic profile

The socio-demographic details of the respondents revealed that, among the respondents participated, "Social Sciences related professional courses," which accounts for 32.7% of the individuals, M.Sc. (28%), M.A (24.3%), and M.Com (7.5%). M.Tech and "Others" have relatively lower representation in the sample. The semester of the participants, 63.6% are in the fourth semester, second semester has the representation at 26.2%. The first and third semesters have lower representation in the sample at 5.6% and 4.7% respectively. The types of colleges where participants are 57.0% fall under the aided category. Government colleges make up 34.6% of the sample, while self-financing colleges account for 8.4% of the sample.

5.3 The knowledge of post-Graduation students about waste management

The first objective is to understand the knowledge about waste management. From the data analysed 78 respondents (72.9%) expressed that waste management encompasses all of the mentioned aspects including proper disposal of waste materials, recycling of waste materials, and the collection and treatment of waste materials. The majority of respondents (72.9%) indicated that waste management encompasses all of these aspects.

From the information there is another finding that the most common location for waste deposition in public places is the common area, including markets, bus stops, shops, and similar locations.

Another finding was that there is a lack of awareness or understanding among the respondents regarding the specific initiative programs taken by the government for waste management. A significant number of respondents provided incorrect answers, while a smaller proportion believed that all the options mentioned were government initiatives. Further education and awareness campaigns could help clarify the actual initiatives taken by the government and improve understanding in this area.

Level of Knowledge of Participants

The first objective of the study was to understand the knowledge of waste management among the respondents. According to the study all participants have different levels of knowledge. The "Low" level of knowledge was chosen by 22 respondents, accounting for 20.6% of the total respondents. The "Moderate" level of knowledge was selected by 61 respondents, representing 57.0% of the total respondents. The "High" level of knowledge was chosen by 24 respondents, accounting for 22.4% of the total respondents. Based on the data, the majority of respondents (57.0%) indicated having a moderate level of knowledge, while a smaller proportion reported low (20.6%) or high (22.4%) levels of knowledge.

Cross Tabulation between gender and level of knowledge

When the data cross tabulates with gender and level of knowledge, a higher proportion of female respondents (58.4%) reported having a moderate level of knowledge compared to male respondents (53.3%).

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Cross Tabulation between Discipline and level of knowledge

When the data cross tabulates with discipline and level of knowledge, the majority of individuals with Low knowledge are pursuing M.Sc. (45.5%) and M.A. (22.7%) disciplines. Individuals with Moderate knowledge are primarily enrolled in Social Sciences related courses (34.4%) and M.A. (26.2%) programs. For those with High knowledge, the highest percentage is in Social Science related professional courses (45.8%), followed by M.Sc. (20.8%) and M.A. (20.8%) disciplines. M.Com. and MTech. programs have a lower representation in all levels of knowledge compared to other disciplines. Among the "Others" category (MBA, Medical related courses), individuals with High knowledge constitute the largest percentage (8.3%).

5.4 The attitude of post-Graduation students towards waste management.

Level of Attitude of participants

The second objective of the study was to understand the attitude of waste management among the respondents. According to the study all participants show different type of attitude towards waste management. Among the respondents, 6 individuals (5.6%) reported having a negative attitude. The majority of respondents, 101 individuals (94.4%), reported having a positive attitude. Based on the data, the majority of respondents (94.4%) reported having a positive attitude, while a smaller proportion (5.6%) indicated a negative attitude.

Cross Tabulation between gender and level of attitude

When the data cross tabulates with gender and level of attitude, the distribution within each level of attitude, among those with a Negative Attitude, males constitute 33.3% and females constitute 66.7% of the total. Among those with a Positive Attitude, males constitute 27.7% and females constitute 72.3% of the total.

Cross Tabulation between discipline and level of attitude

When the data cross tabulates with discipline and level of attitude, the distribution within each discipline, the majority of individuals in M.Sc., M.Com., and Social Science related professional courses have a Positive Attitude, while M.A. has an equal distribution between Negative Attitude and Positive Attitude. Across all disciplines, the

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overall distribution shows that 5.6% of individuals have a Negative Attitude and 94.4% have a Positive Attitude

5.5 The waste management practices of post-Graduation students.

The third objective is to understand the knowledge about waste management practices. Analysing the percentages, it becomes evident that the majority of respondents (48.6%) engage in all of the listed waste management practices. Among the individual practices, recycling paper, plastic, and glass stands out as the most popular, with 17.8% of respondents participating in this activity. On the other hand, participating in waste reduction campaigns or initiatives is the least adopted practice, with only 4.7% of respondents taking part in such activities

Moreover, a substantial proportion of respondents (38.3%) face multiple barriers, as they selected "All of the above" as their reason for not engaging in waste management practices. This highlights the complexity and interconnectedness of the challenges faced by individuals in adopting proper waste management habits. The data reveals various obstacles people encounter when attempting to practice effective waste management. These barriers encompass issues related to convenience, knowledge, awareness, and access to appropriate facilities. Understanding these challenges is crucial for devising targeted strategies to promote waste management and encourage sustainable practices within the population.

Another finding is that a significant majority of respondents (52.3%) believe that implementing and improvement measures would enhance waste management practices comprehensively. The data highlights various strategies and preferences that respondents have for improving waste management practices, such as enhancing access to recycling and composting facilities, providing clear guidelines, raising awareness through educational campaigns, and involving the community in waste management initiatives. Implementing these measures could play a vital role in encouraging more sustainable waste management practices and promoting environmental consciousness among the population.

Level of practice of participants

The third objective of the study was to understand the practice of waste management among the respondents. According to the study all participants show different levels of practice towards waste management. The data shows that the majority of individuals (93.5%) are categorized as having a good level of practice, while a smaller percentage have an Average level (4.7%) and the smallest percentage have a Poor level (1.9%) of practice.

Cross Tabulation between gender and level of practice

When the data cross tabulates with gender and level of practice, considering both genders together, the overall distribution shows that 1.9% of individuals have a "Poor" level of practice, 4.7% have an "Average" level of practice, and the vast majority, 93.5%, have a "Good" level of practice. Analysing the distribution within each level of practice, it's observed that among those with a "Poor" level of practice, all individuals are female. For respondents with an "Average" level of practice, 60% are male, and 40% are female. Among those with a "Good" level of practice, 27% are male, while 73% are female.

Cross Tabulation between discipline and level of practice

When the data cross tabulates with discipline and level of practice, analysing the distribution within each level of practice, it becomes evident that M.Sc. has the highest representation in both the "Poor" and "Good" levels. On the other hand, M.Com. has the highest representation among respondents with an "Average" level of practice. Considering all disciplines together, the overall distribution shows that 1.9% of individuals have a "Poor" level of practice, 4.7% have an "Average" level of practice, and the vast majority, 93.5%, have a "Good" level of practice in waste management.

Cross Tabulation between Residential area and level of practice

When the data cross tabulates with residential area and level of practice, considering both residential areas together, the overall distribution shows that 1.9% of individuals have a "Poor" level of practice, 4.7% have an "Average" level of practice, and the vast majority, 93.5%, have a "Good" level of practice in waste management. Analyzing the distribution within each level of practice, it's observed that among those with a "Poor"

level of practice, individuals from Urban residential areas constitute 100% of the total. For respondents with an "Average" level of practice, 20% are from Rural residential areas, and 80% are from Urban residential areas. Among those with a "Good" level of practice, 38% are from Rural residential areas, while 62% are from Urban residential areas

5.6 Summary of the Chapter

The chapter described in detailed explanation about socio-demographic features of respondents. It also explained the knowledge of waste management, attitude towards waste management, practices of waste management among the post graduate students. Levels of knowledge, attitude and practices among respondents and the reasons behind it also was explained in this chapter. In-depth discussion on gender, discipline, residential area and cross tabulate with level of knowledge, attitude and practices also described in this chapter.

CHAPTER VI

FINDINGS, SUGGESTIONS AND CONCLUSION

Chapter 6: Findings, Suggestions and Conclusion

6.1 Overview of the Chapter

The Main aim of the study was to understand the Knowledge, Attitude and Practice of Waste Management among Post Graduation Students in Trivandrum District. The objectives of the study included determining to understand the knowledge of post-Graduation students about waste management practices, to know the attitude of students towards waste management. And to understand the waste management practices of post-Graduation students. The key findings from the study are summarised in this chapter. It gives suggestions, recommendations, and outcomes based on the findings and summarizes the major findings. The goal is to give a thorough overview of all of the study that was done. The chapter emphasizes key findings regarding the Knowledge, Attitude and Practice of Waste Management among Post Graduation Students.

6.2 Summary of the Major Findings

Socio-Demographic Profile of the Respondents.

Personal profile

- Majority of the respondents of the study was from the age 23 and age 22.
- In the study the female population of respondents were higher than males.

Academic profile

- Majority of the participants are Social Science related professional courses," which accounts for 32.7%
- M.Sc. (28%), M.A (24.3%), and M.Com (7.5%). M.Tech and "Others" have relatively lower representation in the sample.
- Majority of the participants, 63.6% are in the fourth semester, second semester has the representation at 26.2% and first and third semesters have lower representation.
- The types of colleges where participants are 57.0% fall under the aided category, Government colleges make up 34.6% of the sample, while self-financing colleges account for 8.4% of the sample.

The knowledge of post-Graduation students about waste management

- 78 respondents (72.9%) expressed that waste management encompasses all aspects, including proper disposal, recycling, and collection/treatment of waste materials.

- Majority of respondents (72.9%) indicated that waste management encompasses all mentioned aspects.

- The most common location for waste deposition in public places is the common area, including markets, bus stops, shops, and similar locations.

- There is a lack of awareness or understanding among respondents regarding specific government initiatives for waste management.

- A significant number of respondents provided incorrect answers, while a smaller proportion believed that all mentioned options were government initiatives.

- Further education and awareness campaigns could help clarify the actual initiatives taken by the government and improve understanding in this area.

Level of Knowledge of Participants

- All participants showed varying levels of knowledge in waste management.

- 22 respondents (20.6% of the total) had a "Low" level of knowledge.

- 61 respondents (57.0% of the total) had a "Moderate" level of knowledge.

- 24 respondents (22.4% of the total) had a "High" level of knowledge.

- The majority of respondents (57.0%) indicated having a moderate level of knowledge.

- A smaller proportion of respondents reported low (20.6%) or high (22.4%) levels of knowledge in waste management.

Cross Tabulation between gender and level of knowledge

- When cross-tabulating the data with gender and level of knowledge, 58.4% of female respondents reported having a moderate level of knowledge.

- In contrast, 53.3% of male respondents reported having a moderate level of knowledge.

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- This indicates that a higher proportion of female respondents have a moderate level of knowledge compared to male respondents.

Cross Tabulation between Discipline and level of knowledge

- Individuals with Low knowledge are primarily pursuing M.Sc. (45.5%) and M.A. (22.7%) disciplines.
- Individuals with Moderate knowledge are mainly enrolled in Social Sciences related professional courses (34.4%) and M.A. (26.2%) programs.
- For those with High knowledge, the highest percentage is in Social Sciences related professional courses (45.8%), followed by M.Sc. (20.8%) and M.A. (20.8%) disciplines.
- M.Com. and MTech. programs have lower representation in all levels of knowledge compared to other disciplines.
- Among the "Others" category (MBA, Medical related courses), individuals with High knowledge constitute the largest percentage (8.3%).

The attitude of post-Graduation students towards waste management.

Level of Attitude of participants

- All participants exhibited different types of attitudes towards waste management.
- 6 individuals (5.6% of the total) reported having a negative attitude.
- The majority of respondents, 101 individuals (94.4% of the total), reported having a positive attitude.
- Based on the data, the majority of respondents (94.4%) had a positive attitude towards waste management, while a smaller proportion (5.6%) indicated a negative attitude.

Cross Tabulation between gender and level of attitude

- Among those with a Negative Attitude, males constitute 33.3% and females constitute 66.7% of the total.

- Among those with a Positive Attitude, males constitute 27.7% and females constitute 72.3% of the total**.**

Cross Tabulation between discipline and level of attitude

The majority of individuals in M.Sc., M.Com., and Social Science related professional courses have a Positive Attitude towards waste management.

- In the M.A. discipline, there is an equal distribution between Negative Attitude and Positive Attitude.
- Across all disciplines, the overall distribution shows that 5.6% of individuals have a Negative Attitude, while 94.4% have a Positive Attitude towards waste management.

The waste management practices of post-Graduation students

- The majority of respondents (48.6%) engage in all listed waste management practices.
- Recycling paper, plastic, and glass are the most popular practices, with 17.8% of respondents participating in these activities.
- Participating in waste reduction campaigns or initiatives is the least adopted practice, with only 4.7% of respondents taking part in such activities.
- 38.3% of respondents face multiple barriers, selecting "All of the above" as their reason for not engaging in waste management practices.
- Various obstacles people encounter include issues related to convenience, knowledge, awareness, and access to appropriate facilities.
- Understanding these challenges is crucial for devising targeted strategies to promote waste management and encourage sustainable practices within the population.
- A significant majority of respondents (52.3%) believe that implementing and improving measures would enhance waste management practices comprehensively.

Level of practice of participants

- All participants show different levels of practice towards waste management.

- The majority of individuals (93.5%) are categorized as having a good level of practice.
- A smaller percentage have an Average level of practice (4.7%).
- The smallest percentage have a Poor level of practice (1.9%) in waste management**.**

Cross Tabulation between gender and level of practice

- Considering both genders together, the overall distribution shows that 1.9% of individuals have a "Poor" level of practice, 4.7% have an "Average" level of practice, and the vast majority, 93.5%, have a "Good" level of practice.
- Among those with a "Poor" level of practice, all individuals are female.
- For respondents with an "Average" level of practice, 60% are male, and 40% are female.
- Among those with a "Good" level of practice, 27% are male, while 73% are female.

Cross Tabulation between discipline and level of practice

- M.Sc. has the highest representation in both the "Poor" and "Good" levels of practice in waste management.
- M.Com. has the highest representation among respondents with an "Average" level of practice.
- Considering all disciplines together, the overall distribution shows that 1.9% of individuals have a "Poor" level of practice, 4.7% have an "Average" level of practice, and the vast majority, 93.5%, have a "Good" level of practice in waste management.

Cross Tabulation between Residential area and level of practice

- Considering both residential areas together, the overall distribution shows that 1.9% of individuals have a "Poor" level of practice, 4.7% have an "Average" level of practice, and the vast majority, 93.5%, have a "Good" level of practice in waste management.

- Among those with a "Poor" level of practice, individuals from Urban residential areas constitute 100% of the total.
- For respondents with an "Average" level of practice, 20% are from Rural residential areas, and 80% are from Urban residential areas.
- Among those with a "Good" level of practice, 38% are from Rural residential areas, while 62% are from Urban residential areas.

6.3 Suggestions

Based on the given findings, here are some suggestions and insights:

- *Targeted Awareness Campaigns*: Since there is a lack of awareness or understanding among respondents regarding specific government initiatives for waste management, conducting targeted awareness campaigns can be beneficial. These campaigns should aim to educate the participants about the various government initiatives and how they can actively contribute to waste management efforts.
- *Promoting Sustainable Practices*: Encourage and promote sustainable waste management practices, such as recycling paper, plastic, and glass. These practices were found to be the most popular among the respondents. By highlighting the environmental benefits and providing convenient recycling facilities, more individuals may be motivated to participate.
- *Addressing Barriers:* A significant proportion of respondents faced barriers to engaging in waste management practices, including issues related to convenience, knowledge, awareness, and access to appropriate facilities. Identifying and addressing these barriers are essential to encouraging more individuals to adopt sustainable waste management practices.
- *Gender-Specific Strategies*: The crosstabulation between gender and knowledge, attitude, and practice levels showed variations. Designing gender-specific strategies for waste management awareness and education might help improve knowledge and practices, particularly among male respondents who have a relatively lower proportion of positive attitudes and good levels of practice.

- *Engaging Social Sciences Students*: As Social Sciences related courses have the highest representation among the respondents, it might be beneficial to engage these students actively in waste management initiatives. These students could act as advocates for waste management in their respective communities, promoting positive attitudes and practices.

- *Residential Area-Specific Interventions*: The crosstabulation between residential area and level of practice indicates differences in waste management practices between urban and rural areas. Tailoring waste management interventions based on the specific challenges and characteristics of each residential area could yield more effective results.

- *Incorporate Waste Management in Curriculum*: Since the majority of the participants are pursuing post-graduation studies, integrating waste management topics into the curriculum of relevant courses can help increase knowledge and foster positive attitudes towards waste management from an early stage.

- *Encourage Research and Innovation*: Promote research and innovation in waste management techniques and technologies within the academic community. Encouraging students to explore and propose new ideas could lead to practical and sustainable solutions to waste-related challenges.

- *Long-term Monitoring and Evaluation*: Implement long-term monitoring and evaluation mechanisms to track changes in knowledge, attitudes, and practices over time. This feedback loop can help identify the effectiveness of interventions and guide adjustments for continuous improvement.

By implementing these suggestions, you can work towards improving waste management practices and fostering a more sustainable environment among post-graduation students and their communities.

6.4 Implication for the Social Work Practice

Social work practices can have significant implications in the field of waste management. Waste management is not just a technical or environmental issue; it also involves complex social, economic, and cultural dimensions. Social workers can contribute to waste management efforts in several ways:

- *Community Engagement and Education*: Social workers can play a crucial role in raising awareness about proper waste disposal practices, recycling, and the importance of reducing waste generation. They can organize community workshops, educational campaigns, and outreach programs to educate individuals and communities on the environmental and health impacts of improper waste management.

- *Behavioural Change and Advocacy*: Social workers can work with individuals, families, and communities to promote behavior change towards more sustainable waste management practices. This could involve counseling and motivational interviewing to encourage people to adopt responsible waste disposal habits. Social workers can also advocate for policy changes and regulations that promote environmentally friendly waste management practices.

- *Vulnerable Populations:* Social workers are often engaged with vulnerable populations, such as low-income communities and marginalized groups. These groups may be disproportionately affected by poor waste management practices, including living in areas with inadequate waste disposal infrastructure. Social workers can advocate for the rights of these populations to access proper waste disposal services and ensure their voices are heard in waste management decision-making processes.

- *Social Equity and Environmental Justice:* Waste management practices can sometimes lead to environmental injustices, where certain communities bear a disproportionate burden of waste-related hazards. Social workers can work to address these inequalities by advocating for equitable distribution of waste management resources and services. They can also support affected communities in demanding their rights to a safe and clean environment.

- *Collaboration and Partnerships*: Waste management involves multiple stakeholders, including local governments, businesses, non-profits, and community organizations. Social workers can facilitate collaboration among these groups to develop comprehensive waste management strategies that consider both technical and social aspects.

- *Crisis and Disaster Response:* In the event of waste-related crises, such as hazardous waste spills or natural disasters affecting waste infrastructure, social workers can provide immediate support to affected individuals and

communities. They can help coordinate emergency response efforts, provide psychological support, and assist in community recovery and rebuilding.

- *Research and Data Collection:* Social workers can contribute to waste management by conducting research on social behaviors and attitudes related to waste generation and disposal. This information can inform the development of targeted interventions and policies that address specific challenges within communities.

- *Capacity Building and Training*: Social workers can train community leaders, local organizations, and waste management professionals on effective community engagement strategies, communication skills, and cultural sensitivity. This helps build the capacity of stakeholders to implement sustainable waste management practices.

6.5 Conclusion

Waste originates from human actions, with virtually every human activity generating some form of waste. The nature of this waste is contingent on the materials individuals consume, and waste management remains closely intertwined with people's lifestyles (Muljaningsih, 2018) This study aimed to understand the socio-demographic features, knowledge, attitude, and practices of post-graduation students regarding waste management in Thiruvananthapuram District. For the data collection self-structed questionnaire were used. The data was collected from 107 post graduate students studying in Thiruvananthapuram, through convenience sampling. The findings provided insights into the Knowledge, Attitude and Practice towards Waste Management. The socio-demographic analysis revealed that the majority of respondents belonged to the age groups 23 and 22, with a higher representation of females (72%) compared to males (28%). Social Sciences related courses were the most common academic discipline, and the fourth semester had the highest representation among the participants.

Regarding knowledge about waste management, a significant proportion of respondents (72.9%) correctly understood the various aspects of waste management, including proper disposal, recycling, and treatment of waste materials. However, there was a lack

of awareness about specific government initiatives for waste management, which calls for further education and awareness campaigns.

Concerning the level of knowledge, most respondents (57.0%) reported having a moderate level of knowledge, with females showing a slightly higher proportion of moderate knowledge compared to males. The cross-tabulation with discipline showed that individuals pursuing Social Sciences related professional courses had the highest representation across all levels of knowledge.

Regarding attitude, the majority of respondents (94.4%) expressed a positive attitude towards waste management, while a smaller proportion (5.6%) showed a negative attitude. Females tended to have a higher positive attitude than males, and students from different academic disciplines exhibited varying levels of attitude.

Analysing the waste management practices, the study revealed that recycling paper, plastic, and glass was the most common practice, and the common area was the most frequent location for waste deposition in public places. However, a significant portion of respondents faced multiple barriers to practicing effective waste management, pointing to the complexity of challenges and the need for targeted strategies. Implementing and improving waste management measures was viewed as crucial for enhancing practices comprehensively.

In terms of the level of practice, the majority of respondents (93.5%) were classified as having a good level of practice in waste management. M.Sc. students had the highest representation in both the "Poor" and "Good" levels of practice, while M.Com. students had the highest representation among those with an "Average" level of practice.

Overall, the study provides valuable insights into the socio-demographic features, knowledge, attitude, and practices of post-graduation students towards waste management. The findings can serve as a basis for designing targeted interventions and awareness campaigns to promote sustainable waste management practices among this population. Further research could explore the effectiveness of specific strategies and initiatives to enhance waste management behaviours and attitudes in this academic cohort.

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ANNEXURE

Annexure

Section 1: Socio demographic details

1. Name

2. Age:

3. Gender:

     (a) Female

     (b) Male

     (c) other

4. Discipline

     a) M.Sc.
     b) M.A
     c) M.Com
     d) MTech
     e) Social Science related professional courses
     f) Others

5. Semester

     a) 1 sem
     b) 2 sem
     c) 3 sem
     d) 4 sem

6. Name of the College

7. Category of College

     a) Government
     b) Aided
     c) Self-financing

8. Residential Area

     a) Urban

b) Rural

To understand the Knowledge of college students about waste management practices

9. what does the term 'waste management' refers to?

   a) Proper disposal of waste management
   b) Recycling of waste materials
   c) Collection and treatment of waste materials
   d) All the above
   e) None of the above

10. Which of the following is an example of non-biodegradable waste?

   a) Food scraps
   b) Paper
   c) Plastic bottles
   d) None of the above

11. From among the following, which type of waste do you produce mostly?

   a) Food waste
   b) Paper waste
   c) Plastic waste
   d) Glass waste
   e) E-waste

12. Which of the following types of wastes are produced more in your household?

   a) Food
   b) Plastic
   c) Paper
   d) Agriculture
   e) Others

13. In Public which place do you see wastes are being deposed?

   a) Public collection point
   b) Common area (markets, bus stop, shops etc)

c) Inhabitant area
d) Others

14. Which type of wastes are produced more by food take away?

a) Food
b) Aluminium foil containers
c) Plastic containers
d) Paper wrappers

15. Which among the following units produce more waste in your campus?

a) Canteen
b) Garden
c) Class rooms
d) Dormitories
e) Others

16. What do you think are the most appropriate waste disposal methods

a) Composting waste
b) Burning of waste
c) Dust Bins
d) Dump pit
e) Recycling
f) Others

17. What is the purpose of recycling waste materials?

a) Reduce landfill waste
b) Generate income
c) Save energy and resources
d) All of the above

18. What is the primary purpose of waste segregation?

a) Facilitate recycling
b) Reduce waste volume
c) Enhance waste collection efficiency
d) All of the above

19. Which of the following materials can typically be recycled?

a) Plastic
b) Glass
c) Food wrapper
d) Wood

e) None of the above

20. Which among the following is the best method for disposing e-waste?

   a) Giving to e-waste recyclers
   b) Donating
   c) Reselling
   d) Give back to companies
   e) Giving to Green Volunteers

21. Are you guided by 3R's (Reduce, Reuse, Recycle) principle in waste management?

   a) Not at all
   b) Very little
   c) Fairly well
   d) Quite well
   e) Perfectly

22. Do you know about 6R's principle in waste management?
   a) Not at all
   b) Very little
   c) Fairly well
   d) Quite well
   e) Perfectly

23. Are there any awareness programmes conducted on waste management in your college?

   a) Not aware
   b) Somewhat aware
   c) Usually aware
   d) Very much aware

24. Do you have environmental related topics in your curriculum on waste management?

   a) Yes
   b) Maybe
   c) No

25. Are you aware of the waste management practices implemented in your college?

   a) Not aware
   b) Somewhat aware
   c) Usually, aware
   d) Very much aware

26. Are you aware of the Colour Code of Waste Bin in India?

   a) Not aware

b) Somewhat aware
c) Usually aware
d) Very much aware

27. Which among the following helped you to waste management consciousness?

    a) Family
    b) School/college
    c) Friends
    d) Social Media
    e) All the above

28. from among the following which are the initiatives taken by the government for waste management?

    a) Swachh Bharat Mission
    b) Jal Shakti Abhiyan
    c) Waste to Energy
    d) All of the above

To know the attitude of students towards waste management.

The following pages are 10 statements of Attitude towards waste management. Please read each statement carefully and decide if you agree with these statements on way using digital devices in your job. Select the option 1=strongly disagree, 2=disagree, 3=Neutral, 4= Agree and 5=strongly agree

Statement	1	2	3	4	5
I believe waste management is essential for environmental conservation					
I am aware of the impact of improper waste disposal on the environment.					
I feel responsible for properly managing and disposing of waste.					

I am willing to make an effort to reduce waste generation					
I believe recycling is an effective way to conserve resources and protect the environment					
I actively participate in waste reduction and recycling initiatives					
I encourage others to adopt environmentally friendly waste management practices					
I am willing to educate myself and others about waste management strategies					
I support the implementation of waste management programs and policies on my college campus					
I believe that individuals can make a significant difference in waste management practices.					

To understand waste management as practiced by Post Graduation students

39. Do you sort waste at home?

        f) Not at all
        g) Very little
        h) Fairly well
        i) Quite well
        j) Perfectly

40 Do you use separate bins to waste sorting?

k) Not at all
l) Very little
m) Fairly well
n) Quite well
o) Perfectly

41. Does your college have a recycling program in place?

o Very ineffective
o Ineffective
o Average
o Effective
o Very effective

42. Is there a club that deals with matters of waste and waste management?

a) Yes

b) No

c) Maybe

43. Do you participate in the waste management programmes in campus/locality?

a) Never
b) Rarely
c) Sometimes
d) Often
e) Always

44. Are you practicing the waste management guidelines of your college?

a) Never
b) Rarely
c) Sometimes
d) Often
e) Always

45. How often do you engage in Reusing items instead of buying new ones to reduce waste?

a) Never
b) Rarely
c) Sometimes
d) Often
e) Always

46. How often do you engage in Repairing items instead of discarding them to reduce waste?

- a) Never
- b) Rarely
- c) Sometimes
- d) Often
- e) Always

47. How often do you engage in Borrowing or sharing items with others to reduce waste?

- a) Never
- b) Rarely
- c) Sometimes
- d) Often
- e) Always

48. How often do you engage in Buying products with minimal packaging to reduce waste?

- a) Never
- b) Rarely
- c) Sometimes
- d) Often
- e) Always

49. Which of the following waste management practices do you engage in?

- a) Recycling paper, plastic, and glass
- b) Properly disposing of hazardous materials (e.g., batteries, electronics)
- c) Composting organic waste
- d) Reusing or repurposing items
- e) Participating in waste reduction campaigns or initiatives
- f) All of the above

50. What are the main barriers preventing you from practicing better waste management?

- a) Lack of convenient waste disposal options
- b) Insufficient knowledge about proper waste management practices
- c) Lack of awareness about the importance of waste management
- d) Limited access to recycling or composting facilities
- e) Time constraints
- f) All of the above

51. What would motivate you to improve your waste management practices?

a) Increased access to recycling or composting facilities
b) Clear instructions and guidelines on proper waste management
c) Education and awareness campaigns about the environmental impact of waste
d) Incentives or rewards for proper waste management
e) Peer or community involvement in waste management initiatives
f) All of the above