EVALUATION OF KNOWLEDGE, AWARENESS, AND ATTITUDE TOWARDS WASTE MANAGEMENT PRACTICES AMONG UNIVERSITY OF MALAYSIA KELANTAN JELI STUDENTS

BY

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DECLARATION

I declare that this thesis entitled **"Evaluation of Knowledge, Awareness, and Attitude Towards Waste Management Practices Among University of Malaysia Kelantan Jeli Students"** is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Evaluation of Knowledge, Awareness, and Attitude Towards Waste Management Practices Among University of Malaysia Kelantan Jeli Students

ABSTRACT

Waste is one of the major serious environmental issues in all over the world. Improper waste management will result in adverse health effects such as diarrhea, cholera, and chicken pox, etc. This study was conducted to identify the factors that influence the practices on waste management among UMK Jeli students and also to determine the relationship between those factors towards practices on waste management taken by students in UMK Jeli. This cross-sectional study was conducted using systematic and well-designed questionnaire. Out of 2500 UMK Jeli students, only 300 were selected. The data was analyzed using Spearman's Rank Correlation. The results show a significant relationship between attitude and practices and indicate a high confidence which is very small than 0.01 ($r=0.233$, $n=300$, $p=0.000$), in the correlation between attitude and practices. This study indicates that more efforts are needed to enhance the knowledge and awareness on waste management among UMK Jeli students.

Keywords: Waste Management, Knowledge, Awareness, Attitude, Practices

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Penilaian tentang Pengetahuan, Kesedaran, dan Sikap Terhadap Amalan

Pengurusan Sisa Buangan antara Pelajar Universiti Malaysia Kelantan Jeli

ABSTRAK

Sisa buangan adalah salah satu isu serius alam sekitar yang utama di seluruh dunia. Pengurusan sisa buangan yang tidak wajar akan mengakibatkan pelbagai kesan buruk kepada kesihatan seperti cirit-birit, kolera, dan cacar air, etc. Kajian ini telah dijalankan untuk mengenalpasti faktor-faktor yang mempengaruhi amalan pengurusan sisa buangan antara pelajar UMK Jeli dan juga untuk menentukan hubungan antara faktor-faktor tersebut terhadap amalan pengurusan sisa buangan yang diambil oleh pelajar UMK Jeli. Keratan rentas kajian ini telah dijalankan dengan menggunakan soal selidik yang sistematik dan tersusun secara baik. Hanya seramai 300 orang pelajar telah dipilih daripada 2500 orang pelajar untuk terlibat memberikan kerjasama terhadap kajian ini. Data yang telah dikumpulkan kemudian dianalisis menggunakan Spearman's Rank Correlation. Hasil kajian menunjukkan bahawa adanya hubungan antara sikap dan amalan dan menunjukkan korelasi Dan signifikan yang tinggi antara sikap dan amalan iaitu sangat kecil dari 0.01 (r=0.233, n=300, p=0.000). Kajian ini menunjukkan yang lebih banyak daya usaha diperlukan untuk meningkatkan pengetahuan dan kesedaran terhadap pengurusan sisa buangan antara pelajar UMK Jeli.

Kata kunci: Pengurusan Sisa Buangan, Pengetahuan, Kesedaran, Sikap, Amalan

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Wastes have negatively affect nature as well public wellbeing, in this way, requiring the need to oversee and control the waste truly. Hilburn (2015) disclosed the lasting complex squander management antiquity. The waste control structures began in the past times, with the main aim to oversee squanders by Greeks occurring in A.D, 4th century. The issues which the Greeks confronted include big populace development, restricted area, sterile complications among everyone making the squander control framework arrangement hard. Narayana (2009) stated that, accumulation and transportation of squanders structure a fundamental practice in squander management. In addition, with the quick city improvement and comparing heightening in populace measure, the cleanliness conditions declined as trash squanders shaped the perilous danger on human wellbeing just as the ecological cleanliness to the occupants of these spots. In the 14th – 16th century, vermin executed the infections in Europe, particularly in urban uncleanliness conditions. Around this time, improvement of squander control methodologies happened according to Nathanson (2015), with the point of battling sickness extent in spite of the social and political confinements amid the time. So, as a way to manage and oversee squanders, communities in developing nations frequently go to knowledge, attitude, practices, transfer methods of squander (dumping and open burning) as the

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main alternative to deal with squander matters and advance great cleanliness and human wellbeing (Al-Khatib et al., 2015). Besides that, the need in many developing countries to manage knowledge, practices, attitude, and expanded industrial squander just as squander kind, urbanization structure tool factors in squander control (Oyake, 2016).

An enclave that has a populace estimate that can be perceived as a community depicts the advanced education establishment. As a top educational centre, there are surely numerous activities conducted in the campus that will affect the earth (Abas, 2012). In this manner, the issue of sustainable campus development has achieved worldwide consideration. The utilization of sustainable development concept in campus activities is a need today (Abas and Md Nor, 2014). The Environmental Preservation Agency in the United States has asked all institutions of higher education in their nation to authorize environment protection laws and policies inside the campus (Habib and Ismaila, 2008). As the outcome, numerous campuses in the United States have taken the initiative to decrease the negative effect of their activities on the environment which has involved multi-dimensions of communities in the campus (Perrin, 2004).

In Malaysia, the improvement of sustainable campus concept is concentrating generally on diminishing number of solid waste created (Yap, 2011). Be that as it may, this idea is a scary errand for some higher education institutions in Malaysia on account of low ecological stewardship and absence of commitment to environmental consideration among campus' community (Norizan et al., 2011). As the outcome, tertiary institutions in Malaysia are among the greatest contributors (>20%) of solid waste produced each year (Abas and Md Nor, 2014).

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1.2 Problem Statement

The development of high educational institutional is a main factor that can contribute to the greatest achievement on the global education. The existence of high educational institution, especially Universiti Malaysia Kelantan (UMK) which act as the research study area had contribute to the mounted of the population from around places. The development of UMK had driven to the increased of population which cause an issue in the solid waste generation. UMK Jeli's student accommodations generate solid waste every day and there were two blocks consist of five level of floor of student accommodation. The waste generates have produce some bad impacts towards the surrounding area in UMK Jeli, such as the leachate leakage from the waste dumped produces a very bad smell. The problem on the waste management in UMK Jeli is because of the attitude and awareness of the students themselves. Some of them are not really care about the environment and do not feel to take or hold the responsibility to protect the environment and the cleanliness on the surrounding of the campus. In a context of knowledge, some of the students are from the sustainable course, but still do not have an awareness on protecting the environment by manage the waste well.

1.3 Objectives of Study

1. To identify the factors that influences student's practices on waste management in UMK Jeli.
2. To determine the relationship between knowledge, awareness and attitudes towards practices on waste management taken by the students in UMK Jeli.

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1.4 Significance of Study

This study will help to raise the level of awareness among students in UMK Jeli towards the waste management. The attitude in desire to protect the environment needs to be nurtured from the young age as the young generation is the valuable heirs of the world. So, it is important to raise the awareness among them to love and protect the environment.

1.5 Scope of Study

The study seeks to investigate the level of knowledge, awareness and attitudes towards practices on waste management among students in UMK Jeli. Questionnaires were distributed to 300 students in UMK Jeli. The respondents involved students from the three faculties, Faculty of Earth Science (FSB), Faculty of Agro-Based Industry (FIAT) and Faculty of Bioengineering and Technology (FBKT).

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CHAPTER 2

LITERATURE REVIEW

2.1 Knowledge of Waste Management

Arora and Agarwal (2011) had conducted a research on aiming students of a particular hostel in Rajasthan University. This study comprises three variables which are attitude, understanding of squander management, and practices. This study was aimed to demonstrate the university student mindset in direction to waste control. The study took three students as respondents and self-administered questionnaire was used as data gathering method. T-test is a data that turned into used to investigate the records. The discovering showed low, less convenient, and medium in attitude, practice, and knowledge respectively; courting of expertise and mindset became missing, knowledge and practice showed an important correlation.

Kumar et al. (2013) utilized a study that takes sample out of the whole population to build up the practices and also knowledge of bio-medicinal squander in a populace test of wellbeing of the employees in healthcare organization. The research found that only 35.4% of the healthcare employees had biomedical waste administration preparing and aptitudes. As the results, due to lack of their proper knowledge, this contributes to the bad practices on the waste management as they did not have knowledge on the way to dispose and handle the squander.

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Next, Karout and Altuwaijri (2012) were studied a research about the impact of community welfare consciousness and intercession to practices, knowledge, and attitude in controlling and disposing the waste. The data was collected from a survey process and shows that the immense knowledge of infections and health risk was related with waste collection for the squad that went to the tutoring and programmes of education, constructive attitude of overseeing squanders and also enhanced squanders of practices in handling wastes such as recycling the wastes from the household. The inspection demonstrated a growth in society participation in cleaning and other environmental care programmes.

Environment is outlined as a structure wherever genuine, unnatural and community elements be with one another during a noticeable interconnection structure. This technique affects the improvement or raise of the number of people (Yucel et al., 2008; Dahiya and Ritu, 2013). Having the foremost necessary role during this system, human beings have used the environment for purposes like initiating a living space and rising the standard of life. Human belief that natural resources square measure infinite and their habit of depleting them unconscientiously resulted in irreversible environmental deterioration (deforestation, declined biodiversity, pollutions, global, and climate change (Sudarmadi et al., 2001; Onder, 2006; Yucel et al., 2006). However, the importance of the matter became obvious once the environmental began to deteriorate everywhere the world and environmental issues reached the purpose of threatening wildlife (Sudarmadi, 2001; EK, 2009). People have responsibilities in resolution and preventing environmental issues. It has been argued that the environment-related approaches of people can offer important contributions to resolution these issues (Yucel, 2006; EK, 2009; Wong, 2003; Oguz, 2011).

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2.2 Awareness on Waste Management

Environmental awareness is outlined as having knowledge concerning environmental issues and solutions (Zsoka et al., 2013). Attitude considers the contrast between the definitions of psychological and sociological. Consequently, psychological definition of attitude identity as behaviour. However, sociological definition of attitude implies expectation to act (Chaiklin, 2011). Responses to the interference or reduction of environmental issues with this awareness comprise environmental attitudes (Yucel, 2003). According to this, environmental awareness plays a very significant role in shaping individuals attitudes (Wong, 2013; Zsoka, 2008). The role of environmental education starting from the preschool period and extending up to the higher education level is vital for raising environmental awareness and attitude (EK, 2009; Oguz, 2011; Erten, 2004).

Banga (2013) revealed in her work that the level of awareness, income of household, level of educational and sex depend on participation of solid waste management activities. Ayodeji (2012) studied the practices, awareness and knowledge of teachers in secondary school in Ogun State with regard to waste management and concluded that all teachers were aware and knowledgeable although they had bad practices on waste management. He outlined considerable knowledge and awareness among people in Nigeria about waste disposal, showed that they are only conscious of the crude and ancient techniques and are unaware of the latest techniques like recycling and incineration. Adeyemo and Gboyesola (2013) explicitly point out that people's mind-set towards waste management can be impacted by way of their stage of consciousness and waste management knowledge. They additionally detailed that houses with bins of waste do better to store waste than homes without waste bins.

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In Ghana, Asuamah et al. (2012) revealed that, people's attitudes towards recycling and waste management have not had any significant impact on gender, employment and educational ranks. Addaney and Anarfiwaah (2015) inferred that some public consciousness being created with little control yielded results because of the rising non-selective littering and disposal in the regions. They included that appalling solid waste practices have clogged most of the few available drains creating stale water for insect breeding and floods during rainy seasons. They additionally noted huge open spaces in the Municipalities dotted with stacks of refuse sited close to residential areas as contributing elements. All these pose risk to both public and environmental health.

If properly administered, waste management activities generate potential environmental benefits (Gentil et al., 2009). In the past, there has been little effort to raise awareness of the community, either about the likely dangers of poor waste management or the simple steps that every citizen can take. This could have contributed to decreasing waste generation and promoting efficient waste management, but it has changed this scenario. Increasing numbers of people are now interested in environmental problems because they have started to encounter the negative impacts of ecological problems. Therefore, this study evaluates the awareness and practice of Ghana Municipality's household waste management practices in Winneba.

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2.3 Attitude towards Waste Management Practices

Environmental attitudes are a psychological trend expressed by some degree of favor or disadvantage in evaluating the natural environment (Milfont and Duckitt, 2010).

Attitude towards environment is a dormant build, so we are incapable directly spot it, just from visible reactions can we conclude it (Himmelfarb, 1993). The techniques of direct self-report or implied methods of measurement also can be used (Krosnick et al., 2005). In the field, numerous evaluated attitudes can be measured to the environment. Nonetheless, (Maloney and Ward 1973), (Maloney et al. 1975), the Environmental Concern Scale (Weigel and Weigel, 1978), and the New Environmental Paradigm Scale (Dunlap et al. and Jones, 2000) stated that only three of these measures are widely used which is the Ecology Scale.

Several outlooks concerning the attitude's dimensionality in direction to the environment were studied by (Wiseman and Bogner 2003) especially cautioned that the grouping composition of the attitudes in the direction of environment need to stand two elements of second order which are Preservation and Use. A current research has suggested the grouping of the attitudes in direction to environment into the similar two unconventional subjects (Milfont and Gouveia, 2006).

Preservation is a bio-centred measurement that reviews environmental preservation and conservation of the environment. People with this kind of attitude towards environment prioritize in their initial state the preservation of nature. These individuals are frequently enthusiastic about conserving nature from any Man use or modification.

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Use is a conceptual measurement that mirrors natural resource utilization. People with this attitude towards the environment trust that the use of natural resources for human use and modification is right and proper.

A few variables that affect environmental attitudes have been recognized by research. The variables affecting environmental attitudes can be widely classified into a factor related to socio-demography, psychology and the environment.

Research on waste disposal and waste management was conducted by Eneji et al. (2016). The study hypotheses were tested at a meaning level of 0.05. The results show that the management and disposal of squander among the Calabar South residents are extremely negative and it is also can be observed that the second theory tested demonstrated a important effect of non-selective squander disposal and the health status of the Calabar South residents. From the whole study of this research, it was concluded that it has some important effects on their status of health due to the negative attitude of Calabar South residents towards managing and disposing of their waste.

A research to organize the impact of attitudes, practices, and knowledge on squander management of 2528 Polytechnic university student was conducted by Barloa (2016). The discoveries show that 73% of the students specified knowledge to be satisfactory, 71% attitude on strategic squander control problems; while around 43% portrayed adequate practice's levels. The relation portrayed a noteworthy association between knowledge and attitude and an $r2 = 0.11$; $p<0.005$ ratings of student projection.

2.4 Waste Management Practices

A research in Owerri municipal Imo state residents in Nigeria was directed by Adogu et al. (2015) and discovered 92% of the respondents that involved in the survey knew about the waste control which 98% of them appearing a nice attitude in direction to the overseeing squanders and conservation of the health of the environment. Then, the outcomes demonstrated a 97% of the household wastes that consists of food residues as well as 95% of vegetable squanders. Open dumping 66% of the tested populace, and burning 62% of the populace practiced it forms the two poor squander management approaches showed in the research. Significant effect on the attitude, practice, and knowledge, attitude, and practice of squander management by the respondent's education and gender which are significant ($p < 0.05$) were shown.

A review of squander management practices by Giusti (2009) researched the effect on human health in municipal squander, and effect of bio aerosol revelation from sewage plant treatment. Results found that municipal squander had unfavourable effect result on wellbeing for the population neighboring dumping areas and nuclear appliance. In addition Adeyemi and Adeyamo (2006) likewise discovered that the fundamental squander disposal practices in squanders have a significant impact on environmental cleanliness and human wellbeing.

According to Cunningham (2009) a few sorts of household squanders comprise of an assortment of materials. The best generally household squander composition evaluated as of now demonstrated a (20%) of garden squanders, 5% wooden squanders, 18% paper dirty, 9% sweeping squanders, 17% kitchen squanders, 3% of metallic material waste, 3% of both material and soil squanders as Julian (2002), separates the parts of household squanders. The main household squanders sources

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comprises item bundling materials, for example, plastic, paper, metal or glass bundling, which, as indicated by Cunningham (2009) establishes over half of wastes.

The weight of overseeing squanders is contrarily affected by the high rate of populace development in towns like Nairobi in East Africa. The difficulties that entangles squander the board in urban focuses includes poor sanitation guideline usage, constrained monetary help, absence of suitable techniques to oversee squanders. Troschinetz and Mihelcic (2009) stated that more than 100 million people need great sanitations in East African urban areas. Dandora, for instance, is Nairobi‟s dumping area, similar to the instance in numerous nations with poor administration of squanders, where squanders are dumped in queries and deserted areas, risking the wellbeing of the people residing near to these areas. The wetlands and low lying terrains close to forests structure larger part of the dumping areas in numerous countries as Global solid waste management report, 2012 demonstrates. In developing countries, these areas are not shielded from human access since they are left open, unfenced expanding the danger of human exposure to environmental and public health disease (Oyake, 2016).

Report of Global squander management in 2012 state that, by 2025, the urban areas and urban focuses on the planet will produce over 2.8 billion tons of squander which is more than double the present measure of 1.3 billion tones particularly in low salary developing countries. Under 26% of squanders are gathered once a day in Nairobi as Ikiara et al. (2014) uncovers. Apparent discoveries uncover that the waste from local sources is 68 percent, while 14 percent is from industrial sources, at that point 8 percent from streets, 2 percent from medical clinics, 3 percent from education

institutions or schools 1 percent from business sectors and the rest of the 4 percent from different sources (UNFPA, 2001).

In excess of 260,000,000 tons of plastics are generated each year internationally, which records for very nearly 8 % of oil production on the planet (Oyake, 2016). A similar report demonstrated that very nearly 1 trillion plastic sacks are manufactured and used in one year comprehensively. This approves the significance of the utilization of plastic substances over all others by packaging division. The urban squander streams end up being the beneficiary of almost a half of these delivered plastic sacks, comprising something between the scope of 5% and 10% of the squander stream, compared to Kenyan urban areas (NEMA, 2003). At the core of Nairobi County, Westlands Sub-province falls inside the insights of 5% to 10% being used of the synthetic substances.

Like most developing countries, Malaysia is facing a tendency towards waste production and accompanying issues with the destruction of this waste. The residents produce 15,000 tons of waste of domestic per day standard and the per capita amounts differ from 0.45 to 1.44 kg per day relying on the financial repute of the areas concerned. On average, the production of waste is approximately 1 kg per capita per day (GAIA Global Meeting, 2003).

Municipal solid squander in Malaysia is within the public sector's obligation, despite the fact that the regime had contracted private contractors for part of the municipal solid squander administration services within the privatization programme. Municipal solid waste management (MSWM) utilities signify a big proportion of the municipal spending plans as squander administration and arrangement are subject to municipal requirements. Averagely, 50 percent of the municipal operating budget is

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spent on MSWM, of which 70 percent is spent on accumulation (UN Environment Program, 2002). Municipal solid waste activity has three sources of funding, in particular, municipal charges, service charges, and municipal income endowments from government sources (UN Environment Program, 2002). Urban communities and towns are heavily dependent on municipal duties in order to supply MSWM utilities to their citizens as the costs of collecting and exchanging services do not cover the expenses of these activities. In addition, there is no institutionalized expenditure-setting strategy and discussions are progressing on this issue.

Different gathering and container systems relying on waste collection zones are used. There is both a way to-entryway gathering and aberrant collection in apartment multiplex and another proper areas for disposal sites and transferring stations by exceptional vehicles of waste, with compartments or public canisters closed to markets. Collecting and transferring are intensive workers. In market and commercial establishments, physically and precisely stacked compactors are used regularly. For areas where particular waste organizations, like Alam Flora Sdn. Bhd. are working on transfer and collection services. Furthermore, Kualiti Alam Sdn. Bhd., transfer and collection are gradually increased and mechanized by capital. Holder sizes are institutionalized, as are collection vehicles and enormous area compartments, that also can be equipped with compactors (UN Environment Program, 2002).

Accumulation rates fluctuate from state to state due to gathering and exchange skill contrasts. 80 % of all waste is gathered in Kuala Lumpur, Malaysia's capital city. So as to improve the collection and exchange of services and beat the money-related requirements of nearby regions, private-owned enterprises are welcome to offer

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municipal solid waste administration services for privatisation-cum-concession understandings. Privately owned businesses are allowed to shape joint endeavor with remote waste administration organizations with budgetary assets and experience in winning contracts from city experts and planning and building landfills and transfer stations or any last disposal structures (UN Environment Program, 2002).

By and by, there are three sorts of disposal of waste groups which are solid waste discarding and burning, incineration of medical squander and burning of hazardous squander. Solid waste transfer is done exclusively by landfill (Penang Consumers' Association, 2001). The nation has 168 disposal sites, of which only seven are clean landfills. The rest are open dumps and about 80 % of these dumps were overflowed and must be shut down in 2005 (GAIA Global Meeting, 2003). The central government spent RM 20.9 million (around US$ 5.5 million) building 9 clean landfills and updating 27 existing landfills in 34 assigned regions. As the waste age rate is expanding quickly because of urbanisation and high populace development, it leads to the lacking to beat the issue of waste transfer.

Consequently, the state regimes and bureaucratic are currently considering to construct incinerator plants in consequential urban areas and towns. Incineration can possibly take care of the issue of landfilling as the first volume and weight of squanders might be diminished up to 95 percent and 75 percent discretely. This will delay the life expectancy of landfill sites up to 10-20 times. In the Seventh Malaysia Plan (1995-2000), the regime spent RM 17 million (around US$ 4.5 million) to buy 7 mini-incinerators with an inhibition of 5 to 20 ton per day to be worked on the resort islands of Langkawi, Labuan, Tioman and Pangkor (GAIA Global Meeting, 2003). The regime supplementally presented another law on solid waste administration

where the key procedures culls are being grouped in a framework for incorporated waste administration. Inside this framework, there is the accompanying progressive system: squander minimization, reuse, material reusing, vitality recuperation and landfill. Alongside this, the Malaysian regime likewise propelled a reusing effort in December 2000 which sets the long haul focus of reusing 22 percent of the waste engendered by 2020 (Penang Consumers' Association, 2001).

The Malaysian government has made the burning of all clinical waste a national strategy for clinical waste (GAIA Global Meeting, 2003). There are currently five territorial therapeutic squander incinerators with 20-500 kg / hour limits and seven small on-site medical squander incinerators with 20-50 kg / hour limits (Penang Consumers' Association, 2001). Each therapeutic incinerator is based on the squander generators ' premises in order to diminish the treatment and the introduction of clinical waste work.

The primary hazardous squander treatment plant for handling synthetic squander was opened in November 1998, with the exception of emergency clinic and radioactive waste, resulting in a wide range of hazardous squander. In the incineration plant, natural squander is scorched while acidic and fundamental inorganic liquids are presented for synthetic treatment that kills and expels sub-positions, such as chromium and cyanide. Buildups from this treatment and solid inorganic squander are firmly bound with lime and concrete before being stored on a two-layer prepared landfill where waste deposit space should be available for up to 20 years. From 1995 to 1999, a normal of 431,000 tons of planned waste was created annually (Penang Consumers' Association, 2001). Kualiti Alam Sdn. Bhd. is working on this hazardous

waste treatment plant which it is one of private squander management organizations, and squander generators pay for the polluter pays rule-based service.

Malaysia's waste management presents a variety of problems, including low collection inclusion of all things considered due to vehicle detachment from certain areas, unpredictable collection services, lack of waste collection hardware, crude open dumping and burning without air and water pollution control, inadequate legitimate arrangements and resource requirements. Different components that affect the advancement of compelling squander management frameworks in Malaysia result in these issues.

Among these problems are institutional requirements. Despite the fact that few organizations, for example, are associated with squander management by the State Department of the Environment and municipal councils, they regularly have no unmistakable capacity to squander the board and no single office is assigned to facilitate their ventures and exercises. The lack of coordination between the applicable offices regularly leads to duplication of efforts in squander management, squandering of assets, and unsustainability of large-scale squander management programs (World Health Organization Western Pacific Regional Environmental Health Center, 1997).

The absence of viable waste management enactment is incompletely responsible for the offices' not well-characterized elements and the lack of coordination between them. In the case of the illicit dumping of 50 drums of lethal waste near a neighborhood and green in Kelana Jaya, Selangor, on 5 December 2003, and 500 drums of paint ooze and paste dumped unlawfully in a gorge in Ijok, Selangor, in November 2003, this can be unmistakably found (Ben and Tan, 2003). Despite

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existing guidelines where organizations associated with illicit dumping are rejected pursuant to Section 34(b) of the Environmental Quality Act 1974, which imposes a maximum fine of RM 500,000 (including US$ 130,000) or a five-year prison sentence, or both, some organizations use the possibility of inadequate enactment to carry out unlawful dumping as the penalties are typically low. The absolute cost of transferring waste was RM 12 million (about US$ 3.15 million) due to illicit dumping of the paint slime (Ben and Tan, 2003).

Specialized requirements also raise a problem on the grounds that there is an absence of HR in both national and nearby dimensions with specialized skills that are fundamental to a strong waste management arrangement and task. Numerous administrative officers involved in solid waste management in the nearby and national dimension have virtually no specialized foundations or preparations for design or board. Without sufficient prepared staff, there is only a small probability that a task begun by a highly qualified squander management expert can be adequately accomplished. From this, the neighborhood and national dimensions lack generally speaking designs for solid waste management. Therefore, in the general framework for solid waste management, a solid waste innovation is regularly selected without due regard for its property (World Health Organization Western Pacific Regional Environmental Health Center, 1997).

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CHAPTER 3

MATERIALS AND METHODS

3.1 Population and Sample

The study was conducted in UMK Jeli. There are a total number of 2500 students from three faculties, namely Faculty of Earth Science (FSB), Faculty of Agro-Based Industry (FIAT), and Faculty of Bioengineering and Technology (FBKT). The number of participating students in this study was 300 students from the three faculties with 100 students for each faculty was taken based on Krejcie and Morgan Table (Table 3.1). In this study, the stratified sampling technique was used. Stratified sampling is a type of sampling technique in which to complete the sampling procedure the complete population is divided into smaller organisations or strata. The strata are formed on the foundation of some common population data characteristics. The researcher selects the pattern proportionally after dividing the population into strata.

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Table 3.1: Krejcie and Morgan Table of Sample Size Determination

Universe	Sample	Universe	Sample	Universe	Sample	Universe	Sample
10	*10*	100	*80*	1,250	*294*	6,000	*361*
15	*14*	200	*132*	1,500	*306*	7,500	*366*
20	*19*	300	*169*	2,000	*322*	10,000	*370*
30	*28*	400	*196*	2,500	*333*	15,000	*375*
40	*36*	500	*217*	3,000	*341*	20,000	*377*
50	*40*	600	*234*	3,500	*346*	30,000	*379*
60	*44*	700	*248*	4,000	*351*	40,000	*380*
70	*59*	800	*260*	4,500	*354*	50,000	*381*
80	*66*	900	*269*	5,000	*357*	75,000	*382*
90	*73*	1,000	*278*	5,500	*359*	1,000,000	*384*

Source: adapted from Krejcie, R. and Morgan, D. (1970)

3.2 Research Method

Survey method was conducted to collect the data in this study. This method is used to investigate the characteristics, behaviours or opinions of the respondents. These can be used to ask questions about demographic information, including gender, religion, ethnicity, and age. It will also gather information about experiences, opinions, and even hypothetical scenarios. A systematic process of assigning answer to the research question was designed in this study. The questionnaires were distributed to 300 students from the three faculties in UMK Jeli in order to get their responses. This questionnaire will be structured in five parts, which Part A collects the demographic profile of the respondents, and Part B, C, D and E collect the knowledge, awareness, attitudes, and practices on waste management among the students in UMK Jeli respectively for the real and dependable information that will be useful for the study.

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3.3 Data Analysis

The Spearman Rank Correlation or Spearman's Rho analysis was used to analyse the data. This analysis was used because the data collected is an ordinal data. It is the nonparametric version of the Pearson coefficient correlation. The Spearman correlation is a statistical analysis that calculates the strength of the relationship between two variables ' relative movements that is non-continuous. The values vary from -1.0 to 1.0. A calculated number that indicates an error in the correlation measurement is greater than 1.0 or less than -1.0, while 0 value indicates no correlation between ranks. The correlation between attitude, awareness, and knowledge with practices were measured by using this analysis.

3.4 Pilot Test

Before conducting the real survey, pilot study was conducted in order to understand whether the questions in questionnaire are reliable. It is also to make sure the questions that being asked are up-to-date and suitable. Pilot study is a strategy for checking out the questionnaire using a smaller sample compared to the number of sample size planned. The questionnaire is managed to a percentage of the total sample population in this phase of conducting a survey, or in more unofficial instances only to a convenience sample. A pilot study will additionally test the accuracy of the guidelines to be measured with the aid of capability of all respondents in the pilot sample to follow the instructions as directed. It also provides better information as to whether the survey type is effective in meeting the study's objective. Practically speaking, pilot studies save financial resources because if

errors are found early on in the questionnaire, there would be less chance of unreliable or worse outcomes that the survey would need to be repeated.

For this study, 10% of the sample size of 300 students, which are 30 students from the three faculties in UMK Jeli had been collected to take for the test of pilot study. They were distributed the questionnaires and analyzed the results gathered using Cronbach's alpha test. The result was shown in Table 3.2.

Table 3.2: Cronbach's Alpha Results for Knowledge, Awareness, Attitude, and Practices

Variables	Cronbach's Alpha Value
Knowledge	0.764943
Awareness	0.784672
Attitude	0.789546
Practices	0.482802
Total	**0.797713**

Cronbach's alpha is a measure used to evaluate a set of scale or test items ' reliability. In other words, any measurement's reliability refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way to measure the strength of that consistency. The number of test items, interrelationship and dimensionality of the item affect the alpha value (Cortina, 1993). The acceptable alpha values range from 0.70 to 0.95 (Nunnally and Bernstein, 1994; Bland and Altman, 1997; DeVellis, 2003) are reported differently. A low alpha value may be due to a small number of questions, poor interrelationships between items, or

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heterogeneous constructs. For instance, if a low alpha is due to poor correlation between items, some items should be revised or discarded. The easiest way to find them is to calculate the correlation between each test item and the total score test; items with low correlations are deleted (approaching zero). If alpha is too high, some items may be redundant as they test the same question but in a different way. Recommended a maximum alpha value of 0.90 (Streiner, 2003).

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CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Demographic Profile

A total of 300 respondents were surveyed for this study, with 95% females and 5% males, as shown in Figure 4.1. The high number of female students was due to the high female to male student in Universiti Malaysia Kelantan. 39% of the respondents are from the Faculty of Agro Industry and Technology (FIAT), followed by 31% from the Faculty of Bioengineering and Technology (FBKT) and 30% from the Faculty of Earth Science (FSB) (Figure 4.2). Most of the respondents are from the programme of Bioindustrial Technology, SBT (Figure 4.3) and 80% of total number of respondent were final year students (Figure 4.4). The respondents are predominantly Malay students (82%) (Figure 4.5) and Muslims (82%) (Figure 4.6) and also most of the respondents are 22 years old (Figure 4.7).

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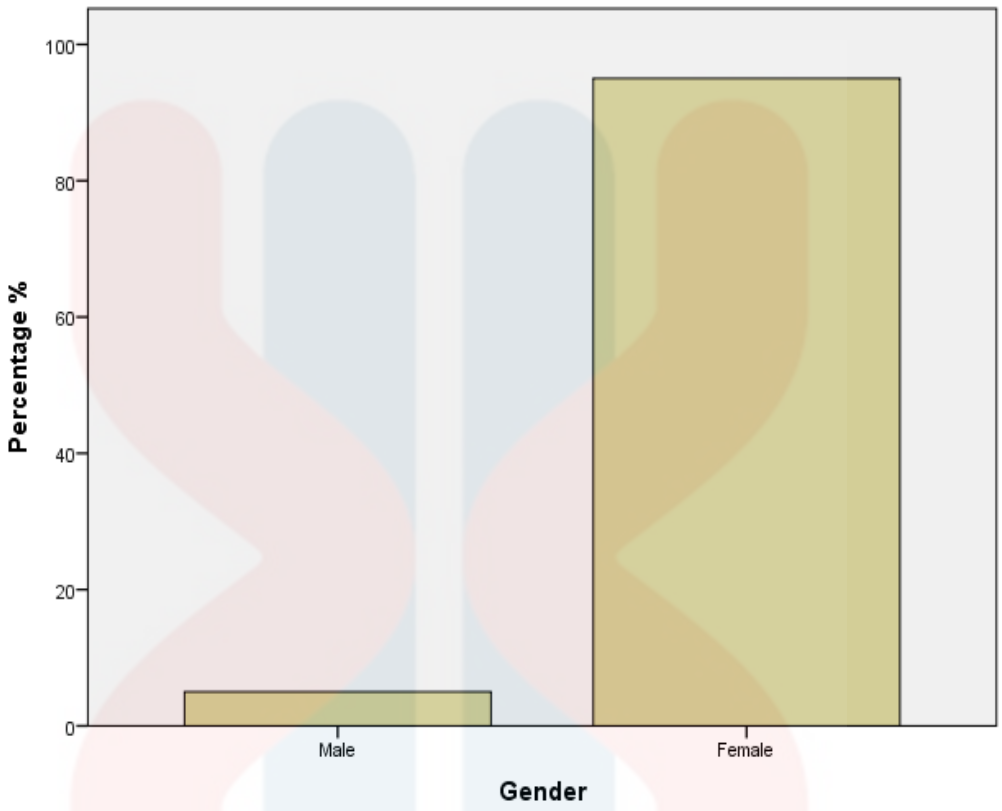

Figure 4.1: Total Percentage of Respondents by Gender

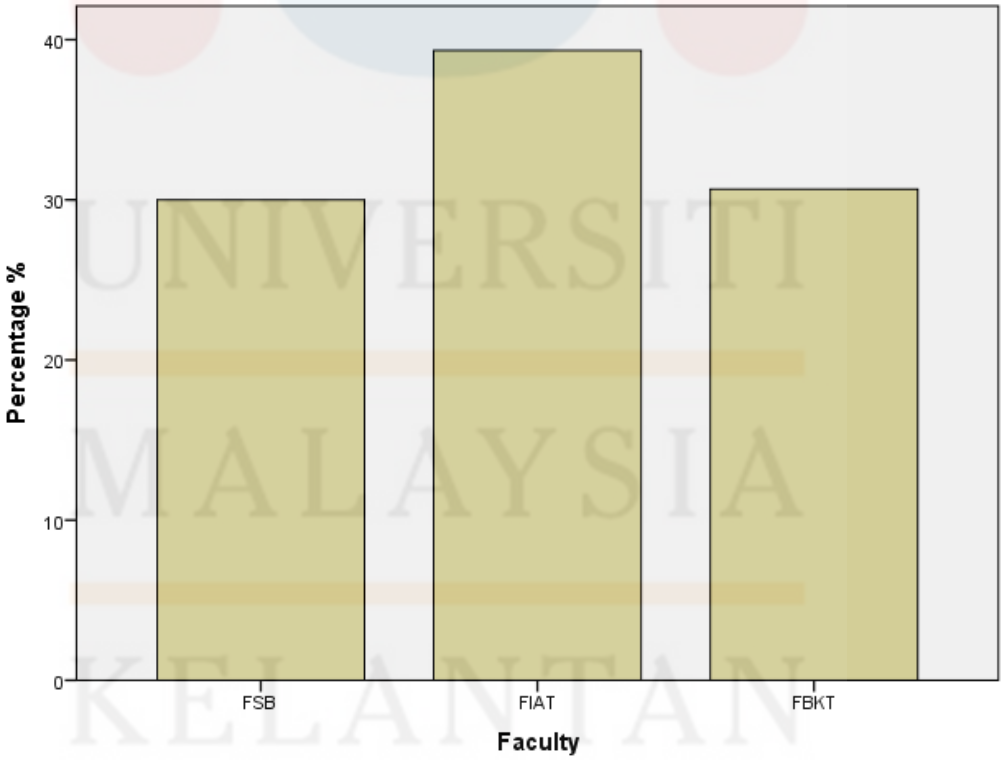

Figure 4.2: Total Percentage of Respondents by Faculty

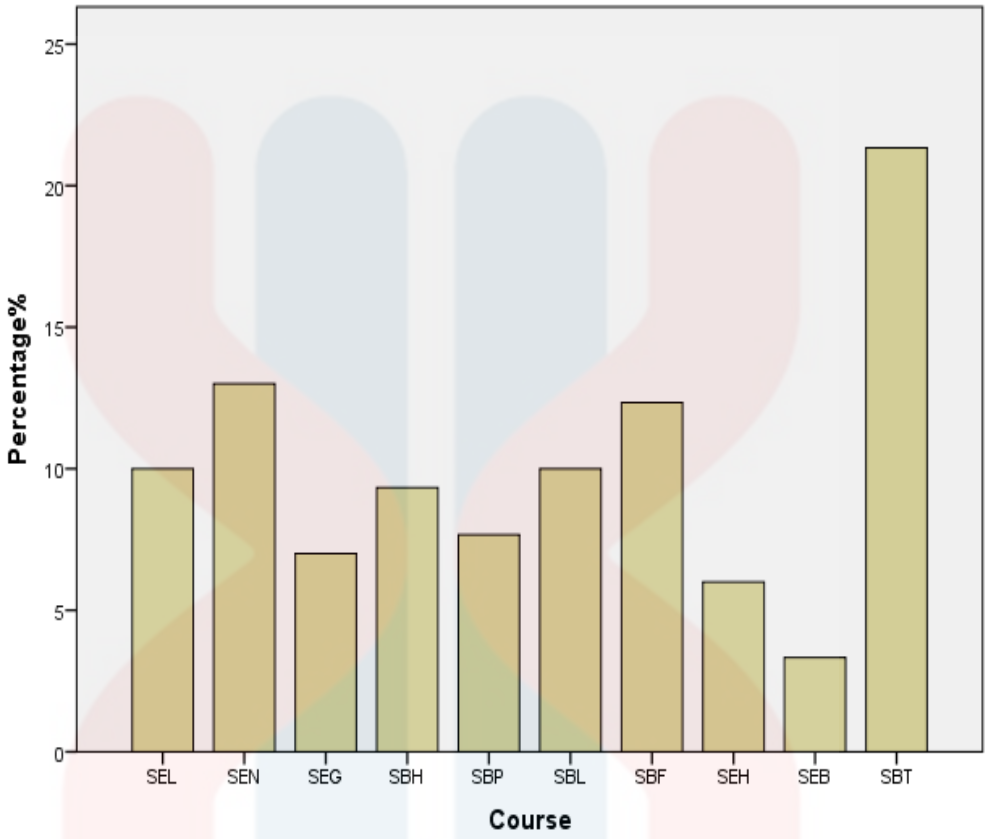

Figure 4.3: Total Percentage of Respondents by Course

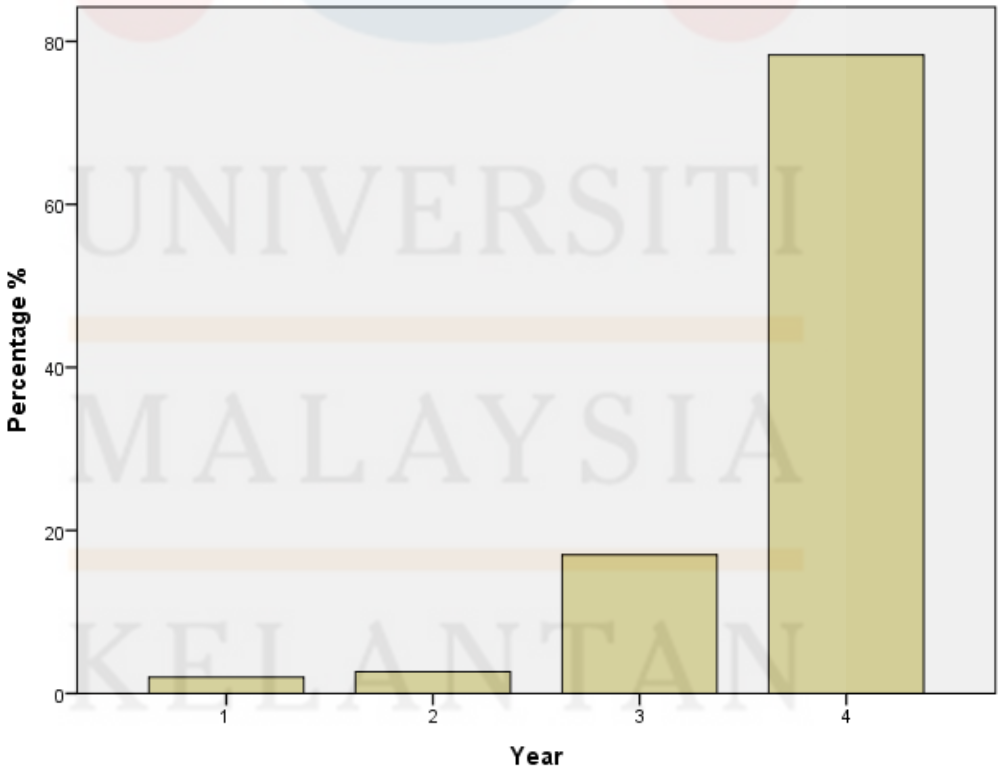

Figure 4.4: Total Percentage of Respondents by Year

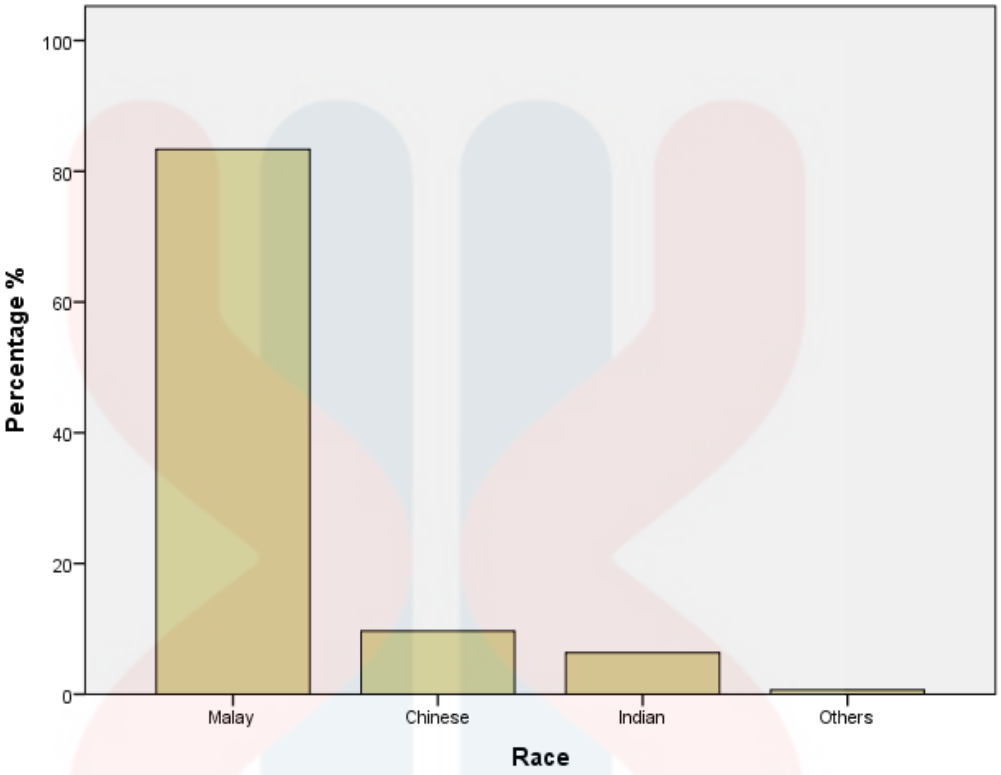

Figure 4.5: Total Percentage of Respondents by Race

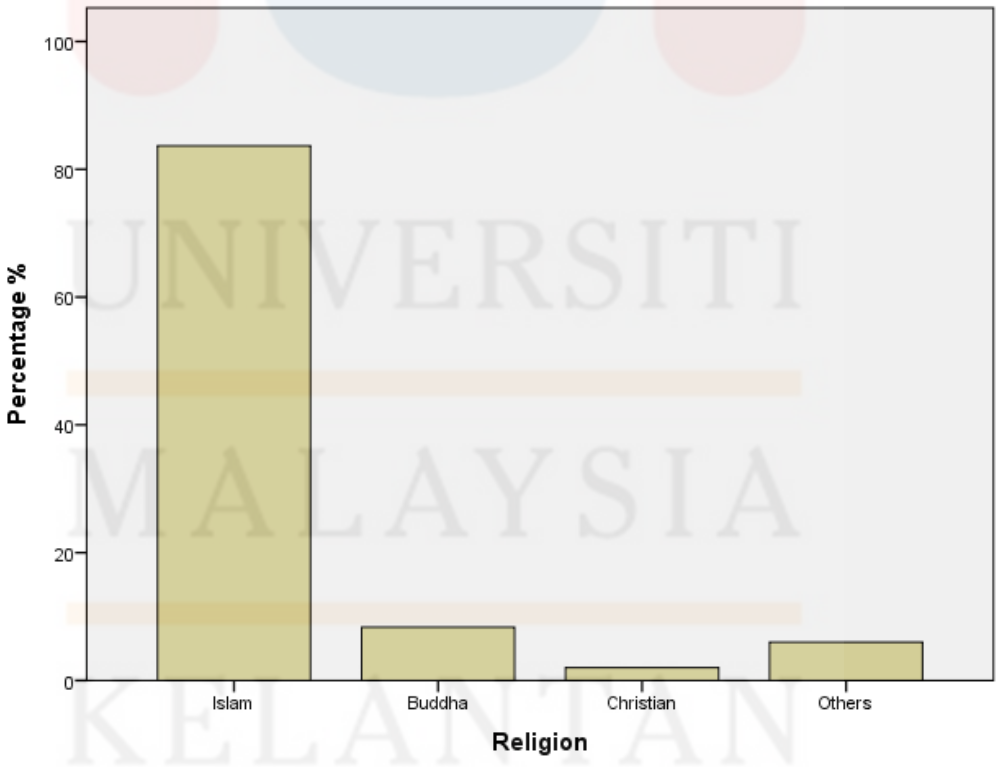

Figure 4.6: Total Percentage of Respondents by Religion

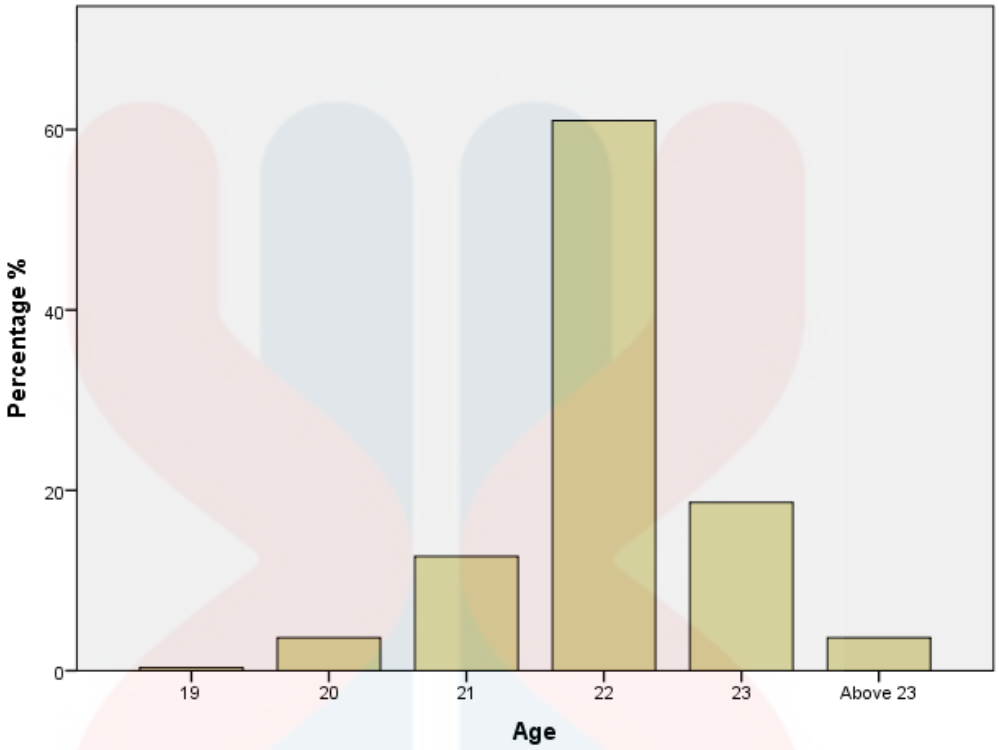

Figure 4.7: Total Percentage of Respondents by Age

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4.2 Assessment on The Respondents' Knowledge, Awareness, Attitude and Practices on The Waste Management

This section presents the results on the assessment of respondents; knowledge, perception, attitude and awareness regarding waste management in UMK Jeli, in Section 4.2.1, Section 4.2.2, Section 4.2.3 and Section 4.2.4 respectively.

4.2.1 Knowledge

Figure 4.8 shows the attendance of respondents on any waste management programmes conducted by local authority and/or the university. More than 40% attended awareness programmes conducted, and there are some (28.7%) who are not sure because there is quite often such these programmes being held in UMK Jeli while 8% did not attend these programmes. Examples of the awareness programmes included 'Cradle to Cradle Programme' and 'Environmental Week'. 'Cradle to Cradle Programme' is a program of collecting recycled things and innovating it into new useful products while 'Environmental Week' is a week of awareness of the environment protection, including the proper management of waste. This kind of awareness programme will give a very huge contribution of knowledge to the students in UMK Jeli about proper waste management and also the initiative that can be taken to recycle something useful and beneficial to the society, ultimately leading to zero waste country.

Besides, the figure also explores if the respondents have knowledge about the effect of improper waste management. The result reveals that the majority of the respondents (48.0%) know about the consequences of inappropriate waste management, while (7.3%) of them were not very sure about their knowledge on the

effects of improper waste management. One of the consequences is health risk such as cholera, typhoid, and malaria which is highly contagious and very dangerous.

Next, the study explored if respondents know about waste segregation. The figure displays that (56.7%) of respondents agree that they know how to segregate wastes according to their categories correctly, while only Urban Well-Being, Housing and Local Government Ministry began implementing Act 672 of the Solid Waste and Public Cleansing Management Act 2007 (SWCorp). The Act makes it obligatory for residents to divide their solid wastes in accordance to classes of paper, plastics, and others or they should face fines between RM50 and RM500. The programme had affected these residing in Putrajaya and Kuala Lumpur, Johor, Malacca, Negeri Sembilan, Kedah, Perlis, and Pahang. It also blanketed the introduction of 120 segregated waste trucks operated by Alam Flora which is a concessionaire of SWCorp. The entire cause of the separation waste programmes was to motivate higher behaviour amongst the public related to the waste management (Edward, 2016). This is also applied at the Faculty of Earth Science (FSB) in UMK Jeli, where three bins with different colours were provided for the students to segregate their wastes according to the right categories. In addition, the study about additionally asked if the respondents recognize about the ideas of waste segregation. It shows that more than 70% mentioned they have knowledge about the ideas of waste segregation to minimise waste.

The study also explored if the respondents are aware that it is important to use protective clothing when handling waste. The protective clothes are very important to ensure the safety and hygienity while handling waste. This is because people are possibly easy to being exposed to the injury and contamination during the handling

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of waste, so the protective cloth is one of the mitigation measures before handling the waste whether domestically or industrially. From the result, more than 80% stated that they are aware of the importance of using protective clothing when handling waste.

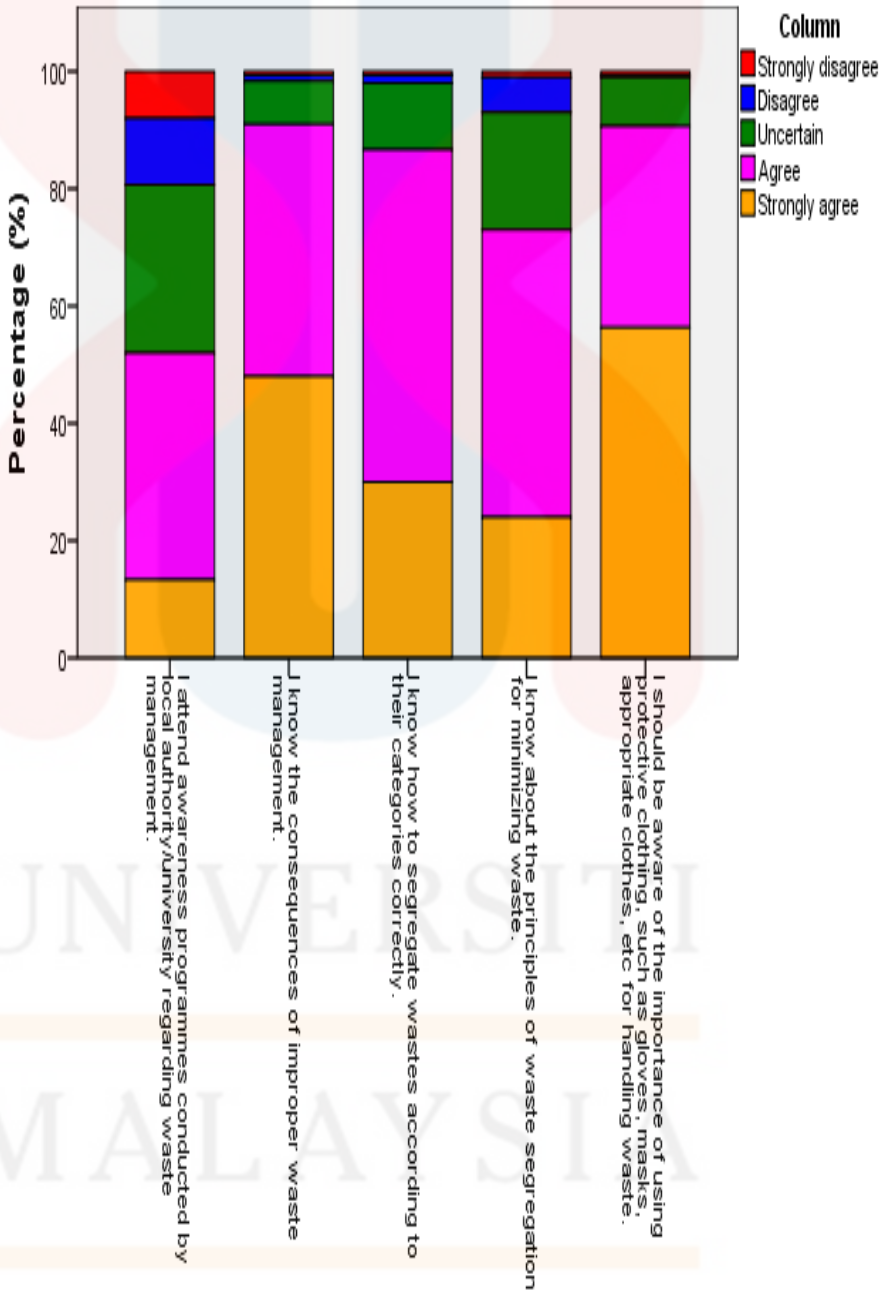

Figure 4.8: Bar Chart of Percentage of Respondents' Feedback on Questions in Knowledge Section

4.2.2 Awareness

Figure 4.9 reveals the consciousness of respondents on the concept of proper waste management. More than 80% agree that they are conscious of the concept of appropriate waste management, and only 0.7% are not aware of it. They are conscious to the theory of appropriate waste management which refers to the many techniques and tactics of dealing with waste at every stage from generation and collection through to final disposal. For example, students from programme of Sustainable Science (SEL) who made a trip to Pulau Burung Sanitary Landfill and learned of the processes of handling waste step by step from the collection process until the waste is dumped into the landfill. Further, more than 90% are aware of the importance of appropriate waste management in order to sustain and protect the environment as shown in the figure.

The study further explored if the respondents are aware of their responsibility for proper collection and disposal of waste. More than 90% are in agreement that they have a responsibility for it. Environment protection is not a responsible for an entity or organization only, but it is a responsible of each individual in this earth since this planet is a place that each one of us lives in and it needs the protection and conservation to ensure it sustainability and long lasting. So, each one of us need to be responsible in protecting it by handling the waste properly from the proper collection until the disposal of waste.

Next, the study explored the respondents' awareness about educating the younger generations about the knowledge of proper waste management and that improper waste management will lead to serious environmental problem. As shown in the figure, more than 90% of the respondents are aware and are in agreement that

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knowledge of proper waste management should be given to younger generations, so as to protect the environment from harm. Educating younger generations about the knowledge of proper waste management is important since youth is the future heritage of this earth, so it is very important for them to be aware about the environment and have the knowledge to manage the waste properly, especially for the students in the university which are the future leader of the country. They need to practice this attitude from a young age so that they can always bring that good attitude into the future. An inefficient waste management will create very serious negative environmental impacts such as land, air, and water pollution, loss of biodiversity, infectious diseases and obstruction of drains.

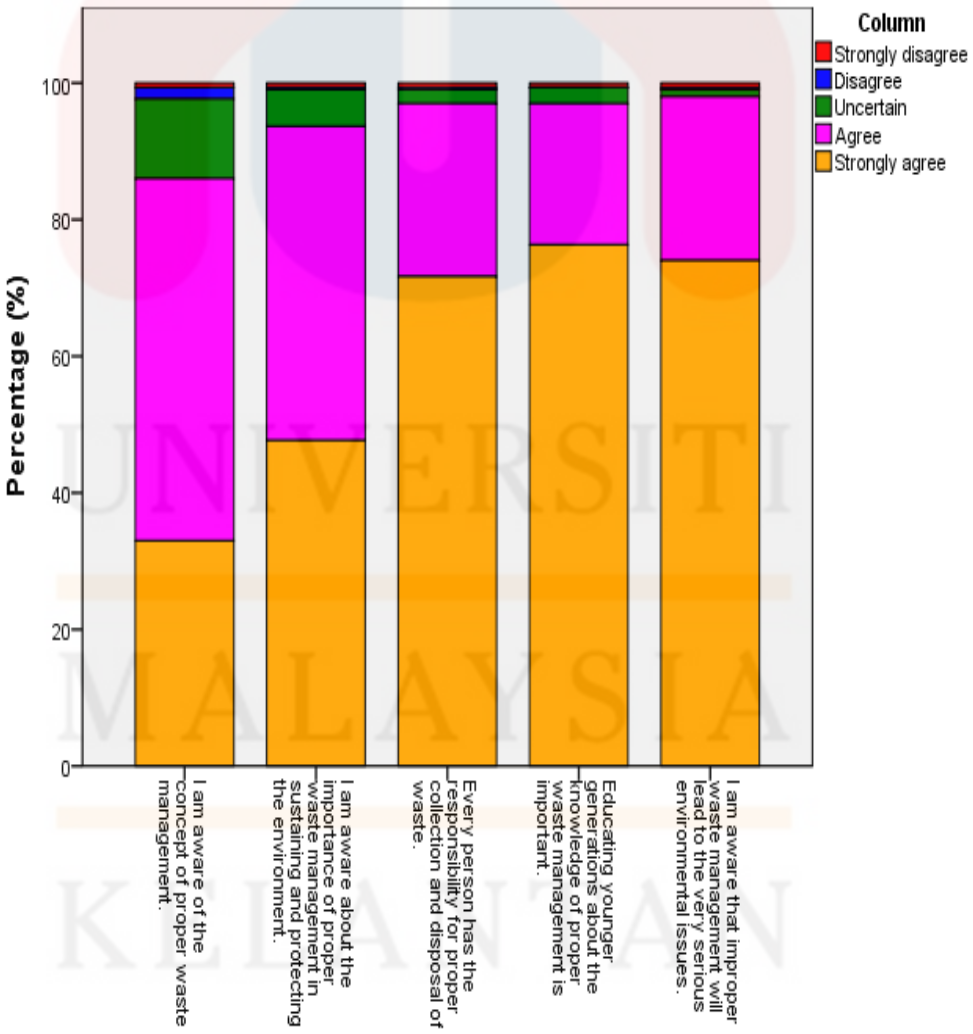

Figure 4.9: Bar Chart of Percentage of Respondents' Feedback on Questions in Awareness Section

4.2.3 Attitude

This section explored the respondents' attitude towards waste management practices. Figure 4.10 displays to a greater extent of 80% of the respondents believe that improper waste disposal is a threat to the environment. For example, there were incidences when the disposal of waste in and near Block A and B in UMK Jeli gave bad sight and odour to the surroundings. When asked if waste management is their responsibility and not just that of the university support staff, more than 70% of them agreed so. For example, in the hostel it is the responsibility of the students to handle their waste properly before being gathered by the cleaner, Otherwise, it will lead to many negative issues that would pose risks on their health and hygiene.

More than 80% of them also agreed that it is important to read and share information on waste management with other students so that each one of them can have the knowledge about the waste management and then are able to perform good waste management practices. In addition to their own responsibility over waste management, almost 80% of them also agree that waste disposal is also the responsibility of the local authorities. Local authorities play an integral role in the management of waste disposal because they are the leader of each state or country so they hold a very big role in ensure the society to also involved in the waste management process. Last but not least, more than 80% of them agree that they are responsible for reminding other students on proper waste disposal (pick and dispose waste) as one of the ways to ensure the cleanliness of the environment in their campus, as shown in the result.

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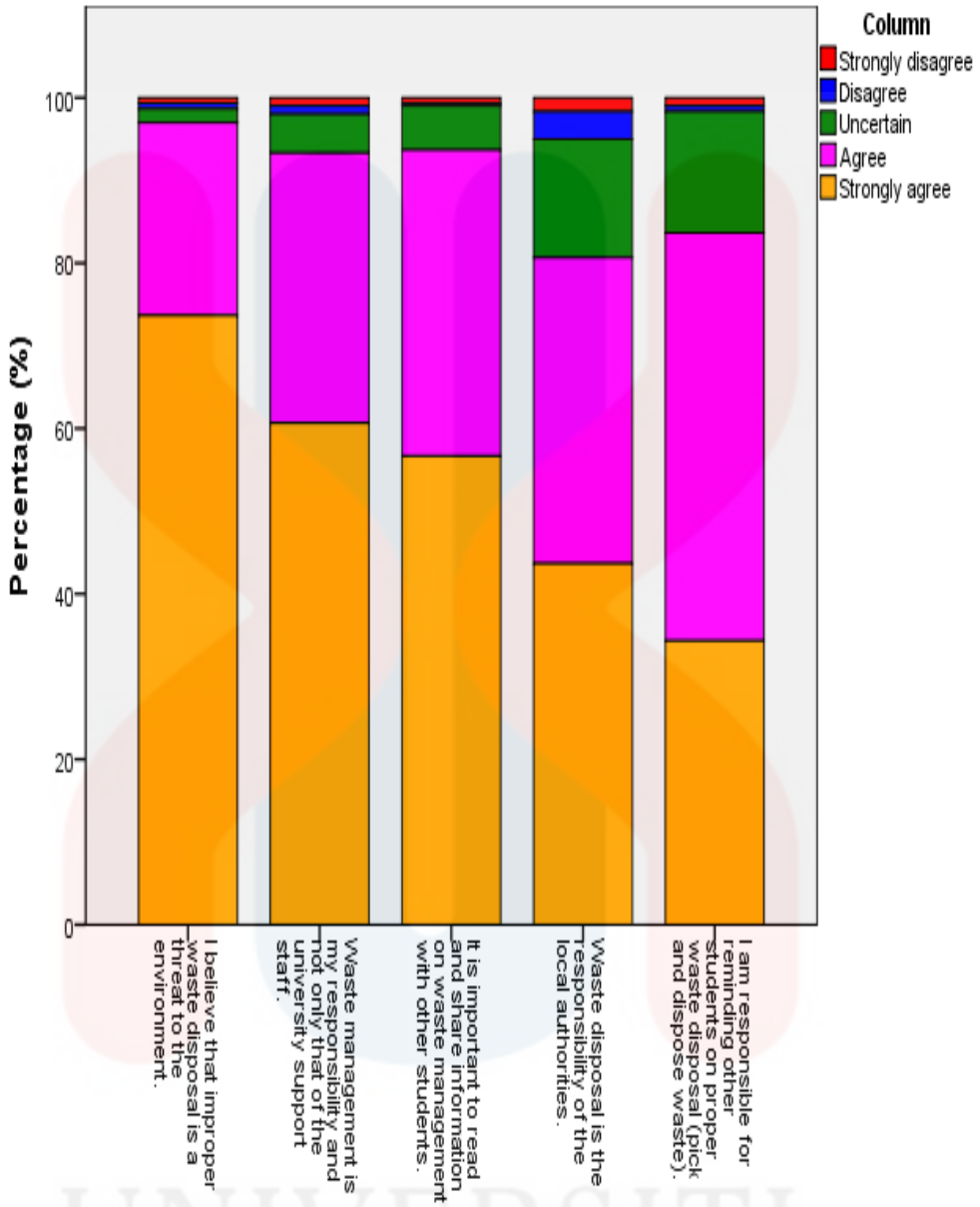

Figure 4.10: Bar Chart of Percentage of Respondents' Feedback on Questions in Attitude Section

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4.2.4 Practices

This section explored the respondents' practice on waste management. The first question asked was if they feel that waste composting is done adequately in the university. 43.3% of them were unsure whether waste composting is adequately done in their campus since such programme was unheard of. The latest one is in the middle of the year of 2019 where students from Sustainable Science (SEL) held a community engagement programme of waste composting with the local people in Taman Muhibbah located in Jeli near the campus.

Next, the study explored about the practices of open burning and incineration. Almost half of the respondents stated that they have not seen occurrences of open burning in the campus, while 30% are unsure and only 5.3% stated that they have seen open burning of waste in the university. Half of them further stated that incineration method of waste disposal should be encouraged by the university as the amount and volume of the wastes can be reduced significantly (up to 90% by volume and 75% by weight) even though it is quite expensive to be installed. On the other hand, more than 90% stated that recycling should be encouraged over other practices, especially before the wastes are disposed of. This is so that waste can be reduced and thereby reducing the consumption of energy and cost for other waste disposal method, but also so that it does not take up a lot of space in the landfill.

Lastly, the respondents were asked if the waste collection and storage method have been carried out effectively on campus. The result shows that about half of them agreed, while 30% of them are unsure, and 15% of them stated that waste collection and storage have not been effectively carried out on campus. This result could be

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shared with the university management to discuss for further improvement to waste management practices of the university.

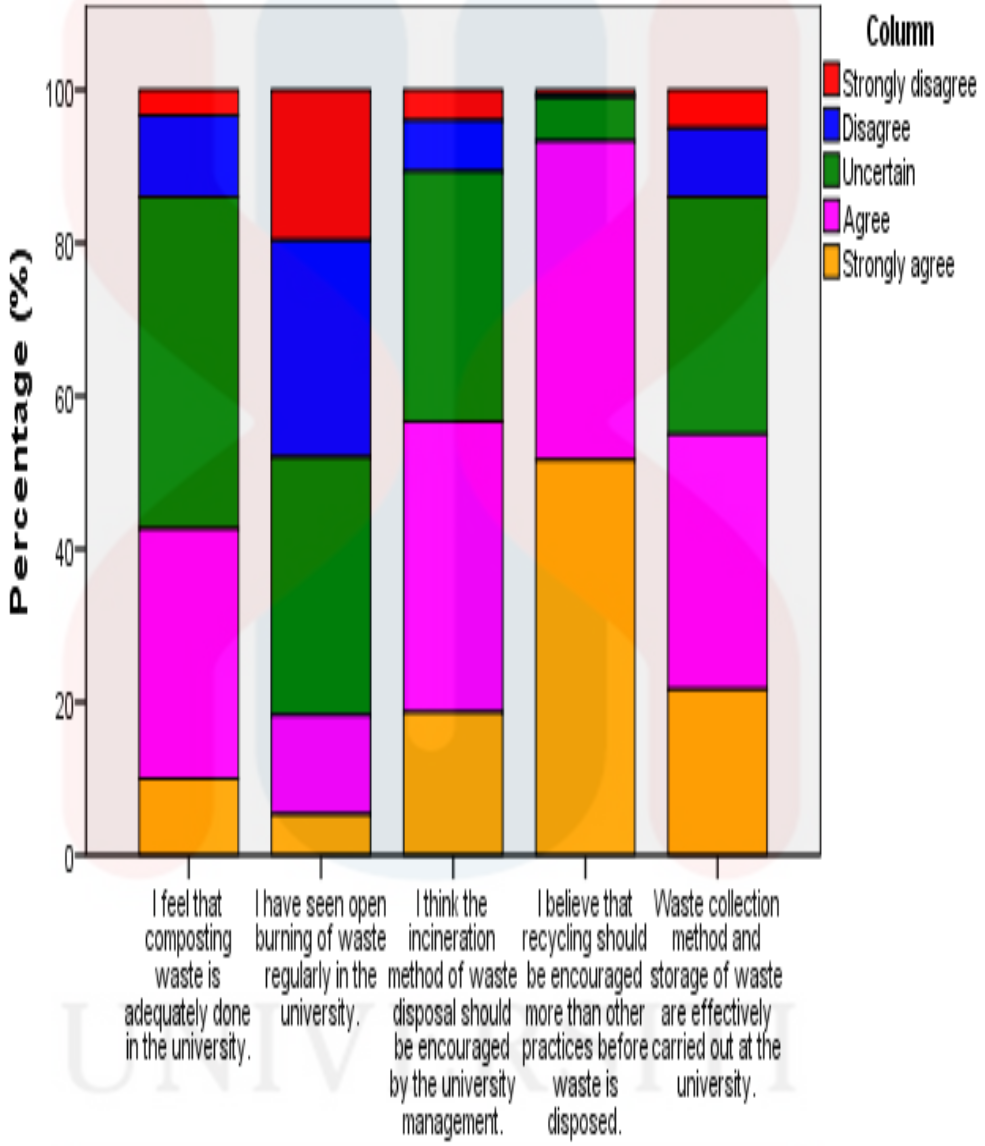

Figure 4.11: Bar Chat of Percentage of Respondents' Feedback on Questions in Practices Section

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4.3 Correlations between Knowledge, Awareness and Attitude with Practices

Table 4.1 shows the correlation between knowledge and practices. There was a weak correlation between knowledge and practices but the correlation between them is significant and are linearly related since the value of the correlation coefficient is very low but has a very small p-value or significant value which is less than 0.05 (r=0.143, n=300, p=0.013). Next, Table 4.2 shows the correlation between awareness and practices and that it was very weak and therefore is not significant as shown by the low correlation coefficient and the p-value is more than 0.05 (r=0.007, n=300, p=0.901). In addition, a weak relationship is also found between attitude and practices as displayed in Table 4.3. Nonetheless, there is a significant relationship between attitude and practices in that the correlation coefficient is very low but the p-value is very small than 0.01 (r=0.233, n=300, p=0.000), indicating a high confidence in the correlation between attitude and practices. These results show and suggest that more effort is needed to enhance the students in UMK Jeli with more knowledge, and to increase their awareness on waste management concept and practices, as well as honing their attitude to practice good waste management practices.

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Table 4.1: Correlations between Knowledge and Practices

Correlations

			KNOWLEDGE	PRACTICES
Spearman's rho	KNOWLEDGE	Correlation Coefficient	1.000	.143*
		Sig. (2-tailed)	.	.013
		N	300	300
	PRACTICES	Correlation Coefficient	.143*	1.000
		Sig. (2-tailed)	.013	.
		N	300	300

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.2: Correlations between Awareness and Practices

Correlations

			AWARENESS	PRACTICES
Spearman's rho	AWARENESS	Correlation Coefficient	1.000	.007
		Sig. (2-tailed)	.	.901
		N	300	300
	PRACTICES	Correlation Coefficient	.007	1.000
		Sig. (2-tailed)	.901	.
		N	300	300

Table 4.3: Correlations between Attitude and Practices

Correlations

			ATTITUDE	PRACTICES
Spearman's rho	ATTITUDE	Correlation Coefficient	1.000	.233**
		Sig. (2-tailed)	.	.000
		N	300	300
	PRACTICES	Correlation Coefficient	.233**	1.000
		Sig. (2-tailed)	.000	.
		N	300	300

**. Correlation is significant at the 0.01 level (2-tailed).

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CHAPTER 5

CONCLUSION

This study aimed to identify the factors that influences student's practices on waste management in UMK Jeli. Overall, the findings show that the effect of the attitude of students towards the practices on waste management is high among those three factors, but their level of knowledge and awareness on the waste management are still low and need to be enhanced. More environmental activities or programmes need to be done in UMK Jeli to ensure the better understanding and awareness among them to manage the waste well and properly.

One of the limitations of this study is some of the target respondents are resist from involving themselves in this study because of different reasons like too busy and do not have enough time to contribute to this study. Other than that, some of them also do not complete this questionnaire according to the time given. They took days to give back the questionnaire. Besides that, some of them also not really aware about the surrounding environment in UMK Jeli such as they themselves unsure whether there is open burning being done in the campus, this limits them from answering the questions properly.

From this study, there are some recommendations for the future. Firstly, it is better if in each environmental programme or activity to has one session of demonstration on how to do the process such as the composting and recycling methods. This is

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important as only by practical will make them understand the activity well, the theory itself does not really helping in doing something.

In conclusion, the results have answering the objectives of this study on the waste management and the objectives have been achieved as knowledge, awareness, and attitude have been identified as the factors that influence the practices on waste management among UMK Jeli students. It also shows that there is a relationship between knowledge, awareness, and attitude towards the practices on the waste management even though some of that factors show a low correlation.

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