UNIVERSITI PUTRA MALAYSIA

KNOWLEDGE, ATTITUDE, AND PRACTICE ON THE IMPORTANCE OF GREEN AREAS AMONG STUDENTS IN UNIVERSITI PUTRA MALAYSIA

DHAMIRAH BINTI YUSOF

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BY

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Thesis submitted in fulfilment of the requirement for the degree of Bachelor of Science in Environmental and Occupational Health with Honours from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

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ABSTRACT

KNOWLEDGE, ATTITUDE, AND PRACTICE ON THE IMPORTANCE OF GREEN AREAS AMONG STUDENTS IN UNIVERSITI PUTRA MALAYSIA

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Introduction: Malaysia has been losing many green areas at a very rapid rate for the last few years; to make ways for housing, employment, transport, infrastructure, and education, especially in the urban area. Concerning this, regardless of academic background, every person needs to have a clear and better understanding of environmental knowledge to develop excellent and functioning urban areas. **Objectives:** This study was conducted to assess the knowledge, attitude, and practice on the importance of green areas among students in UPM, Serdang. **Methodology:** This study is a cross-sectional study that used universal sampling method in recruiting the respondents among final year students in five selected courses. A total of 195 students were participated in this study. A validated and pilot-tested questionnaire was used to obtain information on socio-demographics, general knowledge, knowledge, attitude, and practice of the respondents regarding the importance of green areas. **Results and Discussion:** The findings revealed that students' overall knowledge, attitude, and practice were on the moderate level which were 66.2%, 60.0%, and 69.7% respectively. There was a significant association between both knowledge and attitude with practice and knowledge with attitude. On the other hand, it was also found that there was a significant relationship between courses with the level of KAP of the students. **Conclusion:** The study suggests that students in UPM have a moderate level of knowledge, attitude, and practice toward the importance of green areas. The findings of this study would be useful in providing the responsible bodies in UPM an input needed to design an effective program for the students in the future.

Keywords: Green Area, Urban Green Area, Knowledge, Attitude, Practice, Students

ABSTRAK

PENGETAHUAN, SIKAP, DAN AMALAN TENTANG KEPENTINGAN KAWASAN HIJAU DI KALANGAN PELAJAR DI UNIVERSITI PUTRA MALAYSIA

DHAMIRAH BINTI YUSOF

Pengenalan: Sejak kebelakangan ini Malaysia telah kehilangan sebahagian besar daripada kawasan hijau pada kadar yang sangat pantas untuk memberi laluan kepada kawasan perumahan, peluang pekerjaan, pengangkutan, infrastruktur, dan pendidikan, terutamanya di kawasan bandar. Oleh itu, setiap orang perlu mempunyai pengetahuan yang jelas dan pemahaman yang baik mengenai alam sekitar tanpa mengira latar belakang pendidikan demi membentuk kawasan bandar yang berfungsi dan cemerlang. O**bjektif:** Kajian ini dijalankan bertujuan untuk mengkaji pengetahuan, sikap, dan amalan pelajar tentang kepentingan kawasan hijau dalam kalangan pelajar di UPM, Serdang. **Metodologi:** Kajian ini merupakan kajian irisan lintang yang mengguakan kaedah pensampelan universal untuk merekrut responden dalam kalangan pelajar tahun akhir dalam lima kursus yang dipilih. Sejumlah 195 orang pelajar telah meyertai kajian ini. Boran soal selidik yang disahkan dan dikaji rintis telah digunakan untuk mendapatkan maklumat mengenai sosiodemografik, pengetahuan umum, pengetahuan, sikap, dan amalan responden mengenai kepentingan kawasan hijau. **Keputusan dan Perbincangan:** Penemuan daripada kajian ini mendedahkan bahawa pengetahuan, sikap, dan amalan pelajar mengenai kepentingan kawasan hijau secara keseluruhan adalah pada tahap serdehana di mana masing-masing adalah 66.2%, 69.0%, dan 69.7%. Kajian ini juga mendapati bahawa terdapat perbezaan signifikan di antara pengetahuan dan sikap terhadap amalan serta pengetahuan terhadap sikap. Pada masa yang sama, terdapat hubungan signifikan antara kursus yang diambil oleh pelajar dan aras pengetahuan, sikap, dan amalan mengenai kepentingan alam sekitar **Kesimpulan:** Kajian ini mencadangkan bahawa pelajar di UPM mempunyai aras pengetahuan, sikap, dan amalan terhadap kepentingan kawasan hijau yang serdahana. Penemuan daripada kajian ini sangat berguna untuk menyediakan input yang diperlukan kepada pihak berkepentingan di UPM untuk merangka program yang berkesan untuk pelajar pada masa hadapan.

Kata kunci: Kawasan hijau, Kawasan hijau bandar, Pengetahuan, Sikap, Amalan

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LIST OF ABBREVATIONS

AMI	Acute Myocardial Infraction
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
EE	Environmental Education
FMHS	Faculty of Medicine and Health Sciences
JKEUPM	Ethics Committee for Research Involving Human, University Putra Malaysia
KAP	Knowledge, Attitude, and Practice
NLD	National Landscape Department
NLP	National Development Policy
NPIC	National Property Information Centre

SPSS	Statistical Package for the Social Sciences
UGS	Urban Green Space
UHI	Urban Heat Island
UPM	Universiti Putra Malaysia
US EPA	United States Environmental Protection Agency

CHAPTER 1

INTRODUCTION

This chapter will briefly talk over the background of the study, problem statement, research question, research objectives, hypotheses, conceptual framework, and the definition of variables.

1.1 Research Background

According to the United States Environmental Protection Agency (EPA) (2017), a green area is defined as partially or entirely covered in grass, trees, bushes, or other vegetation. Since the green area issues are more concentrated on the city area that has undergone development, a green area is frequently implied as Urban Green Space (UGS). Generally, these two terms carry the same interpretation; Urban Green Space is more directing to all urban lands, whether private or public space, of any size or function, and can also include small water bodies like ponds, lakes, or streams (WHO, 2017). Evidence demonstrates that living in a greener environment may foster and protect good health and aid in disease recovery and health management. People with higher green space exposure have a range of greater physiological effects (Public Health England, 2020).

As a consequence of the rapid urban expansion, the land cover for green areas has become degraded by 29% since early 2000 (Global Forest Watch, 2021). This past decade, the urban population in Malaysia has risen from 70.9 percent in 2010 to 76.61 percent in 2019 (O'Neill, 2021). This is due to the urbanisation process that occurred recently, where the once rural area has shifted in becoming an urban area. In addition, the migration process in which people relocate from the countryside to the metropolitan region has also contributed to a growing urban population. However, in most developing countries like Malaysia, this hasty population growth will cause the cities to experience unplanned and unmanaged developments (Garg, 2020).

Human overpopulation has become a global concern for the last few years since it has resulted in several adverse effects on the environment. Not only that, but it has also resulted in a series of disaster outcomes by increased demand for the remaining natural resources, especially in deforestation (Singh et al., 2016). A study by Aisyah et al. (2015) proved that deforestation in Selangor was mainly caused by agriculture activity and urban expansion. The population growth increases demand for new housing areas, making the clearing out of the green area like forest deemed inevitable, especially in the urban area. The trend of housing demand in the residential property transaction has continued to climb since 2001 where Selangor dominated the market, accounting more than 24% of total residential property transaction in 2019 (Global Property Guide, 2020). In 2020, Malaysia's National Property Information Centre (NPIC) (2021), reported that more than half of the property market performance in Malaysia is made up of residential transactions.

Thus, urbanisation should be appropriately planned and managed to protect our green area by rights. Proper planning is essential because the green area is also a necessary element for environmental conservation (Nor et al., 2017). Urban green spaces are a nature-based solution that uses urban ecosystem services as ecological management to climate change and urbanisation-related issues (Kabisch et al., 2017). In addition, the green area can act as a crucial health- promoting tool for society to lead a healthier lifestyle and able strengthen the resilience of a city to extreme (weather) occurrences and the consequences of pollution (WHO, 2017; Ernstson et al., 2010; Jansson,2013). Therefore, it is vital to guarantee that expenditure of the green spaces is emphasised and distributed equitably within the city for the better future of our nature.

1.2 Problem Statement

Urban green areas aid the environment by reducing urban heat, balancing greenhouse gas emission, and absorbing flood. Additionally, they provide immediate health advantages by giving urban dwellers opportunities for physical and social connection and facilitating psychological well-being (Lee et al., 2015). A study was done in 2015 by van den Berg also mentioned that exposure to green surroundings has significantly reduced the risk of chronic and non-communicable diseases like cardiovascular diseases. Interaction with green space has the ability to reduce the possible health risk by helping the urban people in the way of stress reduction, attention restoration, and extended physical activity.

Even with the existing legislation regarding the green areas, Malaysia still confronts many critical problems, mainly on deforestation, resulting from uncontrolled development (WWF, 2014). In 2010, Malaysia had 20.3 Mha of natural forest. Unfortunately, according to the Global Forest Watch (2021), Malaysia has lost over 8.39 million hectares of tree cover, equivalent to a 29% drop since early 2000. Destruction of natural green spaces such as forest to make way for urbanisation would undoubtedly have a detrimental effect on ecosystem services, cultural association, psychological well-being, and health of the urban people (Nor et al., 2017).

However, the majority of the population continue to be unaware of the value of the environment, particularly the greenery land covered. A previous study by Tiong et al. (2020) revealed that the student's knowledge regarding the environment, in general, is only on the average level depending on their age, educational background, and academic field of study. Furthermore, another study found that attitudes toward nature are strongly connected to whether people acquired general or particular environmental knowledge about the environment (Paço & Lavrador, 2017).

1.3 Study Justification

As we all know, Malaysia has been losing a large amount of green area at a very rapid rate for the last few years; to make ways for housing, employment, transport, infrastructure, and education, especially in the urban area. Even though this situation is considered unavoidable, at this rate, multidisciplinary collaborative system thinking is crucial to come out with comprehensive and holistic planning to preserve the remaining green areas before all the green area in this country is being over-exploit uncontrollably. Concerning this, regardless of academic background, every person needs to have a clear and better understanding of environmental knowledge to develop excellent and functioning urban areas.

Green area is a beneficial tool for the students' well-being in terms of education performance, social well-being, mental and physical health, and the sake of nature itself. So, for this study, the students at University Putra Malaysia (UPM) were chosen

as the study population. Universiti Putra Malaysia, Serdang is located in an urban area and will be indirectly affected by the urbanisation process. The finding from this study will be able to provide baseline knowledge attitude and practise on the importance of green areas among the UPM students.

Additionally, according to the Universiti Putra Malaysia official website, UPM had successfully ranked as a Top 30th in the UI-Greenmetric World University Ranking globally and led other universities in Malaysia for eleven consecutive years (hairul_nizam, 2020). UPM is covered by 1,800 hectares of green areas. With the existing green recreational facilities like Expo Hill, Ayer Hitam Forest Reserve, Golf course, as well as equestrian that are freely accessible by the students. A study done in 2015 claimed that accessibility was regarded as a more reliable indicator of intention to utilise green areas (Wang et al., 2015). Thus, it is wise to assume that the UPM students strongly bond with the green areas. Therefore, UPM students could easily access the green area within the UPM and are well associated with nature.

The respondents for this study will consist of students from the Faculty of Medicine and Health Sciences. All five courses from health sciences field are chosen from the Faculty of Medicine and Health Sciences are; Bachelor of Science Biomedical Sciences, Bachelor of Science Dietetic, Bachelor of Science Nutrition and Community Health, Bachelor of Science Environmental and Occupational Health, and Bachelor of Nursing. Generally, all these five courses have an overlapped courses outline as well as involved with human health while having different study focus.

However, among all these five courses, Bachelor of Science Environmental and Occupational Health is the only course that received a comprehensive environmental education.

By doing this, comparison can be done on the level of KAP between these five courses and see if the general environmental and specific environmental knowledge affects one's awareness of the importance of green areas. This study is deem to be necessary as it can become a baseline data for the knowledge gap within the environmental and non-environmental students as well as provide an inputs needed for the design of an effective programs to ensure the sustainability of green areas in UPM.

1.4 Conceptual Framework

Figure 1.1 below shows the conceptual framework of this study. A conceptual framework is an analytical tool used for a better understanding regarding this study research procedure. The framework offers all variables that will be included in this study. It also conveys the research outlines and will indicate the scope covered in this research on the KAP on the importance of green area.

Basically, green areas can be categorised into two areas which are urban areas and rural areas. However, the focus of this study is mainly on the urban green area like a recreational park. The study subject includes all the undergraduate final year health sciences students from the Faculty of Medicine and Health Sciences, UPM. Hence, the courses that will be involved are Bachelor of Science (Biomedical Sciences), Bachelor of Science (Dietetic), Bachelor of Science (Nutrition and Community Health), Bachelor of Science (Environmental and Occupational Health), and Bachelor of Nursing.

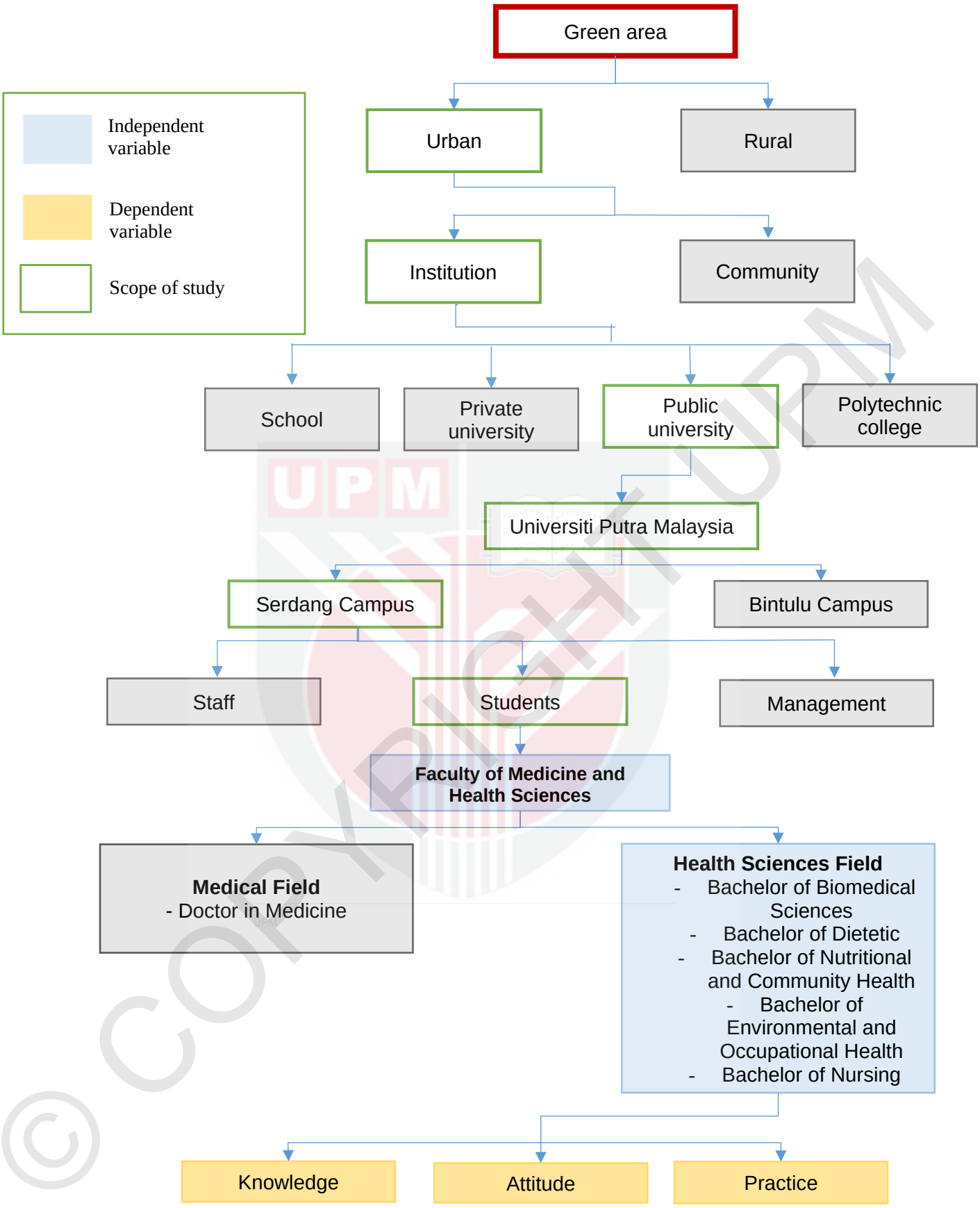

Figure 1.1: Conceptual Framework

1.5 Research Question

1) What is the level of knowledge, attitude, and practice on the importance of green areas among students in UPM?

2) What is the distribution of UPM students based on socio-demographic information and the source of information regarding the green area?

3) What are the association of socio-demographic information and knowledge, attitude, and practice on the importance of green areas?

4) What is the association of knowledge, attitude, practice on the importance of green areas?

1.6 Research Objective

1.6.1 General Objective

To assess the knowledge, attitude, and practice (KAP) on the importance of green areas among students in UPM, Serdang.

1.6.2 Specific Objective

i) To determine the level of knowledge attitude and practice among students.

ii) To determine the association of the students' socio-demographic and their KAP on the importance of green area.

iii) To determine the association of knowledge, attitude, and practice on the importance of green area.

iv) To compare the level of KAP on the importance of green area between the five different courses.

1.7 Research Hypotheses

i) There is a significant association between socio-demographic factors with the students' knowledge, attitude, and practice.

ii) There is a significant association of knowledge, attitude, and practice on the importance of green area.

iii) There is a significant difference between knowledge, attitude, and practice on the importance of the green area between five different courses.

1.8 Definition of Terms

1.8.1 Conceptual

- Knowledge

Understanding of or information about a subject gained via experience or study, whether known to a single individual or a large group of people (Cambridge Dictionary, 2021).

- Attitude

A sentiment or attitude regarding something or someone, or a particular manner of acting (Cambridge Dictionary, 2021).

- Practice

Something that is frequently or routinely done, frequently as a result of a habit, tradition, or custom (Cambridge Dictionary, 2021).

- Green area

Is the land partly or wholly covered with grass, trees, shrubs, or other vegetation, including parks, community gardens, and cemeteries (US EPA, REG 01, 2017).

- Students in University Putra Malaysia

A person who is learning at University Putra Malaysia on campus Serdang (Cambridge Dictionary, 2021).

1.8.2 Operational

- Knowledge

The knowledge is characterised by the set of understandings, knowledge, and science on the importance of green area, which will be determined by using a self-administrated questionnaire regarding the importance of green area.

- Attitude

The attitude can be defined as the manner, disposition, feeling, position, or the perception of the subjects towards the importance of the green area and how they act towards certain conditions. This will be resolved by the questionnaire that will be distributed to the participants.

- Practice

A practice referred to the participants' long-term behaviour as a mitigation step towards the green area. The level of practice will be measured using a questionnaire.

- Green area

Green area is the greenery parks within the university areas covered with vegetation, including trees and grass.

- Universiti Putra Malaysia students

The final year of undergraduate students studying in the Bachelor of Biomedical Sciences, Bachelor of Science Dietetic, Bachelor of Science Nutrition and Community Health, Bachelor of Science Environmental and Occupational Health, and Bachelor of Nursing in University Putra Malaysia, Serdang, Selangor.

CHAPTER 2

LITERATURE REVIEW

This chapter will highlight the characterisation of the indoor air pollutant parameters, the possible indoor sources of the pollutants, and the possible health risk associated with exposure to indoor air pollutants. This literature review was extracted from previous research and articles related to indoor air pollutants.

2.1 Definition of Green Area

As defined by the United States Environmental Protection Agency (EPA) (2017), a green area is partially or totally covered in grass, trees, shrubs, or other vegetation. Meanwhile, Public Health England (2020) characterises the green space as any vegetated, urban, or rural environment. This category includes both public and private spaces such as parks, gardens, playing fields, children's play areas, woods, and other natural areas, grassed areas, cemeteries and allotments, green corridors, abandoned railway lines, rivers and canals, and derelict, vacant, and contaminated land with the potential to be transformed. Muratet et al. (2015) explain that urban green space is an area covered by lawns, small bushes, and scattered trees which consist of a playground and park around the artificial lake, that surrounded by a rocky and prominent island with cliffs connected by many small paths. However, a study describes the green area in the urban setting as the vegetation coverage that is directly detectable by remote sensing techniques (De Carvalho & Szlafsztein, 2019).

Therefore, generally, a green area can be considered any land in the urban or rural area wholly or partially covered with vegetation like trees, grass, or shrub. Thus, urban green space results from both formally and informally green covered areas in the cities expanses. Formally, green areas consist of parks, community gardens, cemeteries, schoolyards, playgrounds, public seating areas, public plazas, and vacant lots. Yet, less maintained, and less modified indigenous vegetation types, in addition to particular urban ecosystems, such as abandoned industrial areas, overgrown gardens, and other brownfield areas, can also be considered as green areas.

2.2 General Overview of Green Area

Urbanisation generates significant ecological changes in landscape functioning, progressively leading to new landscape designs and a difference in the spatial organisation (Qureshi et al., 2010). These rapid changes have limited the access of the urban dwellers to nature and can increase exposure to specific environmental hazards, such as air and noise pollution (Dias &Tchepel, 2018, Wu et al., 2019). The loss of urban vegetation relates to ecosystem services for air quality reduction, air pollution reduction and climate regulation (De Carvalho & Szlafsztein, 2019). Urban green space comprises green corridors, woodlands, gardens, and playgrounds and even "right, unoccupied and contaminated land with transformation potential." (Bush, 2020).

Nature-based solutions, such as green spaces and other nature-based solutions, provide new methods to improve the quality of urban environments, enhance local resilience, and promote sustainable lifestyles, increasing the health and well-being of urban populations (WHO, 2017). Unfortunately, the benefits deriving from urban ecosystems are not always explicit or evident to the urban residents since not all of these can be sensed immediately by human senses. However, to assess the perceived worth and quality of existing urban green spaces, the benefits of the ecosystems must be recognised by urban citizen (Buchel & Frantzeskaki, 2015).

2.3 The Importance of Green Area to Human Health

Green areas such as public and private parks, playgrounds and plants provide a significant component for boosting local resilience and supporting sustainable lifestyles, benefiting both urban health and well-being. Everyone can benefit from urban green space. It also supports health and well-being through stress relief and relaxation, physical activity, better social contact, and cohesion with the community. The health advantages include enhanced mental health, fitness, cognitive and immunological function, and decreased mortality rates (WHO, 2017). In addition, many epidemiological studies have shown several favourable health impacts in urban green areas, including reduced depression, and enhanced mental health, decreased cardiovascular morbidity, better pregnancy and reduced obesity and diabetes (Kabisch et al., 2017).

Physical inactivity is one of the world's foremost risk factors for chronic illnesses affecting people, communities, and countries like obesity and diabetes. There is increasing evidence that the urban environment might impact levels of physical activity. Research has established indicating links between urban green space availability and physical activity levels (Lee et al., 2015). The lack of access to green space has become a barrier for people to visit green space. A recent study indicates that the number of parks in an individual's community is a consistent predictor of neighbourhood park use and physical activity across several circumstances, particularly for adults (Hughey et al., 2021).

Green space has also been associated with reducing the risk of cardiovascular disease (CVD). According to a recent study, those who lived in locations with more green space coverage had a lower risk of cardiovascular disease (CVD), coronary heart disease (CHD), acute myocardial infarction (AMI), total stroke, and ischemic stroke (Seo et al., 2019). Some hypotheses have been advanced to explain the association between cardiovascular health and green space use (James et al., 2015). Greenery and parks in neighbourhoods may stimulate physical activity (Dadvand et al., 2015).

Furthermore, cross-sectional data indicate that residing nearer to green areas such as parks is linked to less mental anguish (White et al., 2013). Mental health illness and well-being have become a concerning issue for every policymaker and public health practitioners. By 2020, mental illness should be Malaysians' second-largest health burden after heart disease (UM SPECIALIST CENTER, 2020). In addition,

there is a finding from a study mentions that green space provides the most protection against mood disorders, depression, neurotic behaviour, and stress-related problems (Green Space is Good for Mental Health, 2019).

2.4 The Effect of Green Area on The Environment Health

Rapid urbanisation has been distorting urban climate change (Yan et al., 2018). This global heating is mainly caused by the displacement of the trees and forestation into concrete buildings, developing a phenomenon called Urban Heat Island (UHI). Urban Heat Island can be referred to as an occurrence of higher air and surface temperatures in urban areas compared to those in the surrounding rural areas (Buyadi et al., 2015). This situation will negatively affect cities' habitability, intensify air pollution, and causes ineffective energy consumption of buildings for cooling purposes during hot weather. In addition, an increase in temperature could also causes detrimental health effect of the human, not only physically, but also physiologically, psychologically, and behavioural factors (Klemm et al., 2015).

A previous study has claimed that planting trees in a city could offer a cooling effect to those specific areas. For example, the survey in Wangchunyuan residential area in Beijing, China, shows that, on average, the cooling effect of vegetation was 1.92 °C at maximum within the vegetation area (Wu et al., 2016). The reduction in temperature in the greenery park is suggested due to the transpiration of trees, the low fraction of hard surfaces, and longwave radiation from surfaces in the parks (Yan et

al., 2018). Additionally, the tree canopy cover and upwind vegetation cover were significantly affected by the parks' thermal condition, making it less warm. A study in Malaysia also supported this concept by declaring mature trees and other vegetation such as grass-covered surfaces able to moderate the urban thermal environment.

The growth in noise pollution at alarming rates is one of the results of urbanisation. (De Carvalho & Szlafsztein, 2019). Noise pollution is a significant issue in many cities' environmental problems, which have crucial human health effects. Transportation system components are an important source of noise pollution (Koprowska et al., 2018). For example, household noise levels near the bridge substantially exceed the national guideline (Wu et al., 2019). Increasing the amount of green space can act as a natural buffer against the negative impacts of living in an urban setting. Generally, the higher the green space percentage in a buffer, the stronger the link between green space cover and objective sound level. This might imply that a high density of green areas limits the amount of site accessible for noise sources, which in turn decreases the noise intensity (Koprowska et al., 2018).

Air pollution from vehicle emissions is one of the world's most critical concerns and had posed a significant danger to the environment and the health of living beings, particularly in urban areas (Kaur & Nagpal, 2017). Vegetation impacts the quality of local and regional air by modifying the urban atmosphere. The trees planted in urban areas influence air quality in terms of air temperature decrease and the elimination of air pollution. Plants are the primary recipients of many sorts of

pollutants and help clean the environment by functioning as a vast sink. Plants may adsorb, absorb and collect contaminants on their leaves' surface. Based on its sensitivity level, the leaf is most vulnerable to air pollution and might display various visual alterations. (Chavan & Sonwane 2012)

2.5 Policy and Law in Malaysia on Green Area

In general, Malaysia's land use planning is governed entirely by the Town and Country Planning Act 1976 (Act 172) and its revisions in 1995 (Act A933) and 2001 (Act A1129). Planning's responsibility is to ensure that land uses are compatible and sustainable throughout several components of the development process, including the provision of open spaces, green spaces, and recreational places.

The National Landscape Department (NLD), founded in 1996 under the Ministry of Housing and Local Government, is another significant policy actor. The NLD is a road map for developing the national landscape, comprising strategic policies and action plans that spark the National Development Policy (NLP). To become the Beautiful Garden Nation by 2020, the NLP is planned to propel the country toward a comprehensive quality of life while also highlighting Malaysia's distinctive landscape character.

One of the NLD strategies is to educate and instil public awareness to appreciate the landscape. This strategy can be accomplished by enhancing the present landscape education system to make it more effective, comprehensive, and competitive to meet society's requirements, increase public awareness, and develop a landscape culture through official education and promotion. Other than that, the different strategy that contended in NLD is to create an urban landscape that is distinctive and its landscape characteristics, harmonious, and sustainable in its use of natural sources and socio-cultural resources. This can be achieved by executing the action plans of designating at least 30% of urban development areas as green areas and establishing a green network by planting shade trees in metropolitan areas, along roadways and rivers, as well as in parks as public spaces and can be quickly and openly access by the community (National Landscape Department Ministry of Housing and Local Government, n.d.).

2.6 Preservation of Green Area

The value of trees and green space for environmental health goes beyond the conservation of forests and violates cities' borders. (De Carvalho & Szlafsztein, 2019). In attempts to conserve green spaces, strengthening the participation of government institutions, such as local authorities, is necessary. Local authorities have a crucial role in creating inclusive and equitable new, high-quality green space, upgrading, preserving, and conserving existing green space, and enhancing green infrastructure in public areas.

However, the local government has tremendous issues when it comes to supporting the upkeep and financing of their existing green infrastructure. Local governments no longer have the funds to preserve the current landscape, because they need to focus on the effects of environmental concerns; notably frequent floods which have always been a challenge for the city (Ibrahim, 2016). Sufficient funds for green management are therefore necessary to safeguard the green area.

CHAPTER 3

METHODOLOGY

This chapter will be discussed about the method and the instrumentation used in the study. This chapter will cover the study design, study location, and sampling used in choosing the respondent, data collection, and data analysis.

3.1 Study Design

For this study, a cross-sectional comparative study design was carried out between students focusing on their knowledge, attitude, and practice on the importance of green areas among the health sciences students of Faculty of Medicine and Health Sciences (FHMS) in UPM.

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3.2 Study Location

The study was conducted in the Universiti Putra Malaysia, Serdang, Selangor, where one faculty chosen out of fifteen faculties available in the UPM Serdang campus. The faculties chosen were based on the purposive sampling method. The selected faculties were Faculty of Medicine and Health Sciences (Figure 3.1).

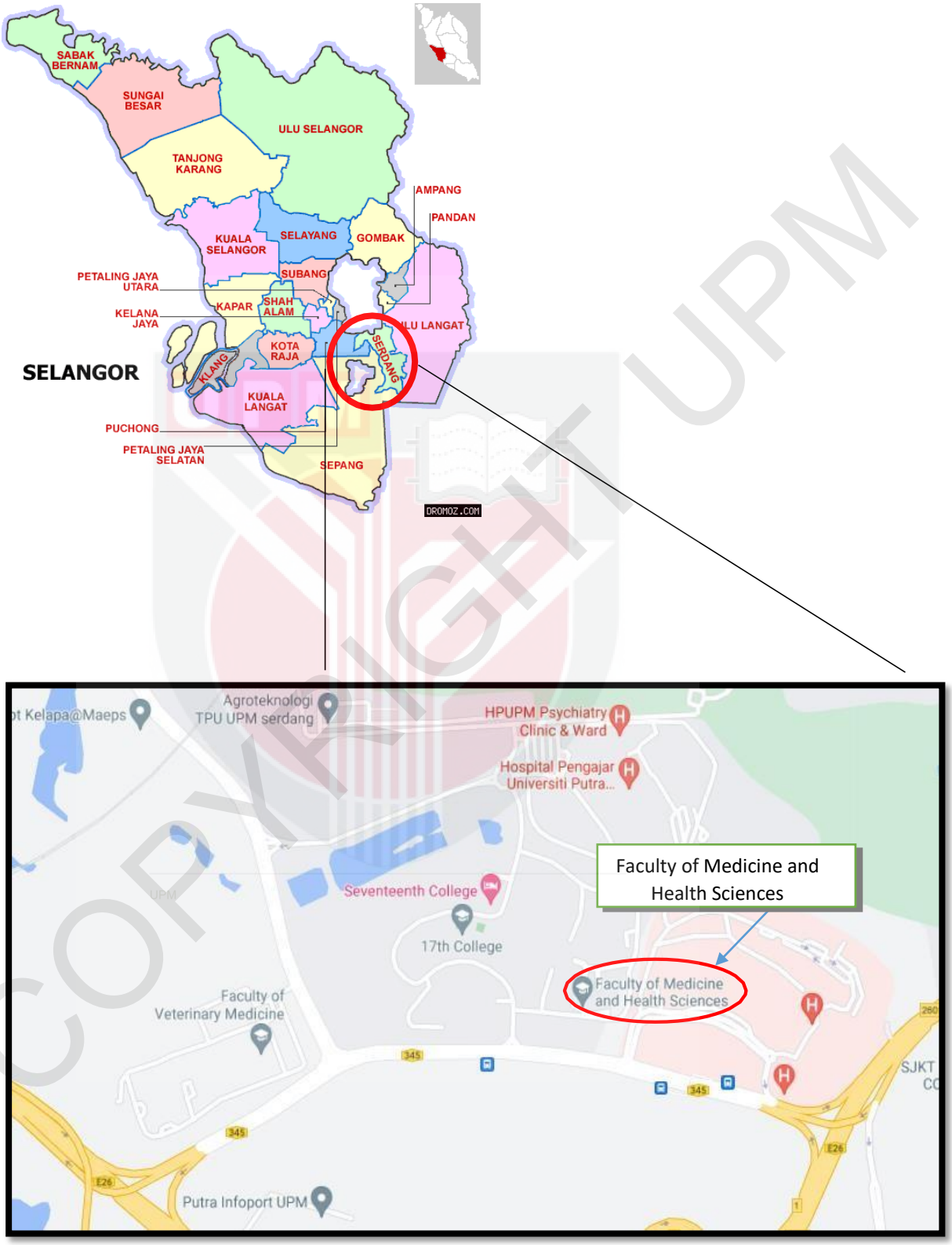

Figure 3.2: Study Location

3.3 Research Flowchart

This study was conducted once receiving approval from the Ethics Committee for Research Involving Human, University Putra Malaysia (JKEUPM). It was then proceed with data collection by distributing a set of an online questionnaires to the involved students. After the data collection, the data was further analysed using SPSS version 22.0. The research procedure is summarised as presented in Figure 3.2.

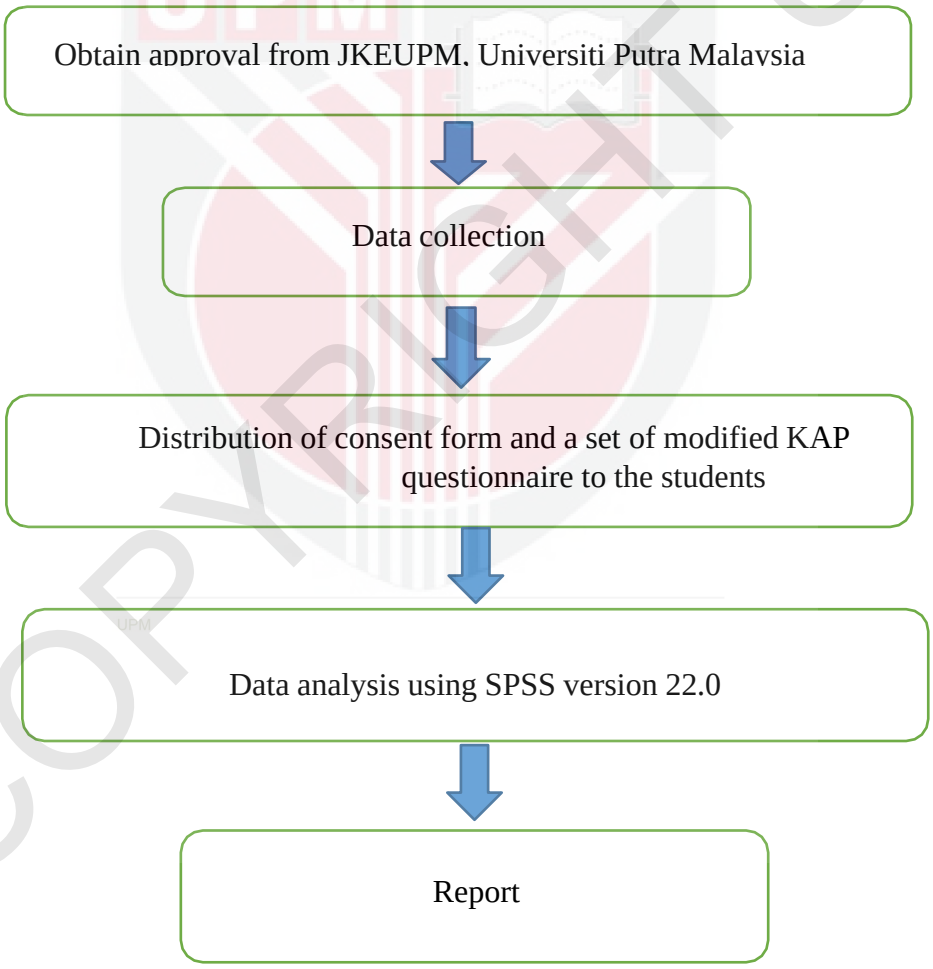

Figure 3.2: Resaerch Flowchart

3.4 Study Duration

The study was conducted for 10 months which is from March 2021 until December 2021.

3.5 Sampling

3.5.1 Sample Population

The sample population for this study involved all the final year undergraduate students of Bachelor of Biomedical Sciences, Bachelor of Science Dietetic, Bachelor of Science Nutrition and Community Health, Bachelor of Science Environmental and Occupational Health, and Bachelor of Nursing.

3.5.2 Sampling Frame

An updated name list of students in the selected courses of Faculty of Medicine and Health Sciences were obtained from the Academic Division.

3.5.3 Study Unit

The sampling unit for this study is all final year of health sciences courses from the Faculty of Medicine and Health Sciences, University Putra Malaysia. The selection criteria are as below ;

Inclusion Criteria

- Undergraduate students.
- Final-year students.
- Students of Faculty of Medicine and Health Sciences, UPM.
- Study in Bachelor of Science (Biomedical Sciences), Bachelor of Science (Dietetic), Bachelor of Science (Nutrition and Community Health), Bachelor of Science (Environmental and Occupational Health), and Bachelor of Nursing.
- Full time students
- On-campus or Off-campus students.

Exclusion Criteria

- Study in Doctor Medicine.
- Students in first, second, and third of selected courses.
- Health Sciences students of others universities.
- Part time students
- Staffs or lecturer
- Master students

3.5.4 Sampling Method

By using the purposive sampling method, one faculty was chosen out of fifteen faculties offered in the UPM. Since all of the undergraduate health sciences courses in FHMS were chosen, hence, universal sampling method is applied for the courses selections.

For the selection of the final year students, the universal sampling method was used for all of five courses. All respondents from final year students of selected courses were chosen to participate in this study. The total number of students are 214 as below:

Table 3.1: Faculty and Courses Selection

Faculty Selected	Course Selected
Faculty of Medicines and Health Sciences	Bachelor of Biomedical Science Final year students: 57
	Bachelor of Science Dietetic Final year students: 30
	Bachelor of Science Nutrition and Community Health Final year students: 49
	Bachelor of Science Environmentaland Occupational Health Final year students: 52
	Bachelor of Nursing Final year students: 26

3.5.5 Sampling Size

The sample size was calculated based on one proportion for one group formula with finite population correction (Daniel & Cross, 2013). Since the study aimed to study the KAP on the importance of the green area of one target population, which is students in University Putra Malaysia, the power of the study is set within 5% of the true prevalence with 95% confidence. Sample size calculation according to the good knowledge, attitude and practice had been determined. Based on all sample size calculations Table 3.2. 229 respondents are to be chosen. With the anticipation of a 20% non-response rate in mind, the 170 samples will be taken as the respondents. However, since the sampling method for the selection of the students is universal sampling, a total of 214 students will take part in this study as greater sample sizes result in more dependable results that are more precise and powerful (Littler, 2015).

Table 3.2: Sample Size Calculation

Objective	Reference and Formula	Sample Size
To determine the association of knowledge, attitude, and practice on the importance of green area.	Calculation for the study sample sizewas referred from Tiong et al 2020: Good knowledge: 50.1% Good attitude: 72% Good practice: 40.6% $n' = \frac{(NZ^2) \text{ x P } (1-P)}{d^2\ (N-1) + Z^2\ P\ (1-P)}$ Where, n' = sample size with finite population N = Population Z = Z statistic for level of confidence P = Expected proportiond = Confidence interval	By using prevalence as below: P = 0.501 for knowledgeP = 0720 for attitude P = 0.406 for practice Sample needed for this objective were: 138 (knowledge) 127 (attitude) 136 (practice).

3.6 Study Instrumentation

Questionnaire

The self-administrated questionnaire used in this study was modified from the previous study (Ghebreab, 2017; Maryam et al., 2018). The questionnaire was meant to assess the level of knowledge, attitude, and practice on the importance of the green area among the final year of the selected course (Table 3.1). The self-constructed questionnaire was first undergone validity test by the expert panel consisting of three environmental health specialists from Universiti Putra Malaysia's Department of Environmental and Occupational Health. After the questionnaire received validity from the experts, it will be undergone a pilot test. The questionnaire is displayed in. The questionnaire comprised four sections as follow:

i) Section A – Socio-demographic information (Age (19-26), gender, year of study)

ii) Section B – General questions

iii) Section C – Knowledge, Attitude and Practice

iv) Section D – Recommendation

3.7 Procedure of Data Collection

The respondents were first and foremost be briefly informed about the objective of the study. Then, a consent form and a series of questionnaires were circulated via email and WhatsApp for all the participants in the last year of selected courses from the Faculty of Medicine and Health Sciences. The researchers shall keep the personal information and the answers of the respondents private and confidential. This research was only attended by individuals who have given their consent. The questionnaire was then used to measure the level of KAP on the importance of the green area as well as the socio-demographic information of the participants.

3.8 Data Analysis

In this study, a statistical data analysis approach utilised version 22.0 of the Social Sciences Statistical Package (SPSS). Analysis was carried out using this program at several levels. The importance level of this investigation was established at $p < 0.05$.

The level of knowledge, attitude, and practice on the importance of green area was evaluated by using a scoring method as follow:

i) The scoring method for knowledge

Right answer : 1 point

Wrong answer : 0 point

The score calculated was converted to score level, which was good, moderate, and low level. A mean score and standard deviation of the group were used to identify the subject into three groups as follow (Singh & Chapman, 2011):

Good level : Score > Mean + SD

Moderate level : Score = Mean ± SD

Poor level : Score < Mean – SD

ii) The scoring method for attitude

Strongly agree : 5 points

Agree : 4 points

Not sure : 3 points

Disagree : 2 points

Strongly disagree : 1 point

The score calculated was converted to score level, which is high, medium, and low attitude. A mean score and standard deviation of the group were used to identify the subject into three groups as follow (Singh & Chapman, 2011):

Good attitude : Score > Mean + SD

Moderate attitude : Score = Mean ± SD

Poor attitude : Score < Mean – SD\

iii) The scoring method for practice

Always : 5 points

Often : 4 points

Sometimes: 3 points

Seldom : 2 points

Never : 1 point

The score calculated was converted to score level, which is good, moderate, and bad practice. A mean score and standard deviation of the group were used to identify the subject into three groups as follow (Singh & Chapman, 2011):

Good practice : Score > Mean + SD

Moderate practice : Score = Mean ± SD

Bad practice : Score < Mean – SD

The statistical analysis for this study will be as below **(Table 3.3)**:

Table 3.3: Statistical Analysis

No.	Objectives	Statistical Analysis
1.	To determine the level of knowledge attitude and practice among students.	Descriptive analysis
2.	To determine the association of students' socio-demographic and their KAP on the importance ofgreen areas.	Chi-square test
3.	To determine the association of knowledge, attitude, and practice on the importance of green areas.	Chi-square test
4.	To compare the level of knowledge, attitude, and practice on the importance of green area between the five different courses.	Non-parametric Kruskal Wallis Test

3.9 Quality Control/ Quality Assurance

In order to assure adequacy, ambiguity, and precision of each item of the questionnaire, the content validity of the questionnaire is reviewed by an expert panel consisting of three environmental health specialists from Universiti Putra Malaysia's Department of Environmental and Occupational Health.

Following the assessment of the questionnaire's validity, a pilot test with 10% of the sample size of the study population with identical characteristics was performed. The participants are then will be excluded from the study. This test has thus been done randomly among 20 FMHS students ranging from first to third-year students. The purpose of the pilot test was to ensure that the respondents could understand the questions well or if there any difficulties while answering the questionnaire. The questionnaire was evaluated by utilising the SPSS version 22.0 statistical package to obtain the alpha Cronbach's value to determine whether the questionnaire can be considered reliable or not.

3.10 Ethical Approval

This research involves the engagement of the respondents in the study process. Therefore, before carrying out a human-oriented research study, the researchers must acquire ethical permission from the JKEUPM. After getting clearance from the Ethical Committee of Universiti Putra Malaysia, the researcher will proceed with the research process and the data collection. The questionnaire will be sent to all respondents and a description of the activities throughout the research project's execution. The respondent shall be notified of the permission of and confidentiality of all its matters relating to personal issues. The respondents will be notified of the study findings, and the report will be forwarded to management for reference.

3.11 Study Limitation

The results of this study are entirely based on the responses of those who completed the self-administered questionnaire; Where it was wholly dependent on the respondent's honesty and integrity as well as their desire to completely comprehend the questions. Additionally, it relies upon their capability to recollect their attitude and behaviour toward the green space over the past few weeks. Therefore, this study may be vulnerable to recall bias. Moreover, because the questionnaire was to be administered online and the data analysis was to be conducted on cross-sectional data, causal interpretation of the results may be unachievable.

3.12 Expected Outcome

i) There is a significant association between socio-demographic factors with the students' knowledge, attitude, and practice.

ii) There is a significant association of knowledge, attitude, and practice on the importance of green area.

iii) There is a significant difference between knowledge, attitude, and practice on the importance of the green area between five different courses.

CHAPTER 4

RESULTS

This chapter included descriptive and analytical demographics, knowledge, attitude, and practice findings. The findings in this chapter were obtained from the questionnaire distributed to the UPM students. The general information represented descriptive findings followed by descriptive characteristics on general knowledge of green areas, attitude towards green areas, and practice. This section presented a comparison between groups and the association between all independent variables for analytical results.

This research was conducted among UPM students, specifically those studying in the health sciences field. This research requires a total of 214 respondents to answer the questionnaire, which was among final year students of Bachelor of Biomedical Science (57), Bachelor Science of Dietetics (30), Bachelor Science of Nutrition and Community Health (49), Bachelor of Nursing (26), and Bachelor Science of Environmental and Occupational Health (52). Out of 214 respondents, 195 (91% response rate) were completed and returned.

4.1 Socio-Demographic Characteristics

This part showed the frequency distributions of socio-demographic of the respondents.

As illustrated in Table 4.1, most of the respondents' age ranged from 21 – 22 years old (88.7%). More female (83.6%) respondents participated in this study compared to male (16.4%). Malay respondents led race distribution with 147 respondents (75.4%), followed by Chinese (16.4%), Indian (7.2%) and lastly, Others (1.0%). More than half of the respondents (62.1%) have never received any formal education regarding environmental care whereas the other 37.8% of the respondents had obtained a formal education regarding the environmental care. Among the respondents, 50.8% are currently reported on-campus, while the other half (49.2%) live off-campus.

Table 4.1: Socio-Demographic Factors of The Respondents (N=195)

	Frequency (N)	Percentage (%)
Age		
21 – 22 years old	173	88.7
23 – 24 years old	19	9.7
25 – 26 years old	3	1.5
Gender		
Male	32	16.4
Female	163	83.6
Race		
Malay	147	75.4
Chinese	32	16.4
Indian	14	7.2
Others	2	1.0
Courses		
Bachelor of Biomedical Sciences	53	27.2
Bachelor of Science Dietetics	25	12.8
Bachelor of Science Nutrition and Community Health	41	21.0
Bachelor of Science Environmental and Occupational Health	52	26.7
Bachelor of Nursing	24	12.3
Received Formal Environment Education		
Yes	74	37.8
No	121	62.2
Current Residency		
On-campus	99	50.8
Off-campus	96	49.2

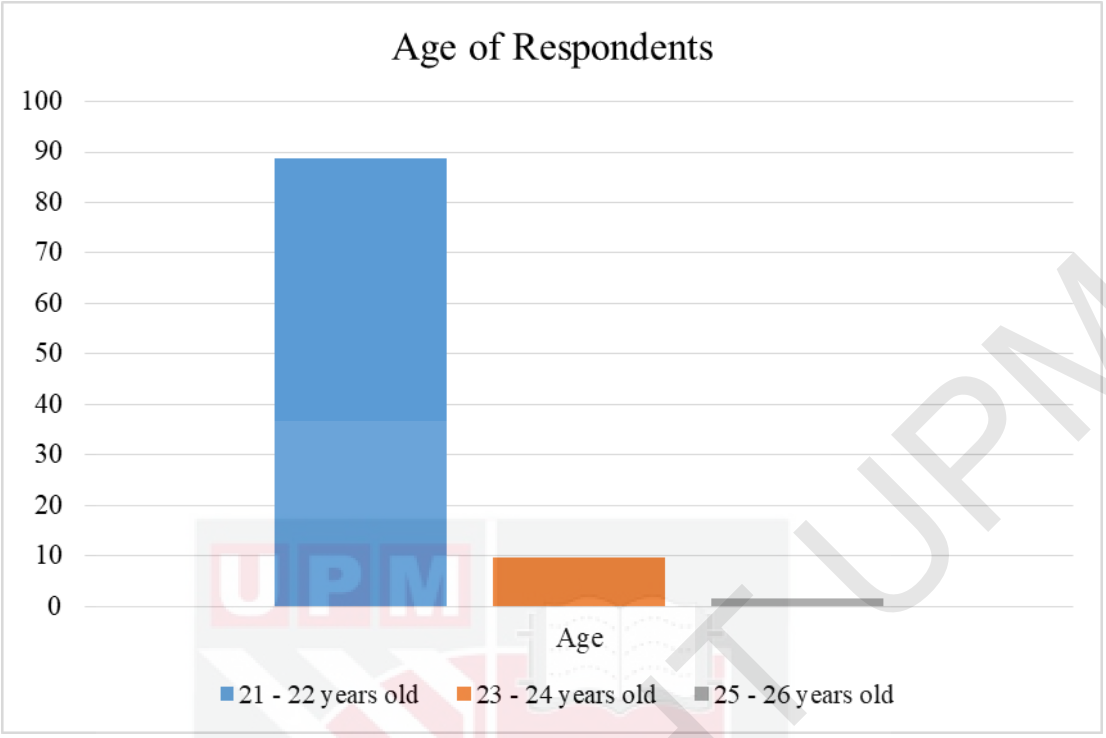

Figure 4.1: Age of the Respondents

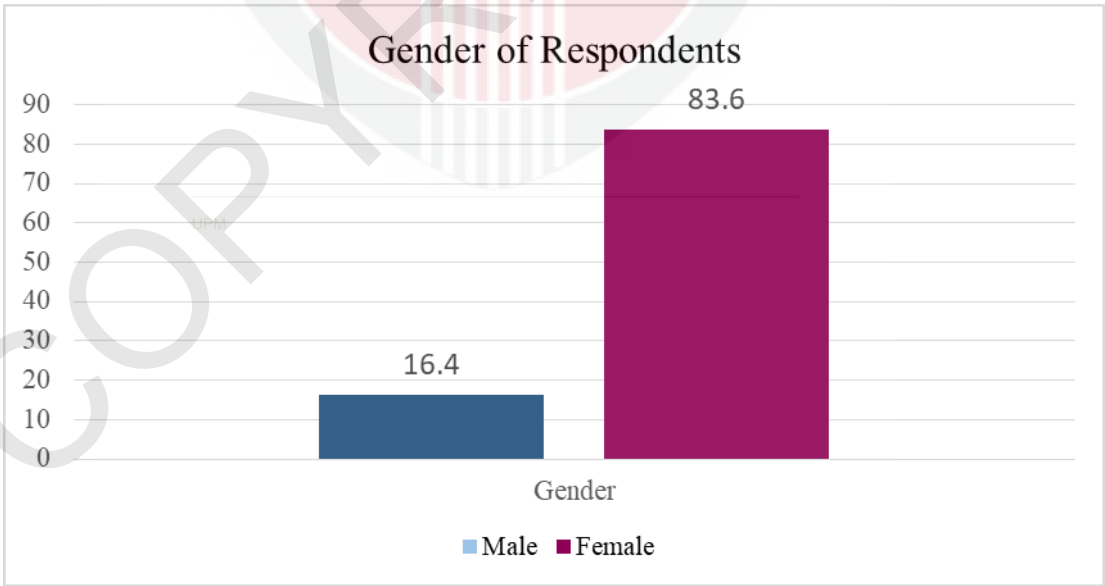

Figure 4.2: Gender of the Respondents

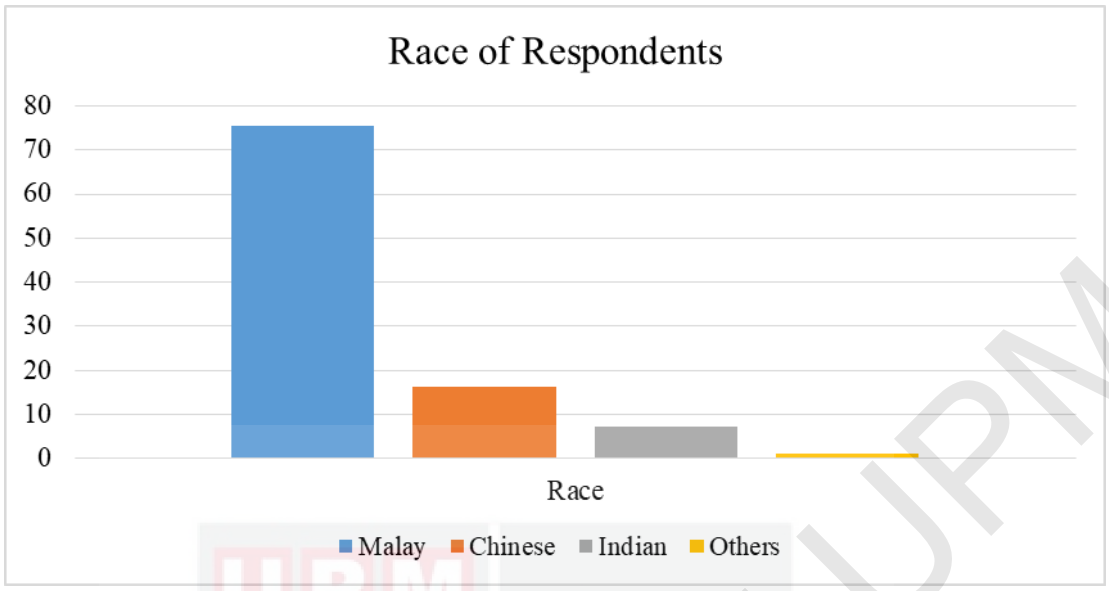

Figure 4.3: Race of the Respondents

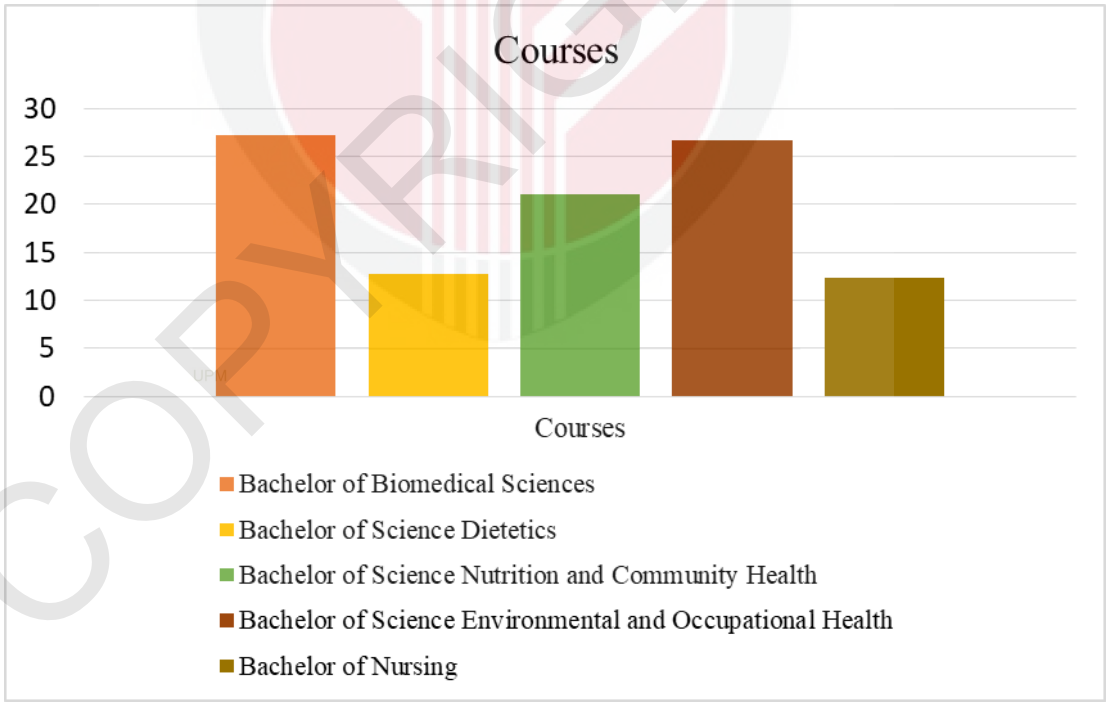

Figure 4.4: Course of the Respondents

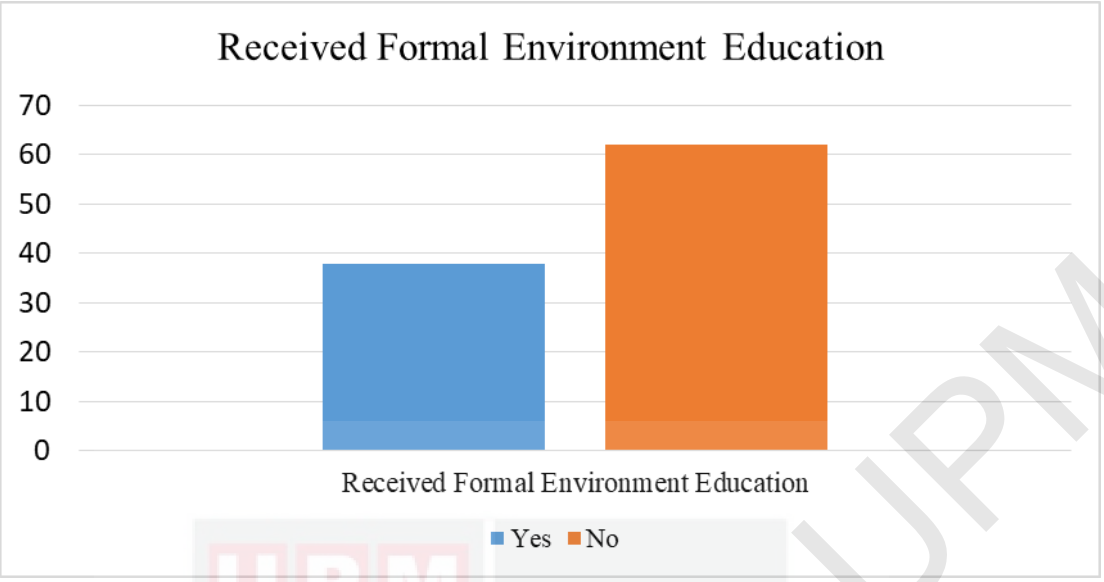

Figure 4.5: Respondents that Received Formal Environment Education

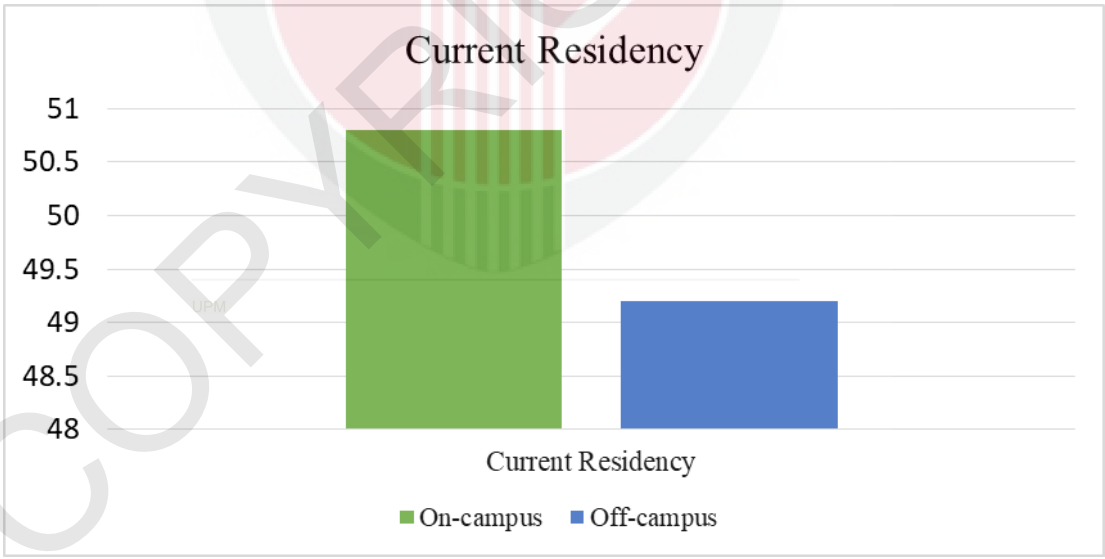

Figure 4.6: Current Residency of the Respondents

4.2 General Information on The Importance of Green Areas

Table 4.2 represent the general information regarding the importance of green areas of the respondents. This section aims to review the students' knowledge of the green areas.

Based on the findings, almost half (42.6%) of the respondents never heard the term of "green areas". On the other hand, fifty percent of the respondents have managed to answer correctly on the exact definition of green areas. Furthermore, almost all of them (90.3%) are aware that green areas are important for the quality of life. "Promote healthy lifestyles by providing space for recreational activities" are the most favourite answer (29.69%) for the importance of the green areas, followed closely by the "lower or cool the temperature" answer (28.25%).

The Source of information was assessed in the questionnaire. Social media was the most popular (35.1%) source of information about the green areas being the Internet was the most referred platform (32.8%) for the informations. Most of the respondents (89.7%) never went to the library to retrieve information regarding the green areas. About forty-three percent of the respondents interact once or twice with the green areas in a week.

Table 4.2: General Information on The Importance of Green Area (N=195)

General Knowledge	Frequency (N)	Percentage (%)
Know about green areas		
Yes	112	57.4
No	83	42.6
Definition of green areas		
Consists of green trees or plants	73	37.4
Consists of animals such as insects, fishes and others	6	3.1
Consists of lakes	10	5.1
Surrounded with infrastructure facilities	7	3.6
All statements above	99	50.8
Aware that green areas are important for quality of life		
Yes	176	90.3
No	19	9.7
Importance of the green areas		
Absorb excessive sound	67	13.81
Lower or cool the temperature	137	28.25
Conserve environmental conditions	79	16.29
Give aesthetic effects that are beautiful, tidy, clean and could attract the public	58	11.96
Promote healthy lifestyles by providing space for recreational activities	144	29.69
Source of information		
Mass media	121	30.56
Printed media	21	5.30
Social media	139	35.1
Friends	47	11.87
Lectures	52	13.13
Parents	7	1.77
Non-governmental organization	8	2.02
Others	1	0.25
Most referred social media platform		
Instagram	37	19.0
Facebook	36	18.5
Twitter	42	21.5
Tiktok	15	7.7
Internet	64	32.8
Others	1	0.5
Frequency visits the library in a week		
Never	175	89.7
1 – 2 times	18	9.2
3 – 4 times	2	1.0
More than 5 times	0	0
Duration of interaction with green areas in a week		
Never	33	16.9
1-2 times	84	43.1
3-4 times	40	20.5

4-5 times	17	8.7
More than 5 times	21	10.8

4.3 Knowledge on The Use of Green Area

There was 12 quenstions being asked to assess the respondents' knowledge about the use of green areas. The respondents required to decide if the questions were right or wrong. The respondents gained 1 point if they answered correctly and 0 point for every wrong answers. Overall score is then converted in the term of score level and catogorised into three level which were high, moderate, or low knowledge. The maximum score for this section is 24 with the mean score of 17.18 and 3.40 standard deviation as follow;

High level: Score 21 – 22

Moderate level: Score 12 – 20

Low level: Score 0 – 13

Table 4.3 below illustrates the response from the respondents regarding the knowledge of the importance of green areas. Most of the respondents (66.2%) have a moderate knowledge of the importance of green areas. Meanwhile, almost eighteen per cent of the respondents have a high knowledge and sixteen per cent have a low level on the importance of green areas.

Table 4.3 Level of Knowledge on The Importance of Green Areas

Variables	Knowledge					
	Low		Moderate		High	
	N	(%)	N	(%)	N	(%)
Final year students	31	15.9	129	66.2	35	17.9

4.4 Attitude towards The Importance of Green Areas

To explore the attitude towards the importance of green areas among the final year students, 13 questions were included in this section in the form of a Likert scale. The respondents were needed to choose from strongly disagree to strongly agree based on the statement. The scoring method is used as five marks given for strongly agree anwers and 1 mark for strongly disagree answers to classify the attitude level to high level, moderate level and low level. The maximum score for this section is with the mean score of 17.18 and 3.40 standard deviation as follow;

High level: Score 57 – 65

Moderate level: Score 40 – 56

Low level: Score 0 – 39

When it comes to attitudes on the importance of green spaces, more than half (60.0 %) of final-year students have a moderate attitude. 43 students (22.1 %)

demonstrated a high attitude, whereas 35 (17.9 %) demonstrated a low level of attitude toward green areas.

Table 4.4: Level of Attitude on The Importance of Green Areas

Variables	Attitude					
	Low		Moderate		High	
	N	(%)	N	(%)	N	(%)
Final year students	35	17.9	117	60.0	43	22.1

4.5 Practice on The Importance of Green Areas

Thirteen questions were asked of the students in this section to get an understanding of the students practice in protecting and conserving the green areas. Based on the answers they provided, each respondent was given a score. Answers never will not receive any point, whereas 2 points were given for seldom answers, 3 points for sometimes, 4 points for often, and 5 points will be added for every always answer. The scores obtained are summed up and categorised into high, moderate, and low practice levels. The cut-off point for the would be the mean which is 32 and 8 standard deviation as follow;

High level: Score 42 – 65

Moderate level: Score 23 – 41

Low level: Score 0 – 22

Table 4.5 shows the level of practice distribution among final years students in UPM. The majority of the respondents (69.7%) had moderate practice in respect of importance of green areas. 17.4% of the respondents had a high level of practice, while the remaining 12.8% had a low practice.

Table 4.5: Level of Practice on The Importance of Green Areas

Variables	Practice					
	Low		Moderate		High	
	N	(%)	N	(%)	N	(%)
Final years students	25	12.8	136	69.7	34	17.4

4.6 Association Between Socio-Demographic with Knowledge, Attitude, And Practice

The association of age, gender, race, formal environmental education, and present residency of final-year UPM students with the knowledge, attitude, and practice on the importance of green areas were evaluated using the Chi-square test, and the results were summarized in Tables 4.6, 4.7, and 4.8. The Chi –square Test was conducted to determine the relationship between the two catogerical variables.

4.6.1 Association Between Socio-Demographic with Knowledge

The relationship between knowledge of the importance of green areas and socio-demographic data is shown in Table 4.6. There was a significant link between received formal environmental education and knowledge of the importance of green spaces in this study (X^2= 13.525, P= 0.001). According to the table below, 28.4% of those who had formal environmental education background had a high level of knowledge about green areas. This study also discovered that there was a significant relationship between students' current residency (X^2= 15.480, P 0.001) and their knowledge, in which 26.3% of on-campus respondents having a high knowledge level compared to 9.4% of off campus respondents.

Table 4.6: Association Between Socio-Demographic with Knowledge

Variables	Level of Knowledge N (%)			X^2	p-value
	Low	Moderate	High		
Age					
21 – 22 years old	29 (16.8)	113 (65.3)	31 (17.9)	1.530	0.742
23 – 24 years old	2 (10.5)	14 (73.7)	3 (15.8)		
25 – 26 years old	0 (0.0)	2 (66.7)	1 (33.3)		
Gender					
Male	5 (15.6)	20 (62.5)	7 (21.9)	0.408	0.816
Female	26 (16.0)	109 (66.9)	28 (17.2)		
Race					
Malay	21 (14.3)	94 (63.9)	32 (21.8)	8.186	0.081
Chinese	6 (18.8)	23 (71.9)	3 (9.4)		
Indian	4 (28.6)	10 (71.4)	0 (0.0)		
Others	0 (0.0)	2 (100.0)	0 (0.0)		
Formal Environment					
Education					
Yes	5 (6.8)	48 (64.9)	21 (28.4)	13.525	0.001*
No	26 (21.5)	81 (66.9)	14 (11.6)		
Current Residency					
On-campus	8 (8.1)	65 (65.7)	26 (26.3)	15.480	<0.001*[a]
Off-campus	23 (24.0)	64 (66.7)	9 (9.4)		

N=195, Chi-square Test, *Significant at p<0.05

4.6.2 Association Between Socio-Demographic with Attitude

As seen in Table 4.7, people's attitudes toward the importance of green spaces vary widely. The results of a statistical test (X^2=14.629, P=0.023) show a significant association between the respondents' race and their attitude toward green areas. A significant difference was also discovered between the respondents' formal environmental education and their attitude toward green spaces (X^2= 19.801, P 0.001), where 27% of the respondents who have received an environmental study have a high attitude towards the importance of the green areas. Moreover, students' current residence (X^2= 15.480, P 0.001) was found to have a significant link with attitude, with 31.3 % of on-campus respondents having a high attitude level, compared to 5% of those who were not on campus.

Table 4.7: Association Between Socio-Demographic with Attitude

Variables	Level of Attitude (N)			X^2	p-value
	Low	Moderate	High		
Age					
21 – 22 years old	32 (18.5)	104 (60.1)	37 (21.4)	3.067	0.399
23 – 24 years old	3 (15.8)	10 (52.6)	6 (31.6)		
25 – 26 years old	0 (0.0)	3 (2.6)	0 (0.0)		
Gender					
Male	4 (12.5)	24 (75.0)	4 (12.5)	3.653	0.161
Female	31 (19.0)	93 (57.1)	39 (23.9)		
Race					
Malay	22 (15.0)	87 (59.2)	38 (25.9)	14.629	0.023*
Chinese	7 (21.9)	21 (65.6)	4 (12.5)		
Indian	6 (42.9)	8 (57.1)	0 (0.0)		
Others	0 (0.0)	1 (50.0)	1 (50.0)		
Received Formal Environment Education					
Yes	5 (6.8)	42 (56.8)	27 (36.5)	19.801	<0.001*
No	30 (24.8)	75 (62.0)	16 (13.2)		
Current Residency					
On-campus	9 (9.1)	59 (59.6)	31 (31.3)	16.619	<0.001*
Off-campus	26 (27.1)	58 (60.4)	12 (12.5)		

N=195, Chi-square Test, *Significant at p<0.05

4.6.3 Association Between Socio-Demographic with Practice

Table 4.8 presents the associated factors of practice regarding the importance of green areas. Statistical test reveals that significant association exists between the races (X^2= 15.482, P= 0.017) and practice of the respondents towards the green areas. There was also a significant difference between respondents' formal environmental education and their attitude toward green spaces (X^2= 13.386, P=0.001), with 29.7% of those who had obtained an environmental study having a high practice considering the importance of green spaces. Furthermore, students' current residency (X^2= 19.504, P0.001) was found to have a significant relationship with attitude, with 28.3% of on-campus respondents having a positive attitude compared to 6.3% of off-campus respondents.

Table 4.8: Association Between Socio-Demographic with Practice

Variables	Level of Practice N (%)			X^2	p-value
	Low	Moderate	High		
Age					
21 – 22 years old	20 (11.6)	120 (64.9)	33 (19.1)	6.104	0.139
23 – 24 years old	5 (26.3)	13 (68.4)	1 (5.3)		
25 – 26 years old	0 (0.0)	3 (100.0)	0 (0.0)		
Gender					
Male	4 (12.5)	19 (59.4)	9 (28.1)	3.102	0.212
Female	21 (12.9)	117 (71.8)	25 (15.3)		
Race					
Malay	17 (11.6)	98 (66.7)	32 (21.8)	15.482	0.017*
Chinese	5 (15.6)	26 (81.3)	1 (3.1)		
Indian	3 (21.4)	11 (78.6)	0 (0.0)		
Others	0 (0.0)	1 (50.0)	1 (50.0)		
Received Formal Environment Education					
Yes	6 (8.1)	46 (62.2)	22 (29.7)	13.386	0.001*
No	19 (15.7)	90 (74.4)	12 (9.9)		
Current Residency					
On-campus	7 (7.1)	64 (64.6)	28 (28.3)	19.504	<0.001*
Off-campus	18 (18.8)	72 (75.0)	6 (6.3)		

N=195, Chi-square Test, *Significant at p<0.05

4.7 Association Between Knowledge and Attitude with Practice and Knowledge with Attitude on The Importance of Green Areas

To analyse the association between knowledge and attitude on practice regarding the importance of green areas, the Chi-square Test was used. The data obtained was tabulated in Table 4.9.

The relationship between practice and knowledge of the importance of green areas is shown in Table 4.12. There was a significant relationship between knowledge of green areas and practice in this study (X^2= 28.484, P0.001). Only 44.1 % of the 35 respondents with a high level of knowledge have a high level of practice when it comes to preserving and conserving green areas. In the case of green areas, there was also a strong association between attitude and practice. 67.6 % of the students with a high level of attitude also had a high level of practice, while 28.0 % with a low level of attitude also had a low level of practice (X^2= 54.366, P<0.001).

Table 4.10 shows the association between knowledge and attitude regarding the importance of green areas. Fifty-one percent of the respondents with a high level of both knowledge and attitude, and 1 (2.9%) of respondents with a low level of attitude while having good knowledge. This finding was significantly associated (X^2= 40.503, P<0.001)

Table 4.9: Association Between Knowledge and Practice

Variable	**Practice**, N (%)				
	Low	Moderate	High	X^2	p-value
Knowledge					
Low	8 (32.0)	23 (16.9)	0 (0.0)	28.484	<0.001*
Moderate	17 (68.0)	93 (68.4)	19 (55.9)		
High	0 (0.0)	20 (14.7)	15 (44.1)		
Attitude					
Low	7 (28.0)	28 (20.6)	0 (0.0)	54.366	<0.001*
Moderate	18 (72.0)	88 (64.5)	11 (32.4)		
High	0 (0.0)	20 (14.7)	23 (67.6)		

N=195, Chi-square Test, *Significant at p<0.05

Table 4.10: Association between Knowledge and Attitude

Variable	**Attitude**, N (%)				
	Low	Moderate	High	X^2	p-value
Knowledge					
Low	14 (45.2)	17 (54.8)	0 (0.0)	40.503	<0.001*
Moderate	20 (15.5)	84 (65.1)	25 (19.4)		
High	1 (2.9)	16 (45.7)	18 (51.4)		

N=195, Chi-square Test, *Significant at p<0.05

4.8 Comparison of Knowledge, Attitude, and Practice on The Importance of Green Areas Between the Five Different Courses

Since this data was not normally distributed, the Kruskal Wallis Test was used to compare students' knowledge, attitude, and practice in five different courses on the importance of green areas. The findings were summarized in Table 4.11.

According to the findings of this study, there was a significant relationship between the respondents' courses and their knowledge, attitude, and practice, where all the p-values are less than 0.05.

Table 4.11: Comparison of Knowledge, Attitude, and Practice on The Importance of Green Areas Between Five Different Courses

	Kruskal Walis Test			
	N	**Median (IQR)**	**Z**	**p-value**
Knowledge				
Bachelor of Biomedical Sciences	53	16.00 (5)	53.474	<0.001*
Bachelor of Science Dietetics	25	17.00 (4)		
Bachelor of Science Nutrition and Community Health	41	14.00 (5)		
Bachelor of Science Environmental and Occupational Health	52	20.00 (2)		
Bachelor of Nursing	24	16.50 (5)		
Attitude				
Bachelor of Biomedical Sciences	53	46.00 (13)	49.719	<0.001*
Bachelor of Science Dietetics	25	46.00 (16)		
Bachelor of Science Nutrition and Community Health	41	43.00 (12)		
Bachelor of Science Environmental and Occupational Health	52	56.00 (9)		
Bachelor of Nursing	24	46.00 (13)		
Practice				
Bachelor of Biomedical Sciences	53	29.00 (11)	60.358	<0.001*
Bachelor of Science Dietetics	25	26.00 (9)		

Bachelor of Science Nutrition and Community Health	41	28.00 (9)
Bachelor of Science Environmental and Occupational Health	52	40.00 (9)
Bachelor of Nursing	24	28.00 (9)

N=195, Kruskal Wallis Test, *significant at $p<0.05$

4.9 Recommendation

The recommendation was proposed in Section D of the questionnaire distributed to the final-year students of selected courses

4.9.1 Most Appropriate Medium to Disseminate Informations on The Importance of Green Areas

According to Figure 4.7, 47 % identified social media as the best method for disseminating information on green spaces, followed by mass media, which received 26 % of the respondents' feedback. Meanwhile, the least preferred approach for communicating information was through local government responsibilities (7%) as well as non-governmental organisation roles (3%).

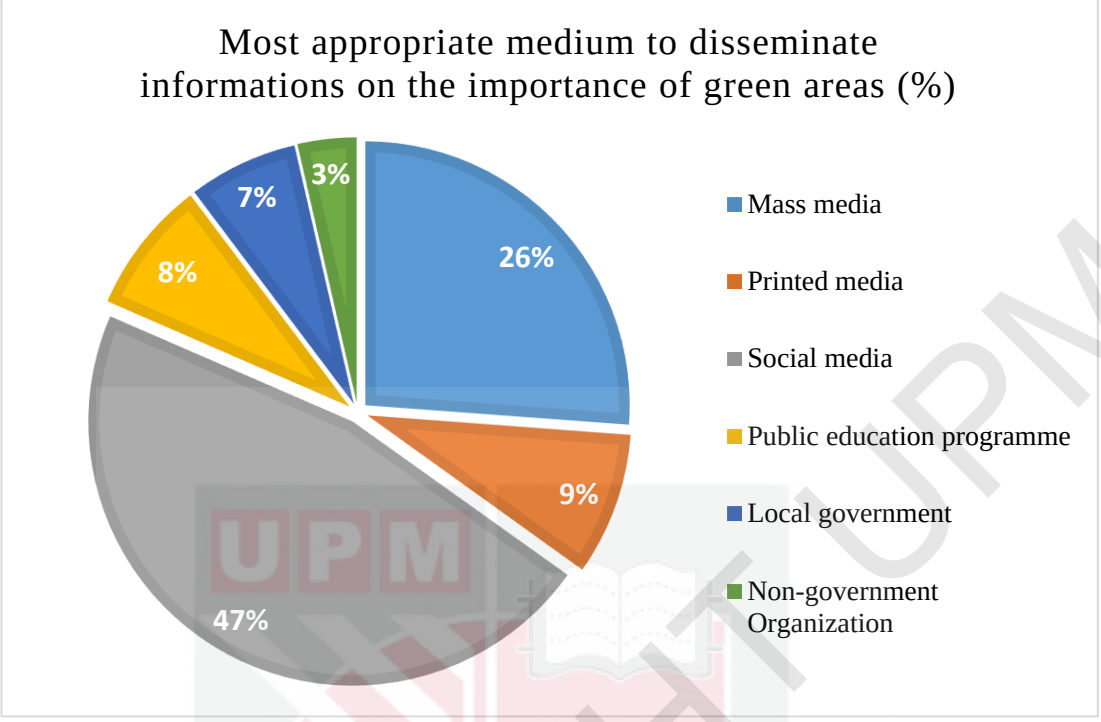

Figure 4.7: The Most Appropriate Medium for Disseminating Information regarding The Importance of Green Areas

4.9.2 Most Effective Measures to Preserve and Conserve Green Areas

Table 4.12 indicates the most effective measures to preserve and conserve the green areas based on the students' feedbacks from the questionnaire. Strengthening the policies and the legislation regarding the green areas (27.7%) and including community engagement in green area management (23.6%) is the best way to preserve and conserve our nature. Other than that, some of the respondents (20%) agreed to enhance reforestation or replantation, and some suggested that it is best to allocate sufficient funds for green management (16.4%) as the best way to save our green areas. Lastly, only 12.3% of respondents recommended strengthening the role of government agencies like the local authority in green area management and preservation..

Table 4.12: Most Effective Measure to Preserve and Conserve Green Areas

Variables	N	Percentage (%)
Strengthen the policies and the legislation regarding the green areas	54	27.7
Include community engagement in green area management	46	23.6
Enhance reforestation or replantation	39	20.0
Allocate sufficient funds for green management	32	16.4
Strengthen the role of government agencies (local authority) in green area management and preservation	24	12.3

CHAPTER 5

DISCUSSION

5.1 Socio-Demographic and Characteristics Distribution of Respondents

This study found the majority of respondents were aged within 21 – 22 years old, female, Malay, final year students of Bachelor of Biomedical Sciences, never received any formal environment education, and live on-campus.

According to previous studies conducted among university students, their ages range from 18 to 30 years, with a median of 21 years (Ahamad & Ariffin, 2018).

The findings of this study matched those of Tienxhi (2017) and Ahmad et al. (2018), which indicated that most respondents were female. Tienxhi (2017) discovered that the gender disparity between men and women increased in Malaysia's public universities.

Majority of the respondents in this study were Malay. Previous local research found that majority of the respondents according to race was Malay, followed by Chinese, Indian, and lastly Others (Ahmad et al., 2015).

5.2 Knowledge on The Use of Green Areas

The goal of this study was to determine participants' knowledge, attitudes, and practice regarding the importance of green areas. The level of KAP of the final year students in UPM was assessed using an online-based questionnaire. The findings from the survey revealed that most of the students had a moderate level of knowledge. These findings matched those of a previous study in the northern part of Malaysia, which mentioned that, in general, not all students had a high level of environmental knowledge (Tiong et al., 2020).

This may due to the fact that not even half of the respondents had received any education regarding environmental care. Environmental education is a learning process that combines problem-solving and the ability of students to make the appropriate decisions for the future regarding environmental sustainability and preservation (Abdul Rahman, 2018). Whether formal or informal, education is said to be one of the most effective tools in cultivating the students' loving and appreciating environment culture (Abdul Rahman, 2020).

Moreover, the research from Liu & Guo, 2018 shows that a significant association is presented between environmental knowledge and environmental education as it allows students to know and understand the objective and tangible environmental facts and phenomena. It also aids students in understanding the essence

of the substantial natural environment and foster environmental knowledge and environmental value to achieve permanent harmony with the natural environment.

5.3 Attitude towards The Importance of Green Areas

More than half of the respondents (60.0%) in this study had a moderate level of attitude towards the importance of green areas. Attitude describes the degree to which an individual values behaviour performance as favourable or unfavourable (Li et al., 2019). However, during the data collection process, our country was in the midst of a severe COVID-19 outbreak, with over 10,000 cases were recorded daily (*COVID-19 Cases in Malaysia - COVIDNOW*, 2022).

This led to the conclusion that the respondents' movement was restricted, especially to visit the greenery. In addition, the students staying in college were prohibited from engaging in any outdoor leisure or sports activities. This prohibition is implemented to ensure that students adhere to social distancing measures to curb the spread of the COVID-19 outbreak. A recent study indicated that The current outbreak of COVID-19 seems to have an impact on people's attitudes towards the importance of green space (Howlett & Turner, 2021). Research discovers that spending more time in green spaces leads to a deeper appreciation for its therapeutic properties, leading to a more significant number of favourable psychological consequences for visitors (Carrus et al., 2015).

5.4 Practice towards The Importance of Green Areas

The overall self-reported practice regarding the importance of green areas, there were only 12.8% had a low practice level, and 17.4% had a high level of practice. The remaining 136 respondents (69.7%) had a moderate level of practice. Given that most respondents had a moderate level of knowledge and attitude, this is highly relevant to the respondents' degree of practice outcomes.

According to a study published in 2015, higher levels of knowledge and concerned attitudes were shown to be linked to a higher probability of engaging in protective measures (De Pretto et al., 2015). The relation between people's attitudes and practice is widely known in psychology, as stated by the Theory of Planned Behavior (Ajzen, 2002). This statement is supported by a study that mentioned that Increased awareness and understanding of environmental concerns are believed to influence environmental attitudes, which is assumed to have a significant impact on environmental behaviour and the reduction of negligent human practice toward nature (Hammami et al., 2017).

Furthermore, an individual's views about the environment are among the factors of one's practice. This value was discovered to be dependent on having suitable opportunities, facilities, and related knowledge and not being discouraged by any external obstacles (Li et al., 2019).

5.5 Association Between Socio-Demographic with Knowledge, Attitude, And Practice

There was a significant link between formal environmental education and current residency in terms of knowledge. However, a significant value was found in the association between race, environmental education and current residency with the level of attitude and practice on the importance of green areas. Other independent variables, such as age and gender, were not significantly associated with the level of knowledge among the respondents.

Age and gender have no relationship with the KAP of the importance of green areas. The findings contrasted with previous studies that found an association between age and gender (Li et al., 2019; Masud & Kari, 2015). Other studies found a significant difference for the gender factor but not for the age factor (Mohd Rodzi et al., 2019; Wan & Shen, 2015). According to Ding Li et al. (2019), women appear to be more cooperative and empathetic in their roles as caregivers and natures, resulting in a more vital concern for the environment.

This study discovers a relationship between race with attitude and practice. This relationship is consistent with a previous study that found an association between environmental concern with race and religion (Todd & Ronald,2016). While these associations are consistent with past studies on race and environmental concern,

further research should be done to uncover the factors associated with levels of environmental care, such as cultural factors or beliefs.

The study found that formal environmental education is one of the solutions for overcoming environmental issues is to be well-versed in all environmental factors in order to protect the environment. Since the 1960s, the goal of environmental education has been to generate individuals who are more knowledgeable, motivated, and active. (Sukma et al., 2020). Numerous studies suggested that a lack of proper environmental knowledge at both global and local levels is a barrier to achieving a sustainable future for humanity. Therefore, incorporating environmental awareness programs into mainstream education can help lessen the environmental implications of human activities (Agboola Omowunmi Sola, 2014).

Furthermore, this study discovered that respondents' present residency was substantially related to their knowledge, attitude and practice towards green spaces. A study done by Wang et al. (2015) reported that, among all significant predictor variables, perceived accessibility (0.429) showed the most decisive direct influence on attitude (0.296). Perceived accessibility was characterized in this context as the distance to parks, park areas, accessibility, the opportunity to visit the park, and public facilities. In addition, A study conducted in Kuala Lumpur, Malaysia, reflects that the Malaysians encounter difficulty when visiting urban parks, such as lack of accessibility, inadequate public transportation, and extreme heat (Sreetheran, 2017). Universiti Putra Malaysia (UPM) has been named Malaysia's most sustainable university in UI-

GreenMetric World University Ranking (The Star Online, 2021; hairul_nizam, 2021). UPM has been blessed with enormous greenery and facilitated with various leisure and recreational areas like Bukit Ekspo. So, it can be concluded that on-campus students were more likely to have a positive KAP towards green areas.

5.6 Comparison of Knowledge, Attitude, And Practice on The Importance of Green Areas Between the Five Different Courses

The study found a significant relationship between respondents' courses and their KAP level. This result was consistent with Tiong et al. (2020) study, which found a link between knowledge and current university enrolment programs. It is reasonable to believe that the relationship arises from the curriculum contents of these five separate courses in this scenario. Even though the respondents in this survey were all in the same field, namely the Health Sciences field, each course's key subjects differed. From all these five courses, students from Bachelor of Science Environmental and Occupational Health is an only course exposed to formal Environmental Education.

Environmental Education (EE) increases people's knowledge and understanding of environmental concerns and their associated challenges. It will indirectly develop the skills and expertise needed to address the challenges and fosters attitudes, motivations, and engagements to make wise decisions and take responsible action associated with the importance of the environment (Agboola Omowunmi Sola, 2014; Fahlquist, 2009).

5.7 Recommendation

Based on the findings, the respondents opted the social media as the most appropriate medium to disseminate information regarding the green areas. For young people and the environmental movement, online social networks are becoming increasingly vital information and communication tools. Based on the findings of this study, the internet is the most frequently used social media platform by users, followed by Twitter, Instagram, and Facebook.

Social media is a remarkable platform that helps users attract themselves with captivating content and broaden their knowledge horizons by paying attention to information-related stuff (Kaur & Chahal, 2018). Furthermore, a study done by Mallick and Bajpai (2019) revealed that social media and all online modes of communication enabled by online connectivity have tremendous potential to affect the environment as it is a highly effective approach for bridging the gap between the government, public, and private sectors and the community.

CHAPTER 6

CONCLUSION AND RECOMMENDATION FOR FUTURE STUDY

6.1 Conclusion

In conclusion, most UPM final-year students had a moderate level of knowledge, attitude, and practice concerning the importance of green spaces. This finding implies a proactive action by responsible bodies in UPM to enhance students' knowledge and understanding of the value of green spaces.

When comparing the level of knowledge, attitude, and practice on the importance of green areas between five different courses, a significant difference was found between them. This study found it essential to give formal environmental education by incorporating environmental studies into the current curriculum to improve students' knowledge and attitude of the value of the environment in general, specifically on green areas.

Good practice must be accompanied by sound knowledge and attitude. The study's findings indicated a relationship between knowledge and attitude and practice.

6.2 Study Limitation

A few limitations to this research that should be addressed. Students at UPM may be underrepresented in this study due to the study's use of convenience sampling, a non-probability sampling technique. The study's sample size was too small due to the study's focus on only five courses. Another potential issue is that this study may be prone to recall bias, as it relies on respondents' capacity to recall past events and uses solely self-reported questionnaires to examine associated factors. Finally, because the data were obtained during a period when COVID-19 cases were high, this may indirectly affect respondents' KAP toward green areas.

6.3 Recommendation

Based on this research, a few suggestions were made to increase environmental knowledge among the UPM students. Each student should be required to take an environmental subject within their 4 years of study in UPM. For example, subjects like PRT2008 should integrate the environmental care study into its syllabus. The lecturers should also be encouraged to utilise the green areas present in UPM during the learning process.

The university can also expand its environmental programme and activities to include all UPM students. This strategy is intended to ensure that not only a small number of interested students enrol in the programme.

To improve this study in the future, the researcher should increase the sample size of the population. The researcher was also recommended to include more students from other fields of study like technical, education, science, literature, and economics.

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Date/*Tarikh*: ID No.:

UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

QUESTIONNAIRE/*BORANG KAJI SELIDIK*

RESEARCH TITLE/*TAJUK KAJIAN***:**	**KNOWLEDGE, ATTITUDE AND PRACTICE ON THE IMPORTANCE OF GREEN SPACE AREA AMONG STUDENTS IN UNIVERSITI PUTRA MALAYSIA.** *PENGETAHUAN, SIKAP DAN AMALAN TENTANG KEPENTINGAN KAWASAN HIJAU DI KALANGAN PELAJAR DI UNIVERSITI PUTRA MALAYSIA.*
STUDENT'S NAME/*NAMA PELAJAR*	**DHAMIRAH BINTI YUSOF (196025)**
STUDENT'S EMAIL & TEL.NO/*EMAIL & NO. TEL PELAJAR*	196025@student.upm.edu.my / 014-3214671
SUPERVISOR'S NAME/*NAMA PENYELIA*	**HALIZA ABDUL RAHMAN**
SUPERVISOR'S EMAIL & TEL.NO/*EMAIL & NO. TEL PENYELIA*	dr.haliza@upm.edu.my / 012-2111129 @ 03-97692403

Instructions/*Arahan*

This questionnaire contains 4 sections:

Borang kaji selidik ini mengandungi 4 bahagian:

1. Section A: Socio-demographic information
   Bahagian A: Maklumat sosio-demografik

2. Section B: General questions
   Bahagian B: Soalan Lazim

3. Section C: Knowledge, Attitude and Practice on the importance of green area
   Bahagian C: Pengetahuan, Sikap dan Amalan terhadap kepentingan kawasan hijau

4. Section D: Recommendations
   Bahagian D: Cadangan

Section A: Socio-demographic information

Bahagian A: Maklumat sosio-demografik

INSTRUCTIONS: Please tick your answer and fill in the blanks for the questions below.

ARAHAN: Sila tandakan jawapan anda dan isi jawapan di ruangan yang disediakan untuk soalan dibawah.

1. Age/*Umur*:
   - ☐ 18 – 20 years old/*19 – 20 tahun*
   - ☐ 21 – 22 years old/*21 – 22 tahun*
   - ☐ 23 – 24 years old/*23 – 24 tahun*
   - ☐ 25 – 26 years old/*25 – 26 tahun*

2. Gender/*Jantina:*

   ☐ Male/*Lelaki* ☐ Female/*Perempuan*

3. Races/*Bangsa:*

   ☐ Malay/*Melayu* ☐ Chinese/*Cina* ☐ Indian/*India*

   Others (Please state)/*Lain-lain (Sila nyatakan):* .....

4. Course/*Kursus:*
   - ☐ Doctor in Medicine/ *Doktor Perubatan*
   - ☐ Veterinary Medicine/Doktor *Perubatan Veterinar*
   - ☐ Bachelor Science of Environmental and Occupational Health/ Bachelor Sains Kesihatan Persekitaran dan Pekerjaan

5. Year of study/*Tahun Pengajian:*

☐ First year/*Tahun Pertama* ☐ Final year/*Tahun terakhir*

6. Have you ever received any formal education regarding the environmental care?/*Adakah anda pernah mendapat pendidikan formal mengenai penjagaan alam sekitar?*

☐ Yes/*Ya* ☐ No/*Tidak*

7. Where do you live now?/*Dimanakah tempat tinggal anda sekarang?:*

☐ On-campus ☐ Off-campus

Section B: General questions

Bahagian B: Soalan Lazim

INSTRUCTIONS: Please tick your answer based on the questions below.

ARAHAN: Sila tandakan jawapan anda untuk soalan dibawah.

1. Do you know about the green areas?/*Adakah nada tahu tentang kawasan hijau?*

   ☐ Yes/*Ya* ☐ No/*Tidak*

2. If yes, what is the definition of green areas? (Choose **ONE** only)./*Jika ya, apakah definisi bagi kawasan Hijau? (Pilih **SATU** sahaja).*

   ☐ Green area is an area that consists of green trees or plants./*Kawasan hijau adalah suatu kawasan yang mempunyai pokok-pokok atau tumbuh-tumbuhan hijau*

   ☐ Green area is an area that consists of animals such as insects, fishes and others./*Kawasan hijau adalah suatu kawasan yang mempunyai haiwan-haiwan seperti serangga, ikan dan lain-lain.*

   ☐ Green area is an area that consists of lakes (If there are any in residential areas)./*Kawasan hijau adalah suatu kawasan yang mempunyai tasik (Jika ada di kawasan kediaman).*

   ☐ Green area is an area that is surrounded with infrastructure facilities./*Kawasan hijau adalah suatu kawasan yang mempunyai kemudahan infrastruktur di sekeliling.*

   ☐ All statements above (Overall ecosystem)./*Semua penyataan di atas (Ekosistem keseluruhan).*

3. Are you aware that green areas are important for quality of life?/*Adakah anda sedar bahawa kawasan hijau adalah penting untuk kualiti kehidupan?*

☐ Yes/*Ya* ☐ No/*Tidak*

4. What is the importance of the green areas? (Can answer **MORE THAN ONE**)./*Apakah kepentingan kawasan hijau? (Boleh tandakan **LEBIH DARIPADA SATU JAWAPAN**).*

☐ Green areas can absorb excessive sound (Loud noise)./*Kawasan hijau dapat menyerap bunyi yang berlebihan (Bunyi bising).*

☐ Green areas can lower or cool the temperature./*Kawasan hijau dapat menurunkan atau menyejukkan suhu.*

☐ Green areas can conserve environmental conditions./*Kawasan hijau dapat memelihara alam sekitar.*

☐ Green areas can give aesthetic effects that are beautiful, tidy, clean and could attract the public./*Kawasan hijau dapat memberikan kesan estetik yang cantik, kemas, bersih dan dapat menarik perhatian orang awam.*

☐ Green areas could promote healthy lifestyles by providing space for recreational activities./*Kawasan hijau dapat menggalakkan gaya hidup sihat dengan menyediakan ruang bagi melakukan aktiviti riadah.*

5. Where do you get information about the importance of green areas? (Can answer **MORE THAN ONE**)./*Dari manakah anda mendapat informasi tentang kepentingan kawasan hijau? (Boleh tandakan **LEBIH DARIPADA SATU JAWAPAN**).*

☐ Mass media (Television/Radio)/*Media massa (Television/Radio)*

☐ Printed media (Newspaper/Magazine)/*Media cetak (Surat khabar/ Majalah)*

☐ Social Media (Instagram, Facebook, Twitter, Tiktok)/*Media Sosial (Instagram, Facebook, Twitter, Tiktok)*

☐ Friends/ *Rakan-rakan*

☐ Lectures/*Kuliah*

☐ Parents/*Ibu-bapa*

☐ Non-governmental Organization/*Badan bukan kerajaan*

Others. Please state/*Lain-lain. Sila nyatakan:*_____

6. Which social media platform is most referred to get the information on the green areas? (Can only tick **ONE ANSWER**)./*Platform di sosial media yang manakah dirujuk untuk mendapatkan maklumat tentang kawasan hijau? (Tandakan hanya **SATU JAWAPAN SAHAJA**).*

- ☐ Instagram
- ☐ Facebook
- ☐ Twitter
- ☐ Tiktok
- ☐ Internet

Others. Please state:/ *Lain-lain. Sila Nyatakan:*_____

7. How many time do you visit the library to get more information on green area in a week time?/*Berapa kerapkah anda mengunjungi perpustakaan untuk mendapatkan maklumat mengenai kawasan hijau?*

- ☐ Never/*Tidak pernah*
- ☐ 1 – 2 times/*1 – 2 kali*
- ☐ 3 – 4 times/*3 – 4 kali*
- ☐ 4 – 5 times/*4 – 5 kali*
- ☐ More than 5 times/*Lebih dari 5 kali*

8. How long do you interact with green areas in a week time?/*Berapa kerapkah anda berinteraksi dengan kawasan hijau di sekitar kediaman anda dalam tempoh satu minggu?*

- ☐ Never/*Tidak pernah*
- ☐ 1 – 2 times/*1 – 2 kali*
- ☐ 3 – 4 times/*3 – 4 kali*
- ☐ 4 – 5 times/*4 – 5 kali*

☐ More than 5 times/*Lebih dari 5 kali*

Section C: KNOWLEDGE, ATTITUDE AND PRACTICE

Bahagian C: Pengetahuan, Sikap dan Amalan

INSTRUCTIONS: Please tick your answer based on the questions below

ARAHAN: Sila tandakan jawapan anda untuk soalan dibawah

i. Knowledge on the use of green areas./*Pengetahuan terhadap kegunaan kawasan hijau.*

No.	Statement/*Penyataan*	Right/ *Betul*	Wrong/ *Salah*
1.	Green areas are widely used for recreational activities such as enjoying the view./*Kawasan hijau banyak digunakan untuk melakukan aktiviti rekreasi seperti menikmati pemandangan.*		
2.	Green areas are widely used for recreation such as jogging./*Kawasan hijau banyak digunakan untuk beriadah seperti jogging.*		
3.	Green areas are a key term that refers to both protected and unmaintained natural areas./*Kawasan hijau adalah istilah utama yang merujuk kepada kawasan semula jadi yang dilindungi dan tidak dilindungi.*		
4.	Green areas are the green component and it is an important part of a city open public spaces./*Kawasan hijau adalah komponen hijau dan merupakan bahagian penting dari ruang awam terbuka di bandar.*		
5.	Green areas are critical components of resilient, sustainable and healthy communities./*Kawasan hijau adalah komponen penting bagi membentuk komuniti yang berdaya tahan, mampan dan sihat.*		

6.	Urban parks and green areas contribute numerous directly and indirectly to the prosperity, well-being, social ties and everyday life of people./*Taman bandar dan kawasan hijau menyumbang secara langsung dan tidak langsung kepada kemakmuran, kesejahteraan, hubungan sosial dan kehidupan seharian masyarakat.*		
7.	Green areas can improve mental health and well-being./*Kawasan hijau dapat meningkatkan tahap kesihatan mental dan kesejahteraan kesihatan.*		
8.	Interaction with an environment such as green areas may increase the one's focus/*Interaksi dengan alam sekitar seperti kawasan hijau boleh meningkatkan daya tumpuan seseorang.*		
9.	Interaction with an environment such as green areas may stabilize one's emotions./*Interaksi dengan alam sekitar seperti kawasan hijau boleh menstabilkan emosi seseorang.*		
10.	Time allocated on the green areas will improve optimistic mood and emotions, reduce daily stress and stabilize emotions./*Masa yang diperuntukkan pada kawasan hijau akan meningkatkan mood dan emosi yang optimis, mengurangkan tekanan seharian dan menstabilkan emosi.*		
11.	Individuals who interact less with green areas tend to suffer obesity and other health problems (Emotional stress)./Individu yang *kurang berinteraksi dengan kawasan hijau cenderung mengalami obesiti dan masalah kesihatan yang lain (Tekanan perasaan).*		
12.	Green areas encourage individuals to do recreation and ultimately have a positive impact on health./*Kawasan hijau mendorong individu untuk beriadah dan akhirnya memberi kesan positif terhadap kesihatan.*		
13.	Green areas can increase the economic value of real estate./Kawasan *hijau dapat meningkatkan nilai ekonomi hartanah.*		

14.	Green areas can bridges' social divides within communities./*Kawasan hijau dapat merapatkan jurang sosial dalam komuniti.*		
15.	Green areas can ensure socio-environmental sustainability./*Kawasan hijau dapat memastikan kelestarian sosial-persekitaran.*		
16.	The presence of green areas leads to more social interactions./*Kewujudan kawasan hijau mendorong lebih banyak interaksi sosial di kalangan komuniti.*		
17.	Green areas help by supplying clean air, lowers the ambient temperature and preserving the natural balance of the city./*Kewujudan kawasan hijau menyumbang kepada udara bersih, merendahkan suhu persekitaran dan memelihara keseimbangan semula jadi bandar.*		
18.	Interaction with green areas provides various benefits including it can help reduce stress./*Interaksi dengan kawasan hijau memberi pelbagai faedah antaranya dapat mengurangkan tekanan.*		
19.	Interaction with green areas provides various benefits including faster healing of the disease suffered./*Interaksi dengan kawasan hijau memberi pelbagai faedah antaranya penyembuhan yang lebih cepat terhadap penyakit yang dialami.*		
20.	Interaction with green areas provides various benefits including crime reduction./*Interaksi dengan kawasan hijau memberi pelbagai faedah antaranya pengurangan kadar jenayah.*		

ii. Attitude on the importance of green space area./*Sikap terhadap kepentingan kawasan hijau.*

Strongly disagree/ *Sangat tidak setuju*	Disagree/ *Tidak setuju*	Not sure/ *Tidak pasti*	Agree/ *Setuju*	Strongly agree/ *Sangat setuju*
1	2	3	4	5

No.	**Statement/*Penyataan***	**Scale/ *Skala***				
		1	**2**	**3**	**4**	**5**
1.	The green areas enhance my quality of life./*Kawasan hijau mempertingkatkan kualiti hidup saya.*					
2.	I believe the existence of green areas like recreational parks is essential to maintain in a residential area./*Saya berpendapat bahawa kewujudan kawasan hijau seperti taman rekreasi penting dikekalkan di sesuatu kawasan kediaman.*					
3.	The management of green areas is the responsibility of the local authority./*Pengurusan kawasan hijau adalah tanggungjawab pihak berkuasa tempatan sahaja.*					
4.	The management of the green area is the responsibility of the community./*Pengurusan kawasan hijau adalah tanggungjawab komuniti*.					
5.	I often use the green area for recreation./*Saya kerap menggunakan kawasan hijau untuk berekreasi.*					
6.	I do not care if there is no green area like recreational park around me./*Saya tidak peduli jika tiada kawasan hijau seperti taman rekreasi di sekitar saya.*					

7.	I feel relax whenever I am in green area./*Saya berasa tenang setiap kali berada di kawasan hijau.*					
8.	I am aware that the green area helps me with my academic or my career performance./*Saya sedar bahawa kawasan hijau membantu meningkatkan prestasi akademik atau kerjaya saya.*					
9.	Visiting green areas like recreational parks is just wasting my time./*Mengunjungi kawasan hijau seperti taman rekreasi hanya membazirkan masa saya.*					
10.	We should preserve the green area because of its importance./*Kita perlu memelihara kawasan hijau* disebabkan kepentingannya.					
11.	I feel like the green area is not beneficial to help improve human health and well-being./*Saya berpendapat kawasan ruang hijau tidak bermanfaat untuk membantu mempertingkatkan kesihatan dan kesejahteraan manusia.*					
12.	I intend to visit the green area as often as possible because of its benefits./*Saya berhasrat ingin mengunjungi kawasan hijau sekerap mungkin kerana kebaikannya.*					
13.	I will only go the green area near where I live or work./*Saya hanya mengunjungi kawasan hijau yang berdekatan tempat tinggal/ tempat kerja saya.*					
14.	I believe that green area can contribute to the well-being of the surrounding space./*Saya percaya bahawa kawasan hijau mampu menyumbang kepada kesejahteraan ruang persekitaran.*					
15.	I think frequent visits to the green area can reduce the health risks./*Saya berpendapat bahawa kekerapan kunjungan ke*					

	kawasan hijau dapat mengurangkan risiko terhadap kesihatan.					
16.	I think the subject syllabus should include indicators related to the environmental care such as the importance of green areas./ *Saya berpendapat silibus mata pelajaran harus memasukkan indikator berkaitan penjagaan alam sekitar seperti kepentingan kawasan hijau.*					

iii. Practice on the importance of green area./*Amalan terhadap kepentingan kawasan hijau.*

Never/ *Tidak pernah*	Seldom/ Jarang-jarang	Sometimes/ *Kadang-kala*	Often/ *Kerap*	Always/ *Sangat kerap*
1	2	3	4	5

No.	**Statement/*Penyataan***	**Scale/ *Skala***				
		1	**2**	**3**	**4**	**5**
1.	When visiting a green area, I throw garbage in the appropriate place./*Ketika mengunjungi kawasan hijau, saya membuang sampah di tempat yang sepatutnya.*					
2.	After doing recreational activity, I will make sure that the area is clean./*Selepas melakukan sesuatu aktiviti seperti beriadah, saya akan memastikan kebersihan kawasan tersebut.*					
3.	I pick and throw the garbage that is surrounding the green area into the dustbin./*Saya mengutip dan membuang sampah yang terdapat di sekitar kawasan hijau ke dalam tong sampah.*					
4.	I don't do anything that could destroy the green areas such as doing an open burning./*Saya tidak melakukan perbuatan yang menjejaskan kawasan hijau seperti pembakaran terbuka.*					
5.	I always educate my family and friends about the importance of the green area./*Saya sentiasa mendidik keluarga dan rakan tentang kepentingan kawasan hijau.*					
6.	I always get latest updates in efforts of preserving green areas./*Saya sentiasa mendapatkan maklumat terkini dalam usaha memelihara kawasan hijau.*					

7.	I would participate in programs that are related to the preservation of green areas./*Saya akan mengambil bahagian dalam program yang berkaitan dengan pemeliharaan kawasan hijau.*					
8.	When I visit green areas, I'd bring my own container for drinks and food that could be reused so that it'd would reduce the amount of total garbage that might pollute green areas./*Ketika saya mengunjungi kawasan hijau, saya membawa bekas air dan makanan yang boleh diguna semula agar dapat mengurangkan penghasilan sampah yang boleh mencemarkan kawasan hijau.*					
9.	I would read brochures that are related to all aspects of green areas if given to me./*Saya akan membaca risalah berkaitan segala aspek kawasan hijau jika diberi kepada saya.*					
10.	I search and find information about the importance of green space areas./*Saya berusaha mencari maklumat tentang segala aspek berkaitan kawasan hijau.*					
11.	I would share information on all aspects that are related to green areas with family and friends./*Saya akan berkongsi maklumat tentang segala aspek berkaitan kawasan hijau bersama keluarga dan rakan-rakan.*					
12.	I'm ready to lend some money to donate for preservation of green areas./*Saya bersedia mengeluarkan duit untuk sumbangan bagi pemeliharaan kawasan hijau.*					
13.	I am willing to contribute my energy in (Communal works) to maintain the sustainability of green areas./*Saya sanggup menyumbang dari segi tenaga (Gotong royong) untuk mengekalkan kelestarian kawasan hijau.*					

14.	I will report to authorities if I see any damaging acts to green areas (Cutting down plants or trees)./*Saya akan melaporkan kepada pihak berkuasa apabila melihat perbuatan yang menjejaskan kawasan hijau (Menebang pokok).*					
15.	I am willing to defend green areas from getting repealed or revoked to other uses./*Saya sanggup mempertahankan kawasan hijau daripada dimansuhkan kepada kegunaan lain.*					
16.	I am willing to participate in Non-governmental Organizations that focus on green areas conservation efforts./*Saya sanggup menyertai badan bukan kerajaan yang menjurus terhadap usaha pemeliharaan kawasan hijau.*					
17.	I support efforts to urge the government to gazette more green areas because of its importance./*Saya menyokong usaha mendesak kerajaan mewartakan lebih banyak kawasan hijau disebabkan kepentingannya.*					

Section D: RECOMMENDATION

Bahagian D: Cadangan

INSTRUCTIONS: Please tick your answer based on the questions below

ARAHAN: Sila tandakan jawapan anda untuk soalan di bawah

1. In your opinion, what is the most appropriate medium to disseminate information regarding the importance of green areas? Choose only **ONE.**/Pada pendapat anda, apakah medium yang paling sesuai untuk mendapatkan maklumat mengenai kepentingan kawasan hijau. *Sila pilih **SATU** sahaja.*

   ☐ Mass media (Television/Radio)/*Media massa (Television/Radio)*

   ☐ Printed media (Newspaper/Magazine)/*Media cetak (Surat khabar/ Majalah)*

   ☐ Social Media (Instagram, Facebook, Twitter, Tiktok)/*Media Sosial (Instagram, Facebook, Twitter, Tiktok)*

   ☐ Friends/ *Rakan-rakan*

   ☐ Lectures/*Kuliah*

   ☐ Parents/*Ibu-bapa*

   ☐ Non-governmental Organization/*Badan bukan kerajaan*

   Others, Please state:/Lain-lain. Sila nyatakan:_____

2. What is the most effective measure to preserve the green area? Choose only **ONE**/*Apakah kaedah yang paling berkesan untuk melestarikan kawasan hijau? Pilih **SATU** sahaja.*

- ☐ Strengthen the policies and the legislation regarding the green areas./*Memperkukuhkan dasar dan perundangan berkaitan kawasan hijau.*
- ☐ Engagement of the communities in the green area management./*Penglibatan komuniti dalam pengurusan kawasan hijau.*
- ☐ Enhancing reforestation or replantation./*Mempertingkatkan penghutanan semula atau penanaman semula.*
- ☐ Allocate sufficient funds for the green management./*Memperuntukkan dana yang mencukupi untuk pengurusan kawasan hijau*
- ☐ Strengthen the role of government agencies (local authority) in efforts to preserve green areas./*Memperkasa peranan agensi kerajaan (kerajaan tempatan) berkaitan dalam usaha melestarikan kawasan hijau*

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG, SELANGOR, MALAYSIA

FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE :

Knowledge, Attitude And Knowledge **on** The Importance of Green Space Area Among Students in Universiti Putra Malaysia.

2. INTRODUCTION:

As a consequence of the rapid urban expansion, the land cover for green space areas has become degraded. The population growth due to urbanization, increases demand for new housing areas, making the clearing out of the green space area like forest deemed inevitable, especially in the urban area. Hence, resulting in natural disasters like climate change, global warming, heat waves, extreme precipitation events, flooding, and drought indirectly affect the country's economy, social hesitancy, and degenerate health and well-being (Kabisch et al., 2017).

Students represent a significant percentage of the young generation and playing a crucial role in sustainable development and will have an impact on green space areas. However, Previous study by Tiong et al. (2020) revealed that the students' knowledge regarding the environment, in general, is only on the average level depending on their age, educational background, and academic field of study.

This research study is conducted to assess the knowledge, Attitude and Knowledge on The Importance of Green Space Area Among Students in UPM, Serdang.

3. WHAT WILL YOU HAVE TO DO?

You are needed to sign a consent form (respondent) to indicate your interest in this study. After anwering the consent form, you will be needed to return the form to the investigator before answering the questionnaire. The questionnaire will be self-administrated and via online platform. The questionnaoire will consist of 4 sections which are sociodemographic information, general questions, KAP on Green Space Areas and recommnedations. You are required to answer all four sections. You will also have the access to the resulf of the study. This study is voluntary, and the participant may withdraw anytime without penalty or loss of benefit to which the participant is entitled.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

The staffs and the students that are not in their first or final year of the selected courses

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

As a subject, you will be able to know your knowledge level regarding the importance of green space area. Simultenously, you will indirectly able to enhance the awareness on the importance of the green space area.

(b) **TO THE INVESTIGATOR?**

The researcher of this study able to obtain primary data that will be used as reference for future study.

6. WHAT ARE THE POSSIBLE RISKS?

There will be no possible risk associated with the respondents who are participating in this study.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

All information and identity obtained during this study will remained confidential. The data that will be collected in this study is for education and research purpose.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

For any inquiries, please contact:

Researcher contact information

Name : Dhamirah binti Yusof

Contact number: 014-3214671

Email address : 196025@student.upm.edu.my

Supervisor contact information

Name : Assoc. Prof. Dr Haliza binti Abdul Rahman

Department : Department of Environmental and Occupational Health, Faculty of Medicine and Health Sciences

Contact number: 012-2111129

Email address : dr.haliza@upm.edu.my

Please initial here if you have read and understood the contents of this page_____

9. CONSENT

I …… Identity Card No. …… address……..

……..hereby voluntarily agree to take part in the research stated above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature ……..…… Signature ……..…….
(Respondent) (Witness)

Date :…….. Name :……..

I/C No. :……..…...

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date ……..…… Signature ……..…….
(Researcher)

10 AUGUST 2021
VERSION: 2

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG, SELANGOR, MALAYSIA

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN:

Pengetahuan, Sikap, dan Amalan tentang Kepentingan Kawassan Hijau di Kalangan Pelajar di Universiti Putra Malaysia.

2. PENGENALAN

Akibat daripada pengembangan bandar yang pesat, kawasan hijau telah berkurang. Pertambahan populasi akibat daripada urbanisasi, telah meningkatkan permintaan untuk kawasan perumahan baru, menjadikan pembukaan tanah baru tidak dapat dielakkan, terutamanya di kawasan bandar. Oleh itu, mengakibatkan bencana alam seperti perubahan iklim, pemanasan global, gelombang panas, kejadian hujan lebat, banjir, dan kemarau yang di mana secara tidak langsung mempengaruhi ekonomi negara, masalah sosial, dan kemerosotan kesihatan dan kesejahteraan penduduk (Kabisch et al., 2017).

Majoriti daripada generasi muda adalah terdiri daripada pelajar di mana mereka memainkan peranan penting dalam pembangunan lestari dan akan memberi impak yang besar kepada kemajuan kawasan hijau. Walau bagaimanapun, kajian terdahulu oleh Tiong et al. (2020) telah mendedahkan bahawa pengetahuan pelajar mengenai alam sekitar, secara umum, hanya pada tahap memuaskan bergantung kepada usia, latar belakang pendidikan, dan bidang akademik mereka.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Anda perlu menanda tangani borang persetujuan (responden) untuk menyatakan minat anda dalam menyertai kaji selidik ini, selepas menjawab borang persetujuan responden, anda dikehendaki untuk membuat penyerahan semula borang persetujuan kepada penyelidik sebelum menjawab borang soal-selidik. Borang soal-selidik yang diberikan adalah secara kendiri dan melalui platform atas talian. Borang soal-selidik terdiri daripada 4 bahagian iaitu maklumat sosiodemografi, pertanyaan umum, Sikap, Amalan, Pengetahuan mengenai kepentingan kawasan hijau dan cadangan. Anda dimimta untuk menjawab keempat-empat bahagian tersebut. DI akhir kajian ini, anda juga layal untuk mendapat akses ke atas keputusan kajian ini. Kajian ini dilakukan secara sukarela, dan anda boleh menarik diri bila-bila masa tanpa penalti atau kehilangan faedah yang layak diberikan kepada anda.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Kakitangan dan pelajar yang bukan berada dalam tahun satu dan tahun akhir kursus yang dipilih.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Sebagai subjek, anda dapat mengetahui tahap pengetahuan anda mengenai kepentingan kawasan hijau. Pada masa yang sama, anda secara tidak langsung juga dapat mempertingkatkan kesedaran anda mengenai kepentingan kawasan hijau.

b) KEPADA PENYELIDIK?

Penyelidik akan memperoleh data primer untuk digunakan sebagai rujukan bagi kajian yang akan datang.

6. ADAKAH IA BERISIKO?

Tiada sebarang risiko terhadap responden yang mengambil bahagian dalam kajian ini.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Segala maklumat dan identiti responden yang diperoleh semasa kajian ini akan dirahsiakan. Data yang diperoleh dari soal-selidik in akan digunakan untuk tujuan pembelajaran dan kajian.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Jika terdapat sebarang pertanyaan, sila hubungi:

Maklumat perhubungan penyelidik

Nama : Dhamirah binti Yusof

No. Tel : 014-3214671

Alamat e-mel : 196025@student.upm.edu.my

Maklumat perhubungan penyelia

Nama : Assoc. Prof. Dr Haliza binti Abdul Rahman

Jabtaan : Jabatan Kesihatan Persekitaran dan Pekerjaan

No. Tel : 012-2111129

Alamat e-mel : dr.haliza@upm.edu.my

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya…… No Kad Pengenalan. …… beralamat…… ……..dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan ……..…… Tandatangan ……..…….
(*Responden*) (*Saksi*)

Tarikh :…….. Nama :……..…..

No. K/P: ……..…..

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh ……..…… Tandatangan ……..…….
(*Penyelidik*)

ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS (JKEUPM)
UNIVERSITI PUTRA MALAYSIA

Research title	**:**	**Knowledge, Attitude, and Practice on the Importance of Green Space Area Among Students in Universiti Putra Malaysia.**
Study Site	**:**	**Faculty of Medicine and Health Science, Universiti Putra Malaysia**
JKEUPM Ref No.	**:**	**JKEUPM-2021-365**
Researcher	**:**	**Dhamirah Binti Yusof**
Supervisor	**:**	**Assoc. Prof. Dr. Haliza Binti Abdul Rahman**

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 14/6/2021
2. Respondent Information Sheet & Consent (English), Version 2 dated 1/9/2021
3. Respondent Information Sheet & Consent (Malay), Version 2 dated 1/9/2021
4. Proposal (English), Version 2 dated 25/8/2021
5. Questionnaire/Interviews (English), Version 1 dated 14/6/2021
6. Questionnaire/Interviews (Malay), Version 1 dated 14/6/2021
7. Curriculum Vitae of:
    a. Assoc. Prof. Dr. Haliza Binti Abdul Rahman

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

[X] Approved

[X] **Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**

[ ] Disapproved

Please note that the approval is **VALID UNTIL 22 SEPTEMBER 2022**

Researchers should comply with the following:

I. Complete a Study Final Report upon study completion (Form 3.2).

II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

III. Applicable for Clinical Trial Studies and Clinical interventional Studies only: Progress Report has to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs) and Protocol Deviation/ Violation at all JKEUPM approved sites to