UNIVERSITI TEKNOLOGI MARA

A FRAMEWORK OF URBAN LAND USE PLANNING ON HEALTHY LIFESTYLE: A CASE STUDY OF PETALING JAYA, SELANGOR

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PhD

June 2026

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A FRAMEWORK OF URBAN LAND USE PLANNING ON HEALTHY LIFESTYLE: A CASE STUDY OF PETALING JAYA, SELANGOR

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Thesis submitted in fulfilment
of the requirements for the degree of
Doctor of Philosophy
(Built Environment)

Faculty of Built Environment

June 2026

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ABSTRACT

Urbanisation has significantly reshaped urban environments, with increasing implications for residents' health and wellbeing. Urban land use planning plays a critical role in shaping daily lifestyle behaviours by influencing opportunities for physical activity, access to healthy food, and overall neighbourhood liveability. In Malaysia, the rising prevalence of non-communicable diseases has highlighted the need to better understand how urban planning decisions contribute to healthy lifestyle outcomes. However, existing studies remain fragmented, often examining physical activity and dietary behaviour separately and with limited integration of specific urban land use planning elements within a comprehensive framework. This study aims to develop an integrated framework of urban land use planning that supports healthy lifestyle outcomes, with a specific focus on physical activity and healthy dietary behaviour among residents of Petaling Jaya, Selangor. A mixed-methods research design was adopted using methodological triangulation. The study was conducted in three phases: identification of framework components through a comprehensive literature review; quantitative data collection via a structured questionnaire survey administered to residents of Petaling Jaya; and expert validation through a semi-structured interview. Field observations, including spatial mapping using IPlanMalaysia and Google Street View as well as on-site surveys, were undertaken to objectively assess neighbourhood urban environment features. Quantitative data were analysed using descriptive statistics, correlation analysis, and multiple regression analysis, while qualitative insights from observation and expert input were used to contextualise and validate the findings. The findings demonstrate that key urban land use planning features particularly the provision, accessibility, convenience, and safety of green spaces, recreational facilities, pedestrian infrastructure, transit stops, and neighbourhood food outlets significantly influence residents' physical activity participation and dietary behaviour. Supportive and well-connected environments were associated with higher engagement in moderate and vigorous physical activity, while improved access to diverse food outlets facilitated healthier dietary practices. Demographic characteristics such as age, gender, and body mass index were found to moderate the relationship between the urban environment and healthy lifestyle behaviours. Based on these findings, the study proposes a comprehensive framework for urban land use planning in Petaling Jaya that explicitly links planning-related urban environment features to behavioural pathways and healthy lifestyle outcomes. The framework offers both theoretical and practical contributions by providing an evidence-based reference for urban planners, policymakers, and public health practitioners in designing healthier and more liveable urban environments in Malaysia.

ACKNOWLEDGEMENT

"In the name of Allah, the Most Gracious and the Most Merciful"

In the Name of Allah S.W.T, the Most Generous and the Most Compassionate. All praise and thanks to Allah, the Almighty God and the Owner of the Universe. Alhamdulillah. First and foremost, all praise to Allah SWT for His blessing, guidance, and giving me strength and opportunity to embark on my philosophical doctorate's degree and for completing this challenging and eventful journey successfully. I am extremely grateful to my supervisors, Associate Professor Dr Oliver Ling Hoon Leh, Associate Professor TPr. Dr Marlyana Azzaty Marzukhi and Dr Farah Ayunie Sahafea for their invaluable advice, continuous support, and patience during my PhD study. Their immense knowledge and plentiful experience have encouraged me in all the time of my academic research and daily life. Without their guidance and dedicated involvement in every step and corners throughout the process, the thesis would have never been accomplished. I would also like to thank to all people who had participated directly and indirectly in this research, whether from public sector agencies or private sector organisation. Also, to the residents from selected neighbourhood areas in Petaling Jaya who willingly participated in the research. I would like to express my outmost gratitude to my beloved parents, Rosli Bin Abdul Latiff and [redacted], my supportive siblings, Shahrul Adha Bin Rosli, Shahim Adaham Bin Rosli, Aisyah Aiza Rosli and Ana Safiyyah Binti Rosli. Without their tremendous understanding and encouragement in the past few years, it would be impossible for me to complete my study. I really appreciate all the support I received from every single one of you. Finally, I would also like to thank Dr Farrah Zurhaira Ismail, the Coordinator of Research Program and all the staffs in the Centre of Postgraduate Studies College of Built Environment for their technical support throughout my study. I would like to thank all my friends from the FSPU Postgraduate Program, my cubical 2 mates and UiTM colleagues. It is their kind help and support that have made my study years is a wonderful time. Thank You

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CHAPTER 1
INTRODUCTION

1.1 Background of the Study

Urbanisation has emerged as a dominant global trend, with more than half of the world's population currently residing in urban areas, a proportion projected to increase further in the coming decades (United Nations, 2022). As cities continue to expand, urban land use planning plays an increasingly critical role in shaping not only the physical structure of urban environments but also the health and wellbeing of urban populations. Urban land use planning refers to the systematic allocation and regulation of land for various functions, including residential, commercial, transportation, recreational, and institutional uses. These spatial configurations influence daily lifestyle behaviours by determining opportunities for physical activity, access to healthy food, and patterns of social interaction (Giles-Corti et al., 2016).

A growing body of literature highlights the relationship between the built environment and health-related behaviours. Land use characteristics such as mixed land use, residential density, street connectivity, availability of public open spaces, and proximity to food outlets have been shown to either facilitate or constrain healthy lifestyle practices, including walking, cycling, and healthy dietary choices (Frank et al., 2005; Sallis et al., 2016). For instance, neighbourhoods with well-connected pedestrian networks and accessible green spaces are associated with higher levels of physical activity, while environments that provide convenient access to healthy food options are linked to improved dietary patterns.

These relationships are particularly relevant in the context of non-communicable diseases (NCDs), which have become the leading causes of morbidity and mortality worldwide. In Malaysia, NCDs such as cardiovascular disease, obesity, diabetes, and certain cancers account for a substantial proportion of premature deaths and are closely associated with modifiable lifestyle behaviours, including physical inactivity and unhealthy diets (World Health Organization [WHO], 2021). As such, the design and planning of urban environments have increasingly been recognised as important determinants of population health.

Within the Malaysian context, Petaling Jaya provides a relevant case study due to its rapid urban transformation. Originally developed as one of the country's earliest planned townships, Petaling Jaya has evolved into a highly urbanised city with a population exceeding 600,000 residents (Department of Statistics Malaysia, 2023). While this growth has brought economic development and improved infrastructure, it has also contributed to several urban challenges, including increased dependence on private vehicles, traffic congestion, limited walkable environments, and unequal access to public open spaces. These conditions have the potential to discourage active living and healthy dietary behaviours among residents.

Despite increasing awareness of the links between urban form and health, health considerations remain insufficiently embedded within urban land use planning practices in many Malaysian cities. In Petaling Jaya, planning decisions have historically prioritised economic growth and infrastructure expansion, often with limited emphasis on creating environments that actively support healthy lifestyles (Zanudin et al., 2019). Consequently, many residents encounter built environment barriers that restrict opportunities for physical activity and access to healthy food.

Furthermore, existing studies in Malaysia tend to examine individual aspects of the built environment or health behaviours in isolation, with limited integration of land use planning elements into a comprehensive analytical framework. There remains a lack of a systematic framework that explains how multiple land use planning components interact to influence healthy lifestyle behaviours, particularly within the local urban context.

In response to this gap, this research seeks to develop a conceptual framework that explains the relationship between urban land use planning and healthy lifestyle behaviours, with a specific focus on physical activity and dietary practices in Petaling Jaya. By providing an integrated understanding of how land use planning influences everyday health behaviours, the findings aim to inform urban planners, public health practitioners, and policymakers in designing urban environments that promote long-term health and wellbeing.

1.2 Problem Statement

Environmental health refers to aspects of human health that are determined by physical, social, and built environmental factors. Globally, environmental determinants are estimated to contribute to nearly one-quarter of all deaths and the total burden of disease, highlighting the significant role of the environment in shaping population health outcomes (World Health Organization [WHO], 2008). In urban contexts, proper land use planning including the provision of safe resources such as clean water, air, and food, as well as conducive environments for living, working, recreation, and transportation plays a critical role in promoting a healthy lifestyle.

Previous studies have established that human health, particularly the prevalence of non-communicable diseases (NCDs), is closely related to lifestyle behaviours such as physical activity and dietary habits (Siti Nur Afiqah et al., 2015). These lifestyle behaviours are, in turn, influenced by urbanisation processes and land use patterns that shape residents' daily environments. Evidence from developed countries consistently demonstrates that supportive built environments such as accessible green spaces, walkable neighbourhoods, and connected transport systems encourage physical activity and contribute to improved health outcomes (WHO, 2008). However, the extent to which these relationships apply in developing and rapidly urbanising countries remains less clear.

In Malaysia, the burden of NCDs continues to rise and presents a major public health challenge. According to the World Health Organization (2017), NCDs including cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes are the leading causes of death globally. Cardiovascular disease accounts for the highest proportion of NCD-related mortality, a trend that is also reflected in Malaysia. Data from the Department of Statistics Malaysia (2017) indicate that ischaemic heart disease, a major component of cardiovascular disease, was the principal cause of death up to 2016. The WHO (2017) further identifies physical inactivity and unhealthy diet as key modifiable risk factors contributing to NCDs, alongside metabolic factors such as obesity, hypertension, elevated blood glucose levels, and high blood lipid levels.

Despite growing awareness of the importance of healthy lifestyles, the level of physical activity and healthy living among Malaysians remains relatively low. Mansor and Harun (2014) emphasised that adopting an active lifestyle is essential for maintaining both physical and mental health and for preventing chronic diseases among

urban residents. Similarly, healthy dietary practices combined with regular physical activity are widely recognised as fundamental components of a healthy lifestyle. Nevertheless, national reports suggest that these practices have not been widely adopted. According to a statement reported by Bernama (2016), only 40% of Malaysians were reported to practise a healthy lifestyle through regular participation in sports and physical activities. The increasing prevalence of obesity and related conditions such as heart disease, hypertension, and diabetes further reflect the seriousness of unhealthy lifestyle patterns in the country.

While individual lifestyle choices are often emphasised in public health discourse, emerging evidence suggests that these behaviours are strongly shaped by neighbourhood environments and urban land use planning decisions. However, existing health behaviour theories, such as the Social Ecological Model and the Theory of Planned Behavior, often conceptualise the built environment in broad terms and provide limited explanation of how specific urban land use planning elements such as green spaces, commercial areas, pedestrian infrastructure, cycling facilities, safety, and accessibility influence residents' physical activity and dietary behaviour. Furthermore, most existing studies examine the relationship between the built environment and physical activity or between the built environment and dietary behaviour as separate outcomes, rather than investigating both behaviours simultaneously (Refer Table 1.1 and Table 1.2).

This fragmentation is particularly evident in the Malaysian context, where integrated analyses of how neighbourhood environments influence both physical activity and diet remain limited. Therefore, there is a clear need for an integrated theoretical framework that explicitly links urban land use planning elements to perceived and observed neighbourhood environmental conditions and, subsequently, to healthy lifestyle behaviours. Addressing this gap is crucial for improving understanding of how urban planning can contribute to healthier lifestyles and for informing evidence-based land use planning policies in Malaysia. This study seeks to fill this gap by proposing and empirically testing an integrated urban land use planning and healthy lifestyle framework using a triangulated methodological approach.

The Social Ecological Model (SEM) (Refer Figure 1.1) has been widely applied in physical activity and public health research to explain health behaviour as the outcome of multiple interacting levels of influence, including individual, social, physical environmental, and policy factors. This model provides a valuable foundation

for understanding that lifestyle behaviours are not determined solely by personal choice but are shaped by broader environmental and structural contexts. However, despite acknowledging the role of the physical environment, the SEM typically conceptualises it in a broad and general manner. The model does not explicitly operationalise specific urban land use planning elements such as the provision of green spaces, access to shops and services, pedestrian walkways, or cycling infrastructure, nor does it sufficiently address the mechanisms through which urban planning decisions influence daily lifestyle behaviours. As a result, the application of SEM in built environment studies often overlooks the role of urban land use planning as a structured and measurable determinant of healthy lifestyle, highlighting a conceptual gap in terms of urban land use planning specificity.



Figure 1.1 Social Ecological Model

Table 1.1
Malaysian Empirical Studies Examining Urban Land Use Characteristics and Health Outcomes

Author (Year)	Study Area	Urban Land Use / BE Variable(s)	Health Outcome Measured	Methodological Rigor & Innovation
Rosli & Ling et al. (2023)	**Petaling Jaya**, Selangor	Green areas, sports facilities, facility convenience, safety, and distance/proximity.	Physical Activity Vigorous and moderate (frequency/ duration)	**Innovative Mapping:** Combined resident surveys with radius-based GIS mapping of green space accessibility in a mature urban center.
Ling et al. (2020)	**Shah Alam** (Section 7), Selangor	Neighbourhood environmental quality (physical & social aspects).	Non-Communicable Diseases (Heart disease, HBP) and Physical Activeness.	**Correlation Analysis:** Linked subjective perceptions of neighborhood quality directly to clinical NCD prevalence.
Mohd Noor et al. (2018)	**Kuala Lumpur** (Sri Pahang Public Housing)	Planning of facilities (availability, design, location, and maintenance).	Physical Inactivity and Active Living lifestyle.	**High-Density Focus:** Specifically analyzed the "slumification" of public housing and its impact on the physical activity of the urban poor.
Penang Health Study (2023/24 Context)	**Penang** (Mukims)	**Food Environment:** Density of kopitiams, fast food, and 24/7 convenience stores.	**Type 2 Diabetes (T2D)** cases (geocoded).	**High Rigor:** Used **Multi-scale Geographically Weighted Regression (MGWR)** to geocode 11,000+ patients against local land use data.
Ab Latif et al. (2023)	**Petaling Jaya** (Taman Aman Park)	Physical attributes of urban parks (accessibility, safety, amenities).	Perceived Mental Well-being and Stress Alleviation.	**IPA Framework:** Employed **Importance-Performance Analysis (IPA)** to prioritize land use interventions for health benefits.
Khazanah Research Institute (2023)	**Nationwide** (Urban Clusters)	Neighbourhood environment indicators (connectivity, density).	**Dietary Patterns**, Obesity, and MHLI (Healthy Lifestyle Index).	**Large-scale Synthesis:** Integrated national health data with urban indicators to create a multidimensional lifestyle index.

Table 1.2
Urban Food Environment Studies and Dietary Health Outcomes in Malaysia

Study / Author	Year	Focus Area	Urban Land Use / BE Variable(s)	Health Outcome Measured	Methodological Rigor & Innovation
Kuala Lumpur Adolescent Study	2024	Kuala Lumpur (Low-income)	**Food Swamps & Deserts:** Density of fast-food outlets vs. supermarkets; Perceived accessibility.	Dietary Quality (HEI scores) and energy-dense food intake.	**Neighborhood Mapping:** Used GIS to objectively map "swamps" (unhealthy density) vs. subjective perception of residents.
Khazanah Research Institute (KRI)	2023	National Urban Centers	**Retail Diversity:** Proximity and availability of 24/7 convenience stores vs. fresh markets.	Obesity rates and "Desirability" of unhealthy vs. healthy diets.	**Policy-Data Synthesis:** A massive multi-sectoral review linking urban zoning laws to the "convenience" of unhealthy choices.
Rahman et al.	2023	**Selangor** (Low-income)	**Infrastructure Barriers:** Geographical distance to markets and lack of transit for grocery shopping.	Food Insecurity and prevalence of NCD-related dietary patterns.	**Thematic Rigor:** Used in-depth qualitative interviews to uncover "invisible" infrastructure barriers in urban Selangor.
JSSM Study (Exploring the link)	2021	Urban Adults (General)	**PNFE (Perceived Food Environment):** Presence of buffets, cafeterias, and neighborhood food variety.	BMI (Body Mass Index) and perceived Diet Quality.	**Path Analysis:** Used structural equation modeling to show how the "Perceived Environment" directly predicts BMI outcomes.
Amat Jani / Wahab et al.	2020	Klang Valley (Urban Fringe)	**Land-Use Conversion:** Loss of agricultural land to residential sprawl (Urban Sprawl).	Food Security and local Self-Sufficiency Level (SSL).	**Sprawl Analysis:** Linked "land-intensive" urbanization directly to the decline in local fresh produce availability.
Nik Rosmawati et al.	2017	Urban School Compounds	**Micro-Zoning:** Proximity of "junk food" vendors and processed food availability in/near schools.	Adolescent micronutrient deprivation and snacking habits.	**Niche-Environment Focus:** Analyzed the "buffer zones" around schools as a specific urban planning policy gap.

1.3 Research Aim

To develop a framework for urban land use planning that integrates and prioritizes the promotion of healthy lifestyle outcomes among the residents.

1.4 Research Objective

i. To analyse the current conditions of urban land use features in Petaling Jaya, focusing on factors identified as key determinants of healthy lifestyle
ii. To evaluate the level of healthy lifestyle among residents of Petaling Jaya based on their engagement in physical activity and healthy diet.
iii. To determine the relationship between urban land use features planning and healthy lifestyle components of residents in Petaling Jaya.
iv. To synthesize the findings from the relationship analysis in order to identify the urban environment features that enhance healthy lifestyle in Petaling Jaya.
v. To propose a comprehensive framework of urban land use planning that integrates the identified urban land use features for supporting a healthy lifestyle among residents in the City of Petaling Jaya, Selangor

1.5 Research Questions

RQ 1: What are the existing urban land use features in Petaling Jaya that act as key determinants of a healthy lifestyle?
RQ 2: To what extent do the residents of Petaling Jaya currently engage in physical activity and maintain a healthy diet?
RQ 3: How do specific urban land use planning features influence the physical activity and dietary habits of Petaling Jaya residents?
RQ 4: Which specific urban environment features are most critical in enhancing healthy lifestyle outcomes in the local context?
RQ 5: How can identified urban land use features be integrated into a comprehensive planning framework for the City of Petaling Jaya?

1.6 Research Hypothesis

H_1 There is a significant positive relationship between the quality of urban land use features (such as walkability and park proximity) and the frequency of physical activity among Petaling Jaya residents.

H_2 The diversity and accessibility of land use specifically the presence of food outlet significantly influence the healthy dietary habits of the residents.

H_3 Residents living in areas with high-quality urban environment features will exhibit significantly healthy lifestyle outcomes compared to those areas with poor land use integration.

1.7 Research Scopes

This study focuses on the relationship between urban land use planning and healthy lifestyle among residents in selected sections of Petaling Jaya, Selangor. The scope of the study emphasises land use characteristics such as land use mix, accessibility to facilities, availability of green and recreational spaces, and neighbourhood walkability, and their influence on physical activity and healthy dietary behaviour.

The geographical scope of the study is limited to seven selected sections in Petaling Jaya, namely SS2, SS4, SS8, SS9, Section 3, Section 9, and Section 21, which were chosen based on accessibility and residents' willingness to participate. The population scope includes residents aged 19 years and above who reside within the selected sections.

In terms of methodology, this study employs a questionnaire survey as the main data collection method to capture residents' perceptions and behaviours related to healthy lifestyle. Field observation is conducted to assess the actual physical condition of the built environment, while expert interviews are used to obtain general professional insights to support the interpretation of findings. The study adopts a cross-sectional approach, with data collected within a specific period, and does not examine changes over time or clinical health outcomes.

1.8 Significance of The Research Case Study

Petaling Jaya was selected as the case study for this research due to its distinctive urban development trajectory, which makes it particularly suitable for examining the relationship between urban land use planning and healthy lifestyle outcomes. Established in 1952 as Malaysia's first planned satellite town to address overcrowding in Kuala Lumpur, Petaling Jaya was deliberately designed with structured residential, commercial, and institutional zones. This planned origin provides a strong foundation for analysing how subsequent urban growth and land use transformations have influenced residents' daily activities and health-related behaviours.

The city exhibits a wide range of land use patterns, encompassing early planned neighbourhoods such as Old Town (Sections 1–3), later suburban developments including Damansara and Kota Damansara, as well as major commercial centres such as Section 52 and Bandar Utama (previously within Petaling Jaya's administrative boundary). This spatial diversity enables comparative assessment of how different zoning practices and urban design phases affect accessibility to physical activity opportunities, green spaces, and healthy food environments.

Petaling Jaya is also among the more densely populated urban centres in Selangor. Recent estimates suggest a population exceeding 600,000 residents, with some sources indicating figures approaching 800,000. This demographic scale reflects a complex socio-economic and cultural composition, making the city particularly valuable for examining lifestyle-related health behaviours across diverse population groups (Cities ABC, 2024; PJ Learning City, 2024).

In terms of infrastructure and connectivity, Petaling Jaya is well integrated into the Klang Valley metropolitan region. The city is connected by major arterial routes such as the Federal Highway, which historically divided the city, and is served by multiple public transport systems including the Mass Rapid Transit (MRT), Light Rail Transit (LRT), and bus networks. These characteristics provide an appropriate context for investigating how transport infrastructure and mobility options influence active commuting, walkability, and sedentary behaviour patterns (World Facts, 2024; Wikipedia, 2024).

Petaling Jaya also contains notable green and recreational spaces, including Taman Jaya and the Kota Damansara Community Forest Park. The presence of these spaces positions the city as a suitable setting for examining the role of urban green

infrastructure in supporting physical activity, recreation, and social wellbeing. Although formal academic documentation on specific parks is limited, these spaces are widely recognised within the Petaling District and local planning discourse.

The city's food environment is equally varied, ranging from traditional wet markets in older neighbourhoods to large-scale retail and commercial complexes such as 1 Utama and Paradigm Mall. This diversity facilitates examination of how urban form, retail concentration, and land use planning influence residents' access to healthy versus processed food options and shape dietary behaviours (Cities ABC, 2024).

From a governance perspective, Petaling Jaya has undergone significant administrative transitions, evolving from a satellite township in the 1950s to a municipal council in 1977, and subsequently attaining city status in 2006. These changes provide a longitudinal perspective on how shifts in planning authority and governance structures may influence urban development priorities, public health infrastructure, and service provision over time (Museum Volunteers, JMM, n.d.; Wikipedia, 2024).

Overall, as one of Malaysia's earliest planned towns, Petaling Jaya represents an important exemplar of national urbanisation processes. Insights derived from this case study have the potential to generate transferable lessons for other rapidly urbanising cities in Malaysia and comparable contexts, particularly in addressing the intertwined challenges of urban land use planning, lifestyle behaviour, and population health.

1.9 Significance of The Study

This study is significant in enhancing the understanding of the relationship between urban land use planning and healthy lifestyle behaviours within the Malaysian urban context, with specific reference to Petaling Jaya. As one of the earliest planned towns in Malaysia and a rapidly urbanised city, Petaling Jaya presents a relevant case for examining how land use patterns, neighbourhood design, and accessibility to facilities influence residents' physical activity and dietary practices. The findings of this study provide locally grounded evidence that is essential for strengthening health-oriented urban planning in Malaysian cities.

From a theoretical perspective, this study contributes to urban planning and public health literature by developing a conceptual framework that integrates land use planning components with healthy lifestyle outcomes. While existing studies in

Malaysia often address physical activity or health issues independently, limited research has systematically linked these outcomes to land use planning at the neighbourhood level. This study addresses this gap by contextualising international planning and health theories within Malaysian urban development characteristics, such as mixed land use patterns, residential density, and access to neighbourhood facilities.

From a methodological perspective, the study is significant as it adopts a mixed-method approach that combines questionnaire surveys, field observation, and expert interviews. This approach enables a comprehensive assessment of both residents' perceptions and the actual physical conditions of the study area. The inclusion of observation strengthens the validity of the findings by capturing real land use characteristics and environmental features that may not be fully reflected through survey data alone. The methodological approach demonstrated in this study provides a practical reference for future urban planning and health-related research in Malaysia.

In terms of practical significance, the findings offer valuable insights for urban planners, local authorities, and built environment professionals, particularly within local councils such as Majlis Bandaraya Petaling Jaya (MBPJ). The study identifies specific land use planning factors that support or constrain healthy lifestyle practices, which can inform neighbourhood planning, urban design, and redevelopment initiatives. The results can assist planners in improving the provision and spatial distribution of recreational facilities, green spaces, and access to daily amenities that promote active living.

From a policy perspective, this study supports the integration of health considerations into statutory and non-statutory planning documents, including local plans and development guidelines. The proposed framework may be used as a reference tool to evaluate existing urban neighbourhoods and to guide future development towards healthier urban environments. This aligns with national and local aspirations related to sustainable development, liveable cities, and community well-being.

Finally, the study holds social significance by addressing contemporary public health challenges in Malaysian cities, particularly issues related to sedentary lifestyles and unhealthy dietary behaviours among urban residents. By highlighting the role of urban land use planning in shaping lifestyle choices, this research contributes to the creation of healthier, more liveable neighbourhoods in Petaling Jaya and offers insights that may be applicable to other urban areas in Malaysia.

1.10 Organization of the Thesis

This thesis is organised into six chapters, each of which contributes to a comprehensive understanding of the relationship between urban land use planning and healthy lifestyle behaviours. The structure of the thesis is outlined as follows:

i. Chapter one: Introduction

This chapter introduces the study by presenting the research background, problem statement, research aim, research objectives, and scope of the study. It establishes the rationale for examining the relationship between urban land use planning and healthy lifestyle behaviours and provides the contextual foundation for the research.

ii. Chapter 2: Literature Review

This chapter reviews relevant literature on urban land use planning and healthy lifestyles. It examines key theories, concepts, and empirical studies related to the built environment, physical activity, and dietary behaviour. The chapter also identifies gaps in existing research and informs the development of the conceptual framework for the study.

iii. Chapter 3: Research Methodology

This chapter describes the research design and methodological approach adopted in the study. A mixed-methods approach is employed, incorporating quantitative and qualitative techniques. Quantitative data are collected through questionnaire surveys and analysed using the Statistical Package for the Social Sciences (SPSS), while qualitative data are obtained through structured observations of the study area. The chapter also details the data collection procedures, variables, and analytical techniques used in the study.

iv. Chapter 4: Results and Analysis

This chapter presents the findings from observations and respondents' perceptions regarding urban environmental features in their respective sections. The observation process assessed various aspects, including land use distribution,

accessibility to green areas and sports facilities, the distribution of shops and stores, safety, and convenience within each section. Additionally, the chapter explores respondents' perceptions of key urban environment features, such as the provision of green spaces, accessibility, safety, and the overall convenience of facilities.

v. Chapter 5: Discussion

This chapter discusses and interprets the findings presented in Chapter 4 through a triangulation approach. Quantitative results, observational findings, and expert interview insights are integrated to provide a comprehensive understanding of the relationship between urban land use planning and healthy lifestyle behaviours in the City of Petaling Jaya. The chapter also relates the findings to existing literature and evaluates the achievement of the research objectives.

iv Chapter 6: Recommendations and Conclusion

The final chapter presents recommendations for improving urban land use planning in the City of Petaling Jaya to promote a healthier lifestyle among residents. It also outlines suggestions for enhancing the overall well-being of the respondents based on the research findings. This structured approach ensures a logical flow of information, allowing a clear understanding of how urban land use planning influences a healthy lifestyle.

To provide a clearer overview of how the research was conducted, the overall research process is summarised in a research flow chart. This flow chart (Refer Figure 1.2) illustrates the sequential stages of the study, beginning from the identification of the research problem through to data collection, analysis, and the formulation of findings and recommendations.

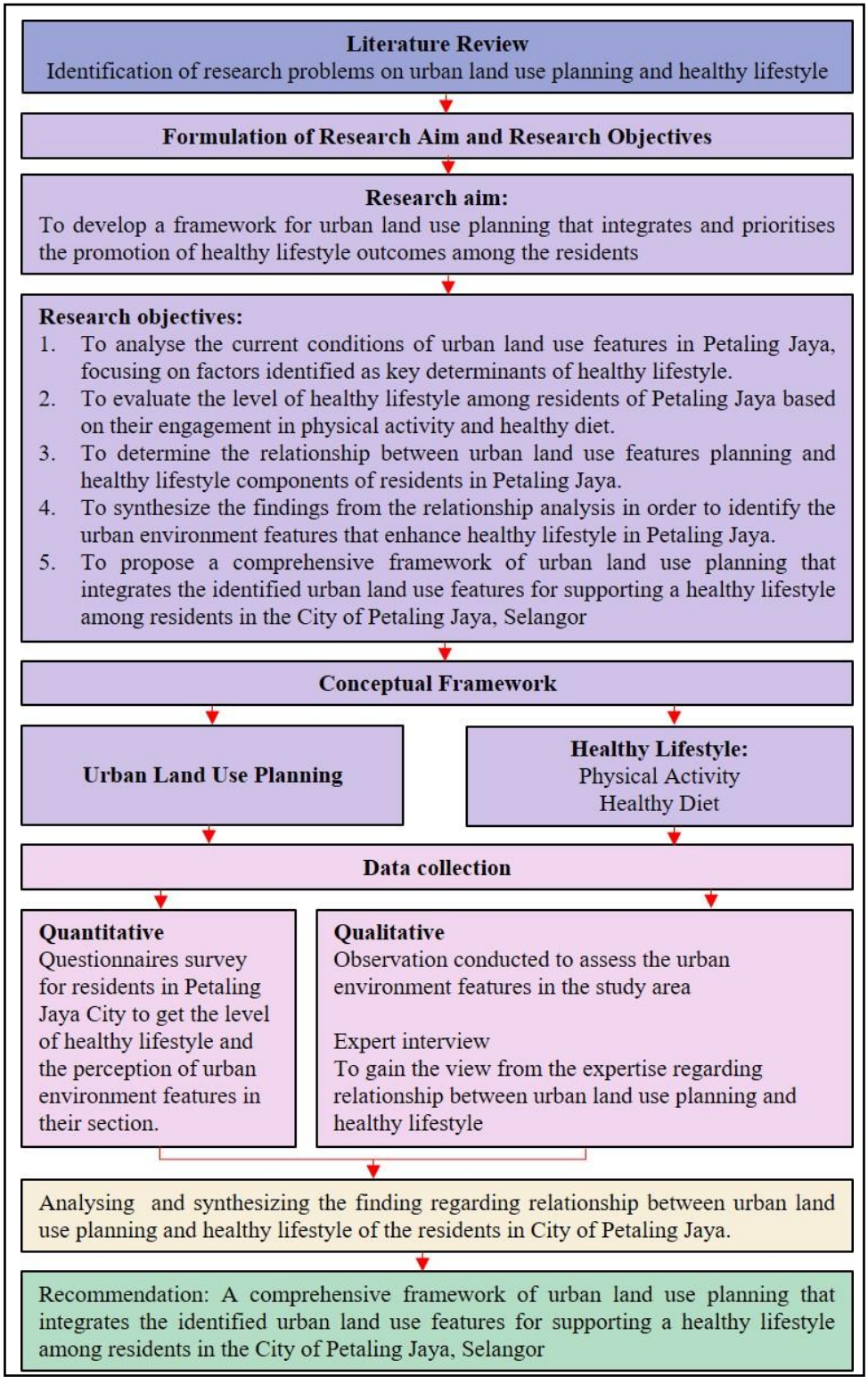


Figure 1.2 Research Process

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Chapter 2 presents a comprehensive review of the literature that underpins the relationship between urban land use planning and healthy lifestyle, with particular emphasis on physical activity and dietary behaviour. The purpose of this chapter is to establish a strong theoretical and empirical foundation for the study by synthesising key concepts, theories, and findings from urban planning, public health, and environmental health research. Through this review, the chapter clarifies how land use planning decisions shape the built environment and, in turn, influence health-related behaviours at both individual and population levels.

The chapter begins by defining and explaining the relationships among key concepts, including land use, the built environment, and environmental health. This conceptual grounding is essential for understanding how planning interventions extend beyond spatial organisation to affect public health outcomes. The discussion then advances to conceptual and theoretical perspectives on urban land use and healthy lifestyle, drawing on established health promotion and ecological frameworks. These perspectives provide theoretical justification for viewing urban land use planning as a determinant of public health, while also contextualising these theories within the Malaysian planning and health landscape.

Subsequent sections critically review empirical evidence on the influence of urban land use on physical activity and dietary behaviour. Factors such as mixed land use, residential density, walkability, accessibility, safety, green spaces, and park characteristics are examined in relation to physical activity. Similarly, the literature on urban food environments is reviewed, focusing on physical accessibility to food resources, land use regulations, zoning strategies, socioeconomic disparities, and alternative food systems. Broader urbanisation processes, including the emergence of obesogenic environments and globalised foodscapes, are also discussed to highlight structural drivers of unhealthy lifestyles in urban settings.

The chapter further reviews the concept of a healthy lifestyle, identifying physical activity and healthy diet as its core components. Measurement approaches used in previous studies are examined to justify the indicators and variables adopted in this research. Best practices from international contexts, such as Vancouver's Healthy City Strategy and Melbourne's 20-Minute Neighbourhood Policy, are then presented to demonstrate how urban land use planning can be systematically integrated with health objectives. The chapter concludes by synthesising the reviewed literature into a conceptual framework that guides the present study.

2.2 Definitions and Relationships among Key Concepts: Land Use, Built Environment, and Environmental Health

Urban planning and health are inherently interconnected, with land use, environmental quality, and the built environment playing a central role in shaping human lifestyles. As cities expand, the way land is organised and utilised determines not only economic functions but also accessibility, mobility, and opportunities for healthy living. In this context, the theoretical and conceptual foundations of land use, environment, built environment, and environmental health provide the basis for understanding how urban land use planning can contribute to a healthier lifestyle. Land use is broadly defined as the human utilisation of land resources for purposes such as housing, commerce, industry, agriculture, and recreation (McDonald, 2009). Within the urban context, this concept is further refined to urban land use, which reflects the spatial organisation of activities such as residential, commercial, industrial, and institutional functions (Cervero & Kockelman, 1997). The way land is allocated and arranged in cities is not merely a matter of physical planning; it also shapes accessibility, social interaction, and the health behaviours of urban residents.

Urban land use planning plays an essential role in guiding the growth and transformation of cities. Historically, it has been viewed as a mechanism for ensuring efficient allocation of scarce resources and minimizing land use conflicts. However, its importance in modern cities extends to promoting accessibility, reducing congestion, and supporting sustainability. Scholars such as Jacobs (1961) and Lynch (1960) have highlighted how the spatial form of cities profoundly influences the quality of urban life, while more recent studies emphasise links between urban form and health

outcomes, including walkability, access to healthy food, and availability of green spaces (Frank, Engelke, & Schmid, 2003).

The approaches to urban land use have also evolved over time. Early planning paradigms were dominated by functional zoning, where residential, industrial, and commercial areas were strictly separated. While this model addressed issues of health and safety in the industrial era, it also produced fragmented, car-dependent environments that limited opportunities for active living. In contrast, contemporary approaches such as mixed-use development and transit-oriented development (TOD) promote integration of land uses, encouraging residents to walk, cycle, or use public transport for daily activities (Cervero & Kockelman, 1997). More recently, the 20-minute neighbourhood concept has emerged, advocating for residents to access work, shops, parks, and essential services within a 20-minute walk or cycle (Giles-Corti et al., 2016). Such approaches highlight the increasing recognition that land use planning must support not only efficiency but also quality of life and health.

The discussion of land use naturally extends to the broader concept of the environment. The environment encompasses all external factors physical, chemical, and biological that influence human life, including natural systems such as air, water, and soil (Alberti, 2016). Within cities, the urban environment takes shape through human modification of the natural landscape, incorporating infrastructure, buildings, and public spaces (Frumkin, 2002). Thus, the urban environment represents an intersection between natural systems and human-made structures, and its quality has direct implications for the lifestyle and well-being of residents.

The urban environment exerts a strong influence on daily patterns of behaviour. Features such as parks, pedestrian pathways, and cycling routes facilitate physical activity, while the distribution of food outlets and markets shapes dietary choices. A city that prioritises walkability and access to healthy food fosters active and nutritious lifestyles, whereas poorly planned environments contribute to sedentary behaviour, limited food diversity, and increased exposure to pollutants (WHO, 2016). In this sense, the quality of the urban environment can either enable or constrain healthy living. Globally, there is growing recognition that sustainable urban environments are critical for balancing economic growth, environmental protection, and human health. Initiatives such as the WHO Healthy Cities Movement and the United Nations Sustainable Development Goals (SDGs) advocate for integrating health into urban policy and governance. Leading cities such as Copenhagen and Singapore provide practical

examples of how sustainable design ranging from integrated public transport systems to extensive green infrastructure can contribute to healthier lifestyles (WHO, 2016; UN-Habitat, 2020). These global perspectives set the stage for understanding how cities like Petaling Jaya can apply similar principles within their local context.

The built environment refers to the human-made surroundings that form the setting for human activity, including infrastructure, transportation networks, housing, and public spaces (Frank et al., 2003). Unlike the natural environment, which is given, the built environment is directly shaped by planning and policy decisions. Its design and organisation significantly affect how people live, move, and interact in urban spaces. The influence of the built environment on human behaviour is profound. Neighbourhoods with well-connected street networks, sidewalks, and safe pedestrian crossings promote walking and cycling, while areas designed primarily for automobiles discourage physical activity and foster dependency on private vehicles (Handy, Boarnet, Ewing, & Killingsworth, 2002). Access to green spaces and recreational areas encourages outdoor activities, reduces stress, and promotes social cohesion. Conversely, environments that lack these features may contribute to sedentary lifestyles and related health problems such as obesity, cardiovascular disease, and mental stress.

Several theoretical perspectives help explain the relationship between the built environment and health. Ecological models of health behaviour emphasise the multiple layers of environmental influence ranging from individual to policy levels that interact to shape human health (Sallis et al., 2006). The principles of New Urbanism advocate for compact, mixed-use, and walkable communities as a means of creating healthier and more socially vibrant neighbourhoods (Jacobs, 1961). Similarly, the Healthy Cities Framework integrates health objectives into planning processes, underscoring that urban design is inseparable from public health (Giles-Corti et al., 2016).

Finally, the concept of environmental health ties together the intersections of land use, the urban environment, and the built environment by focusing on their direct and indirect impacts on human well-being. Environmental health, as defined by the World Health Organization, is concerned with preventing disease and promoting health through a safe and supportive environment. Its scope encompasses key issues such as air and water quality, sanitation, waste management, and noise exposure (WHO, 2010). The process of urbanisation often intensifies environmental health challenges. High levels of air pollution discourage outdoor activity and contribute to respiratory diseases. Reduced green cover exacerbates heat stress, while traffic congestion increases both

noise and air quality concerns. In addition, poor sanitation and waste management threaten water quality and food safety. These environmental factors collectively influence patterns of physical activity, diet, and overall health (Rao, Prasad, Adshead, & Tissera, 2007; Nieuwenhuijsen, 2020). For example, noise pollution and stress may indirectly affect dietary habits, while poor air quality reduces the likelihood of individuals engaging in outdoor exercise.

In response to these challenges, the WHO Healthy Cities Initiative advocates for integrating health into urban governance through frameworks such as Health in All Policies (HiAP) and Urban Health Equity Assessments (WHO, 2010). These approaches encourage cities to evaluate the health implications of planning decisions, ensuring that sustainability and well-being remain central to development. At the national level, frameworks such as Malaysia's National Physical Plan (NPP-3) underscore the importance of linking planning with environmental health considerations (PLANMalaysia, 2020). Taken together, these theoretical and conceptual foundations provide a coherent understanding of how urban planning relates to health. Land use sets the spatial structure of the city, the environment represents the conditions in which life occurs, the built environment shapes behaviours and opportunities, and environmental health addresses the outcomes of these interactions. Collectively, they highlight the importance of integrating planning and health to create cities that not only function efficiently but also promotes healthier lifestyles through active living and better dietary environments.

2.3 Urban Land Use and Healthy Lifestyle: Conceptual and Theoretical Perspectives

The relationship between spatial planning and human health, originally established in the 19th century to combat inhumane living conditions, has seen a significant resurgence in importance due to contemporary challenges such as the obesity epidemic and climate change (Barton, 2009). Barton (2009) utilizes the "Settlement Health Map" as a central theoretical framework, which integrates urban ecosystem and health determinants theories to illustrate how various spheres of the environment from individual lifestyles and local communities to the global ecosystem impact human well-being. This model emphasizes that while personal factors are critical, the urban environment can either exacerbate or mitigate health outcomes by influencing physical

activity through walkable neighborhood designs and mental health through access to greenspace and social networks. Furthermore, the framework highlights that strategic decisions regarding housing and transport are fundamental determinants of social exclusion and geographical health inequalities. Ultimately, the research suggests that creating health-promoting environments requires radical, collaborative policies that move beyond departmental silos to integrate spatial planning with public health objectives (Barton, 2009).

The diagram serves as a conceptual tool for understanding both the functioning of human settlements and their implications for health. It is grounded in two interrelated bodies of theory: urban ecosystem theory and theories concerning the determinants of health. The framework is structured into multiple layers, each of which influences health and well-being while simultaneously being shaped by land use change. Among these layers, the built environment is identified as the domain in which land use planning has the most direct impact. Changes in the configuration of the built environment subsequently affect the natural, social, and economic environments. Figure 2.1 shows the sequence works from the inmost ring (lifestyle) to the outer ring (the earth):

- Lifestyle (Physical Activity): Active travel and recreation, with an emphasis on the neighbourhood planning level.
- Lifestyle (Diet): Retailing and local food production.
- Community: Local social networks and neighbourhood planning.
- Local economy and income: the general influence of planning.
- Activities, space and networks (linking two spheres of the health map) – social inclusion and health inequalities, with a strategic planning emphasis.
- The natural environment: air pollution – transport and urban form.
- Global eco-system: climate change – mitigation and adaptation.

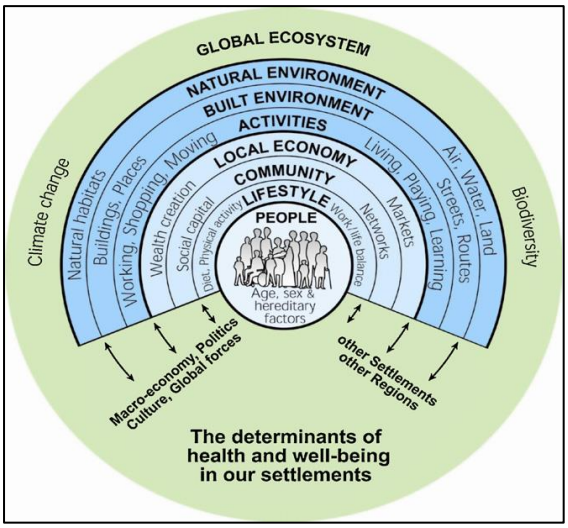


Figure 2.1 Settlement Health Map

To investigate the influence of urban land use planning on healthy lifestyles within Petaling Jaya, this study adopts the ecological and systemic framework developed by Barton and Grant (2006). This framework, often referred to as the "Health Map for the Local Human Habitat," posits that individual health is the product of nested environmental layers, ranging from personal biology to the global ecosystem (Barton & Grant, 2006). In the context of Petaling Jaya, land use planning serves as a critical determinant within the "built environment" and "activities" layers of this map. By determining the spatial distribution of residential, commercial, and recreational zones, land use planning directly shapes the lifestyle layer facilitating or hindering health-promoting behaviors such as active commuting, exercise in public parks, and access to fresh food markets. Using this systemic lens, the study argues that the lifestyle choices of Petaling Jaya's residents are not merely individual preferences but are environmentally cued by the city's structural layout. Consequently, Barton and Grant's (2006) model provides a robust theoretical basis for analyzing how Petaling Jaya's urban form serves as a precursor to the physical activity levels and overall well-being of its population.

Kent and Thompson (2014) introduce a conceptual framework comprising three key urban planning "domains" aimed at addressing the growing prevalence of chronic non-communicable diseases by targeting physical inactivity, social isolation, and obesity. These domains physical activity, community interaction, and healthy eating identify specific areas through which built environment professionals can support primary prevention, including integrated land-use planning, the provision of safe public spaces that facilitate incidental social interaction, and the promotion of equitable access to nutritious food through zoning controls and agricultural land preservation.

Although existing evidence indicates a strong relationship between human well-being and the built environment, the authors emphasise persistent challenges related to the standardisation of measurement and the establishment of causal relationships, which have traditionally differed between the urban planning and public health disciplines. Ultimately, the framework functions as a platform for interdisciplinary collaboration, encouraging planners and health professionals to move beyond disciplinary silos in order to create environments that promote health and well-being across diverse communities.

Building on earlier interdisciplinary research, the framework consolidates existing knowledge into three key domains through which urban planning can most effectively promote human health:

a) Physical Activity: Examines the ways in which the built environment enables or restricts movement through land-use integration, public transport provision, and access to recreational open spaces.
b) Connecting and Strengthening Communities: Explores how the design of streets and public spaces can encourage social interaction, foster a sense of belonging, and support mental well-being.
c) Equitable Access to Healthy Food: Focuses on the spatial accessibility of nutritious food and planning controls aimed at limiting "obesogenic" environments, such as high concentrations of fast-food outlets near schools.

2.3.1 Theoretical Justifications for the Role of Land Use in Health

Land use is a critical determinant of health within the Malaysian planning context because the physical environment fundamentally shapes human well-being and everyday lifestyle behaviour. In Malaysia, spatial planning decisions guided by the Town and Country Planning Act 1976 (Act 172), the National Physical Plan (NPP), and state and local development plans directly influence environmental quality, mobility patterns, social interaction, and access to essential services. As such, land use planning affects health outcomes both directly, through physical and environmental exposure, and indirectly, by structuring social and behavioural conditions that support or hinder healthy living. Drawing on the reviewed literature, the theoretical significance of land use for health can be explained through several interrelated frameworks, interpreted within Malaysian planning theory and practice.

2.3.1.1 Urban Ecosystems and the Determinants of Health

The relationship between settlements and health can be conceptualised through the Settlement Health Map, which integrates urban ecosystem theory with the determinants of health framework. This perspective aligns with PLANMalaysia's emphasis on sustainable and liveable urban development, as articulated in the National Physical Plan and Structure Plans. Within this framework, individual health is positioned at the centre of a series of interconnected layers, ranging from lifestyle factors to the global ecosystem. Land use planning directly shapes the built environment layer, which in turn influences other layers such as social cohesion, environmental quality, and economic conditions. In urban areas such as Petaling Jaya, changes in land use intensity, density, and functional mix affect walkability, exposure to green spaces, and access to community facilities, thereby influencing health-related behaviours and outcomes.

2.3.1.2 Ecological Models of Health Promotion

Ecological models of health promotion emphasise that health is shaped by the interaction between individuals and their surrounding environments, rather than by individual choice alone. This approach resonates with Malaysian urban challenges,

where rapid urbanisation and car-dependent development patterns have contributed to sedentary lifestyles and rising rates of obesity and non-communicable diseases. From this perspective, the built environment functions as a structural condition that can either enable or constrain healthy behaviour. For example, land use patterns characterised by single-use zoning and limited pedestrian connectivity common in many suburban areas of Petaling Jaya create obesogenic environments that discourage walking and cycling, even when individuals are motivated to be physically active. Land use planning therefore matters because it establishes the spatial context within which health-related behaviours become feasible or constrained.

2.3.1.3 The Three Domains Framework in the Malaysian Context

The health impacts of land use can be further understood through three interrelated domains in which planning interventions can most effectively address key risk factors for chronic non-communicable diseases in Malaysia: physical inactivity, social isolation, and unhealthy diets.

a) Physical Activity Domain: In Malaysian cities, land use planning influences physical activity primarily through accessibility, proximity, and connectivity. Compact, mixed-use development promoted under transit-oriented development (TOD) policies by PLANMalaysia reduces travel distances and encourages active travel such as walking to public transport, local shops, and neighbourhood facilities. In contrast, low-density and car-oriented land use patterns increase reliance on private vehicles and limit opportunities for routine physical activity.
b) Community Interaction Domain: This domain draws on theories of social capital and mental well-being, which recognise the importance of social interaction and a sense of belonging. Land use planning determines the provision and spatial distribution of public spaces, neighbourhood centres, and local parks that function as "third places." In Petaling Jaya, the availability and quality of such spaces influence opportunities for informal social interaction, community engagement, and social cohesion, which are essential for mental health and overall well-being.
c) Healthy Food Domain: The healthy food domain reflects theories of the social gradient of health and spatial inequality. In the Malaysian context, zoning

regulations and commercial land use decisions shape the distribution of food outlets, wet markets, supermarkets, and fast-food premises. Areas with high concentrations of fast-food outlets and limited access to fresh food particularly near schools and residential neighbourhoods contribute to obesogenic food environments. Land use planning therefore plays a crucial role in promoting equitable access to nutritious food through the regulation of food outlet locations and the protection of urban and peri-urban agricultural land.

2.3.2 Urban Land Use Planning as a Determinant of Public Health and Healthy lifestyle

Globally, urbanisation has become a dominant demographic trend, with approximately 56.2% of the world's population currently residing in urban areas (UNDESA, 2020). This rapid shift towards urban living has been accompanied by higher-density development patterns, which often result in the reduction of open spaces and vegetation cover (Mohd Azhar et al., 2017). While compact urban forms are frequently promoted for their economic efficiency, they can also generate unintended consequences for environmental quality and population health if not carefully planned. Across many countries, urban expansion and modernisation have significantly reshaped daily lifestyles, influencing physical activity patterns, dietary behaviour, and overall well-being. Within this context, urban land use planning plays a critical role in shaping the built environment in ways that either promote or constrain healthy living.

In line with global trends, Malaysia is undergoing rapid demographic and spatial transformation characteristic of a fast-developing South-East Asian nation. Rapid modernisation has altered the lifestyle practices of Malaysians in ways similar to those observed globally, particularly through increased reliance on motorised transport, sedentary routines, and changing dietary habits (Sook, L. W. et al., 2019). The level of urbanisation in Malaysia rose substantially from 62% in 2000 to 71% in 2010, and projections suggest that the urban population will reach approximately 86% by 2050. This growth has been especially concentrated within major urban conurbations such as the Klang Valley, including Kuala Lumpur, Shah Alam, and Petaling Jaya, placing considerable pressure on economic systems, social structures, and environmental resources. Such concentrated urban development has direct implications for residents' quality of life and public health outcomes.

Notably, this rapid urbanisation is closely linked to emerging public health challenges in Malaysia, particularly those associated with lifestyle-related diseases. According to the Malaysian National Health and Morbidity Survey (NHMS) 2015, the rising prevalence of non-communicable diseases (NCDs) in the country is largely attributed to unhealthy lifestyle behaviours, including poor dietary practices, physical inactivity, inadequate sleep, and psychological stress. Non-communicable diseases such as diabetes, hypertension, and high cholesterol are major risk factors for cardiovascular diseases (CVDs), which remain the leading causes of death in Malaysia (National Health Morbidity Survey, 2019).

These health challenges are further exacerbated by urban environments that inadequately support active living. Evidence suggests that Malaysia faces persistent issues related to sedentary lifestyles and high obesity rates, particularly in urban areas. A global study conducted in 2017 reported that Malaysians are among the least active walkers worldwide, recording an average of only 3,963 steps per day. This figure is substantially lower than that of more physically active nations and reflects an urban landscape that prioritises vehicular mobility over walkability and human-scale movement. Consequently, the Malaysian urban environment often offers convenience at the expense of health, underscoring the critical need for interventions rooted in Urban Land Use Planning (ULUP) to create supportive environments that encourage physical activity and healthier lifestyle behaviours.

2.3.3 The Influence of Urban Land Use Planning on Healthy Lifestyle

Frank et al. 2013 (as cited by Gadais et al 2017) explained that the built environment involves three dimensions (land use patterns, urban design characteristics, and transportation system), which influence the physical activity of the community and can potentially improve its health status (Table 2.1).

Table 2.1
Three Dimensions Which Influence the Physical Activity of The Community and Can Potentially Improve Its Health Status

Dimensions	Elements
1. Land use patterns	
• Mixed	• Different use in the same sector (industrial, commercial, civil, residential, recreational)
• Density	• Number of people
2. Urban design and characteristics	
• Urban design (street)	• Width and pavement surfaces • Lighting, street vegetation • Traffic calming measures • Parking
• Urban design (site)	• Pedestrian crossings • Width and height of buildings, architecture
3. Transportation system	
• Road network	• Ongoing road network • Connectivity
• Non-motorized transport infrastructure	• Cycling paths • Pavements • Tracks
• Public transport infrastructure	• Bus stops • Train stations

The first dimension is land use patterns. Bergeron et al. 2010 (as cited by Gadais et al 2017) mentioned neighborhood; urban design; proximity and types of restaurants; food options; and sports infrastructures. The second dimension is urban design characteristics. Urban design characteristics influence people's perception of their environment. For example, a walk in a well-maintained park is more enjoyable than a walk along a traffic-dense road or in an industrial neighborhood. The third dimension is transportation systems. The transportation systems include safe cycling and walking routes, use of stairs instead of elevators

Based on the first dimension (land use patterns: mixed and density) in Table 2.1, Croucher, Wallace and Duffy 2012 also summarized relationship between density and healthy lifestyle. Refer Table 2. Table 2 shows the purported impacts of high-density developments and it also shows the positive impact of the density towards healthy lifestyle. However, The relationship between individual characteristics and likelihood of being obese in areas with a density of fast food outlet is significant and individual characteristics may influence residents' propensity to use the fast food outlets in their area may be more powerful than exposure to the outlets alone (as cited by Croucher et al. 2012)

2.4 Urban Land Use and Physical Activity

2.4.1 Mixed land use and Physical Activity

Mixed land use refers to the integration of different land functions such as residential, commercial, institutional, and recreational uses within the same area or neighbourhood. This approach contrasts with conventional single-use zoning, where land uses are spatially segregated, for example separating residential areas from shops, services, and workplaces. In urban planning theory, mixed land use is recognised as a core component of walkable and activity-friendly environments because it places a variety of destinations within closer proximity to people's homes and daily routines. By shortening travel distances, mixed land use reduces reliance on private motor vehicles and supports active travel modes such as walking, cycling, and the use of public transport (Healthy Active by Design, n.d.; Frank et al., as cited in the RESIDE study, 2011).

The relationship between mixed land use and physical activity is further supported by the ecological model of health behaviour, which posits that behaviour is shaped not only by individual factors but also by broader environmental contexts, including the built environment and land use patterns (Sallis & Owen, 2002). Within this framework, mixed land use operates as a macro-level environmental determinant that structures daily opportunities for movement and increases the likelihood of engaging in physical activity, particularly walking for transport or recreation.

Mixed land use influences physical activity through several interrelated mechanisms. One of the most important pathways is proximity and accessibility. By reducing the distance between housing and everyday destinations such as shops, workplaces, schools, and parks, mixed land use makes walking a practical and convenient choice for daily errands and travel. Shorter distances increase opportunities for incidental physical activity embedded within daily routines. Empirical evidence consistently indicates that closer proximity to a greater variety of destinations is associated with higher levels of walking, particularly walking for transport (Handy et al., as discussed by Sallis et al.).

Another key mechanism is walkability and transport choice. Mixed land use is a fundamental element of neighbourhood walkability because it provides purposeful destinations within walking distance. Evidence from the RESIDE (RESIDential Environments) study in Australia demonstrates that residents living in neighbourhoods with higher levels of land use mix reported significantly more walking for transport than those living in low-mix neighbourhoods. These findings suggest that the presence of diverse land uses within close proximity encourages walking as a regular mode of transport (Cervero & Kockelman, 1997; as reported in the RESIDE study, 2011).

In addition, areas characterised by mixed land use tend to exhibit more vibrant street life and higher pedestrian activity. The presence of diverse activities and users throughout the day contributes to increased social interaction and natural surveillance, which can enhance perceptions of safety and environmental attractiveness. Improved perceptions of safety and comfort are important psychosocial factors that encourage walking and outdoor physical activity, reinforcing the role of mixed land use in creating activity-supportive urban environments.

Mixed land use is also closely linked to public transport integration. Mixed-use developments frequently co-exist with transit nodes, such as bus stops and rail stations, particularly within transit-oriented development contexts. Accessing public transport typically requires walking to and from transit stops, thereby increasing levels of incidental physical activity as part of daily commuting. Previous studies have shown that greater land use diversity around transit areas is associated with higher levels of walking to public transport, further strengthening the relationship between mixed land use and physical activity.

A substantial body of empirical research supports the association between mixed land use and physical activity. Findings from the RESIDE study indicate that higher land use mix within residential environments is positively associated with walking for transport, with residents in high-mix neighbourhoods reporting more minutes of walking per week than those in low-mix areas. These associations were particularly strong when land use categories relevant to daily travel were included in the analysis. Similarly, a longitudinal study conducted in the Netherlands found that increases in land use mix over time were associated with increased walking and cycling among middle-aged and older adults, suggesting that changes in land use diversity can lead to corresponding changes in active travel behaviour. Research in Seoul, Korea, also reported that areas zoned for mixed land use exhibited higher pedestrian walking activity than areas dominated by single land uses, indicating that zoning regulations promoting land use diversity can support walking behaviour. Furthermore, systematic reviews have consistently identified mixed land use as an important environmental correlate of walking and physical activity across different urban contexts, particularly for transport-related physical activity.

In the Malaysian context, mixed land use and related planning principles such as activity diversity and compact development are embedded within urban planning guidelines, local plans, and development control policies to promote more sustainable and vibrant urban environments. Malaysian planning manuals and local development plans commonly emphasise the integration of residential, commercial, and institutional land uses to support daily activities, enhance accessibility, and reduce over-dependence on private automobiles. Contemporary planning documents, including the Kuala Lumpur Local Plan 2040, similarly advocate balanced and mixed land use as a strategy to create dynamic, accessible, and liveable urban neighbourhoods aligned with long-term sustainability goals.

However, empirical evidence from Malaysia presents mixed findings. A systematic review of walkability research in the Malaysian context found that while certain built environment attributes such as street connectivity and pedestrian infrastructure are consistently associated with walking behaviour, mixed land use does not always demonstrate a significant relationship with physical activity. These inconsistent findings may reflect variations in local urban form, pedestrian comfort, traffic conditions, cultural preferences, or methodological differences across studies. This highlights the importance of context-specific research to better understand how

mixed land use operates within Malaysian cities and how it interacts with other urban environment features to influence physical activity.

2.4.2 Residential Density and Physical Activity

Residential density refers to the number of people or dwellings per unit of land area within a neighbourhood or urban area. High residential density is typically characterised by a compact urban form, smaller lot sizes, multi-storey housing, and a greater concentration of residents living within walkable distances of services and amenities. In urban planning and public health literature, residential density is widely recognised as a key built environment attribute that can shape physical activity behaviours, particularly walking for transport and recreation (Sallis et al., 2012; Demdoum, 2025).

The influence of residential density on physical activity is supported by the social ecological model, which emphasises that behaviour is shaped by macro-level environmental contexts such as the built environment (Sallis & Owen, 2002). Within this framework, higher residential density increases the concentration of people and activities within a given area, thereby reducing travel distances and increasing opportunities for incidental physical activity through active transport modes such as walking and cycling as part of daily routines.

Residential density affects physical activity through several interrelated mechanisms. One key pathway is proximity to destinations and services. In higher-density neighbourhoods, everyday destinations such as shops, transit stops, schools, and workplaces tend to be located closer to residential areas. Shorter distances reduce dependence on private vehicles and make walking or cycling more convenient and feasible, leading to higher overall levels of physical activity (Saelens & Handy, 2008; Demdoum, 2025). As a result, residents in denser neighbourhoods are more likely to accumulate physical activity through routine travel rather than structured exercise alone.

Residential density is also closely associated with walkable urban form and infrastructure. Dense neighbourhoods are often designed with compact layouts, interconnected street networks, sidewalks, and pedestrian infrastructure that facilitate active travel. A walkable environment with continuous, safe, and accessible routes encourages residents to engage in walking for both transportation and leisure purposes.

The presence of supportive pedestrian infrastructure further enhances the likelihood that residents will choose active modes of travel over motorised transport. In addition, higher residential density can support greater social and recreational opportunities. Dense neighbourhoods are more likely to sustain public and semi-public spaces such as parks, community centres, playgrounds, and local markets, which promote social interaction and outdoor activities. Increased pedestrian presence and street activity may also enhance perceptions of safety and environmental attractiveness, which are important psychosocial factors influencing participation in physical activity.

Residential density can also generate economic and environmental incentives for active travel by supporting public transport services. Higher population concentrations increase the viability and efficiency of public transport systems, encouraging walking to and from transit stops and reducing reliance on private vehicles. This relationship aligns with planning concepts such as transit-oriented development (TOD) and the 15-minute city, which aim to enhance accessibility to daily needs while promoting active travel and sustainable mobility.

Empirical research generally suggests that residential density is associated with higher levels of physical activity, although the strength and direction of this relationship vary across contexts, populations, and measurement approaches. Systematic evidence has identified residential density, along with intersection density and land use mix, as key built environment attributes linked to walking and physical activity outcomes. Higher residential density consistently appears as one of the principal environmental correlates of active travel behaviour across multiple studies (Demdoum, 2025). Studies conducted in Western contexts have reported positive associations between higher residential density and walking or transport-related physical activity, indicating that denser neighbourhoods support active lifestyles by placing services and amenities within walking distance of homes (Forsyth et al., 2007).

Similarly, a review of research in low- and middle-income countries found that built environment factors such as residential density and proximity to destinations were positively associated with physical activity outcomes, particularly walking and cycling (Topothai et al., 2025). However, not all studies report straightforward relationships. Research conducted in rapidly urbanising areas of China found that very high residential density was negatively associated with sufficient physical activity, potentially due to factors such as traffic safety concerns, overcrowding, and urban design constraints that limit opportunities for outdoor physical activity (Wang et al., 2019). These mixed

findings suggest that the impact of residential density on physical activity is context-dependent and influenced by how density interacts with other environmental attributes, including street connectivity, destination mix, safety, and pedestrian environment quality.

In the Malaysian context, urban planning policies generally aim to accommodate population growth while improving liveability through land use strategies that address housing density, accessibility, and sustainable development. Although national planning guidelines do not always explicitly specify residential density thresholds for promoting physical activity, local plans and urban design frameworks commonly emphasise compact development, mixed land use, and access to amenities principles that are consistent with higher residential density approaches. Empirical studies in Malaysian cities, such as Penang, indicate that higher residential density is associated with improved walkability and better access to community facilities, which contribute to increased resident mobility and active travel behaviour (Roslan et al., 2025). Findings from these neighbourhoods suggest that areas with higher residential density and diverse housing types facilitate walking by improving proximity to services and infrastructure that support physical activity.

At the same time, national health data in Malaysia consistently highlight low levels of physical activity among urban populations, underscoring the need for environmental and planning interventions that support active lifestyles (National Health and Morbidity Survey, 2023). Taken together, these findings highlight the importance of optimising residential density in conjunction with supportive urban design, pedestrian infrastructure, and safety measures. Residential density alone may not automatically promote physical activity; rather, its effectiveness depends on how well it is integrated with accessible services, high-quality public spaces, and walkable environments. Thoughtfully balanced density remains a critical planning strategy for promoting healthier and more active urban lifestyles.

2.4.3 Walkability, Accessibility and Connectivity

Research consistently shows that the built environment is a key determinant of physical activity (National Research Council [NRC], 2005; Wengel & Troelsen, 2020). Recent studies have further explored this in specific contexts, such as the assessment of commercial centers in Malaysia (Teh et al., 2024) and the definition of neighborhoods

to support urban sustainability (Aparicio et al., 2024). Together, these findings suggest that urban planning is vital for public health. The National Research Council (NRC, 2005) emphasizes that high accessibility to utilitarian destinations such as workplaces, schools, and grocery stores is a primary driver of walking. Their findings suggest that to effectively promote physical activity, these destinations should ideally be located within an optimum distance of 400 to 1,600 meters from residential areas.

Beyond the layout of the street network, the physical condition of the environment is a critical determinant of active transport. The presence of well-maintained sidewalks, pavements, and dedicated cycle lanes is essential to support the connectivity provided by a grid-like street network (National Research Council [NRC], 2005; Wengel & Troelsen, 2020).

2.4.3.1 Safety and Perception

The decision to engage in active travel is heavily moderated by both real and perceived safety from crime and traffic. For instance, Wengel and Troelsen (2020) highlight that parental concerns regarding traffic safety are a primary barrier to children walking to school, suggesting that perception often carries as much weight as objective safety data. Physical activity among adults is a multifaceted behaviour shaped by both individual motivations and environmental contexts. Scholars increasingly recognize safety and convenience as two core environmental determinants that strongly influence the likelihood of adults engaging in regular physical activity (Sallis, Floyd, Rodríguez, & Saelens, 2012). These environmental conditions rooted in perceptions as well as objectively measurable features of urban form play a pivotal role in supporting or constraining adults' physical activity patterns.

Perceptions of safety are among the most consistently reported barriers to adult physical activity. Numerous studies have found that adults who perceive their neighbourhoods as unsafe, whether due to crime, traffic hazards, or poor lighting, are less likely to participate in walking, cycling, or recreational physical activities (Foster & Giles-Corti, 2008). Perceived traffic safety, in particular, has been shown to relate positively to moderate levels of physical activity, with adults reporting higher levels of activity in neighbourhoods characterized by easy access to services and safer traffic conditions (Chang et al., 2019). Similarly, neighbourhood walkability which encompasses safety from traffic and crime was associated with higher likelihood of

sufficient physical activity during the COVID-19 pandemic, even when options for indoor exercise were limited (Arifwidodo & Chandrasiri, 2024). These findings underscore the importance of safety not just as an abstract quality of a neighbourhood but as a lived perception that directly affects adult behaviour.

Convenience also has a significant influence on adult physical activity. Convenience refers to how easily individuals can access physical activity opportunities, including proximity to parks, trails, shops, sidewalks, and recreation facilities. Evidence from multiple settings shows that adults are more likely to engage in regular physical activity when destinations and amenities are closer and easier to reach (Saelens & Handy, 2008). For instance, adults in Taiwan who perceived their neighbourhoods as having easy access to stores and services were significantly more likely to achieve moderate or high levels of physical activity (Chang et al., 2019). These results align with broader research indicating that destination accessibility and land-use connectivity are positively associated with physical activity in tropical and subtropical regions, suggesting that convenience complements safety in shaping behaviour across geographic contexts (Gao et al., 2024).

The relationship between safety, convenience, and physical activity is not only additive but also synergistic. Urban interventions that improve walking and cycling environments such as renovations of parks, creation of protected bike lanes, and enhancements to active travel infrastructure have been shown to increase physical activity levels among adults (Barnett et al., 2022). These interventions reduce perceived barriers by creating spaces that are both physically accessible and psychologically inviting, thereby reinforcing adults' motivation to be active. Likewise, systematic reviews confirm that built environment attributes like destination accessibility, walking infrastructure, and safety are among the strongest correlates of adult physical activity (Gao et al., 2024).

Demographic factors such as age, gender, and socio-economic status further moderate how safety and convenience influence physical activity among adults. For example, older adults tend to prioritize well-lit pathways, benches, and safe crossings, all of which enhance both convenience and perceived safety (Cunningham & Michael, 2004). Women may also be more sensitive to safety concerns when engaging in outdoor physical activity, indicating the need for gender-responsive planning (King et al., 2000). These demographic nuances suggest that perceptions of environmental safety and convenience are individualized and reflect broader social and structural inequities.

Recent research during the COVID-19 pandemic highlights how safety and convenience jointly buffer declines in physical activity during periods of mobility restriction. Adults living in walkable neighbourhoods characterized by safe sidewalks, nearby green spaces, and accessible open areas were more likely to maintain sufficient levels of activity despite lockdowns and closures of formal recreational facilities (Arifwidodo & Chandrasiri, 2024). These pandemic findings demonstrate that supportive neighbourhood environments are vital for sustaining physical activity even under adverse conditions.

The psychosocial literature further elucidates mechanisms linking safety and convenience to physical activity. According to social cognitive theory, environmental facilitators such as perceived safety enhance self-efficacy one's belief in their ability to engage in physical activity which in turn predicts actual behaviour (Bandura, 1997). Convenient access to activity-supportive spaces reinforces outcome expectations by lowering the effort and time needed to be active, thereby making routine physical activity more sustainable over time.

Policy and planning frameworks increasingly incorporate safety and convenience as core pillars for promoting active lifestyles. For instance, global initiatives such as the World Health Organization's Global Action Plan on Physical Activity highlight the need for environments that make the "active choice the easy choice" through infrastructure investments, traffic calming, and accessible amenities (World Health Organization, 2018). This approach is consistent with evidence showing that built environments that are safe, walkable, and accessible can significantly enhance physical activity levels among adult populations.

In summary, the literature from recent years (2019–2024) continues to affirm that both safety and convenience are critical determinants of physical activity among adults. Perceived safety influences individuals' willingness to be active outdoors, while convenience ensures that opportunities for physical activity are reachable and integrated into daily life. Together, these environmental factors shape not only whether adults choose to be active but also how consistently they sustain physical activity over time. Integrating these variables into urban land use and public health planning is essential for fostering healthier and more active adult populations at scale.

2.4.3.2 Green Spaces and Well-being

Access to urban green spaces provides critical opportunities for psychological restoration and social interaction. Research indicates that residents in "greener" neighborhoods consistently report higher levels of mental well-being compared to those in more densley built environments (Aparicio et al., 2024; Wengel & Troelsen, 2020). Urban green spaces are increasingly recognized as critical environmental resources that influence physical activity and public health outcomes. Green spaces publicly accessible parks, vegetated corridors, urban forestry, and open landscape areas provide settings for walking, recreation, active transport, and social interaction, all of which contribute to an active lifestyle. The concept of green exercise, defined as physical activity performed in natural or vegetated environments, has gained prominence in public health research because of its potential to simultaneously promote physical and mental health (Pretty, 2017, as cited in Nath et al., 2018). Urban green spaces are theorized to foster physical activity by offering aesthetically appealing environments, reducing stressors such as noise and air pollution, and providing social destinations that encourage movement (Kreisler, 2025; Turner & Astell-Burt, 2021).

A wealth of empirical studies suggests that access to and quality of green spaces are positively associated with physical activity levels among residents. A systematic review covering multiple countries found that publicly accessible green space is generally associated with increased physical activity, although the magnitude of this effect can vary by study design and measurement approach (Kreisler, 2025). This meta-analysis, which synthesised evidence from dozens of observational studies, reported a small but statistically significant positive association between green space and physical activity outcomes, indicating that residents living in greener environments tend to exhibit higher activity levels than those in areas with less green space (Kreisler, 2025).

Physical activity in green spaces has been linked with specific types of movement such as walking, cycling, and recreational exercise. Research in China demonstrated that exposure to green space significantly increases the likelihood of residents participating in physical activity, with mechanisms attributed to reduced carbon emissions, improved social interaction, and enhanced perceptions of environmental quality (Xia et al., 2024). Findings from this study highlight how green space exposure operates through multiple pathways, reinforcing the role of vegetation, shade, and social environments in facilitating active lifestyles.

Evidence from outside Asia reinforces these patterns. For instance, neighborhood greenness and park proximity have been associated with greater minutes of moderate-to-vigorous physical activity (MVPA) and more walking trips in European studies (Turner & Astell-Burt, 2021). In Shanghai, studies focusing on older adults found that measures of neighborhood greenness were effective in encouraging physical activity and active transportation, although individual health and socio-economic conditions also influenced activity levels (Turner & Astell-Burt, 2021).

The quality and accessibility of green spaces also matter. Research in the UK and Netherlands indicated that green space microenvironments such as tree cover, lawn areas, and connected walking routes can influence the amount and type of physical activity undertaken, especially when parks and green corridors are integrated with pedestrian networks (Turner & Astell-Burt, 2021). Studies have also found that closer distance to parks and high vegetation density are associated with higher odds of engaging in active commuting and leisure physical activity, supporting the idea that both proximity and usability of green spaces shape physical activity behaviors (Shen et al., 2021).

In the Malaysian context, although research on green space and physical activity is emerging, several studies provide evidence that aligns with global findings. A 2023 study in Petaling Jaya, Selangor, found that neighborhoods with more green areas and sports facilities were associated with residents reporting higher levels of physical activity (Rosli et al., 2023). This suggests that the presence of green space complements other physical activity-supportive infrastructure in encouraging active lifestyles. Another Malaysian study in Batu Gajah documented a relationship between the quality of urban parks and the physical activity of park users, reinforcing the idea that not just the presence but the design quality of green spaces matters for active use.

Research on green space use in Malaysia, such as park usage measurement studies, also lays groundwork for understanding how people physically interact with parks in everyday contexts, including different activity types and patterns of use (Abdul Malek, Mariapan, & Ab Rahman, 2024). Although much of the local literature focuses on use patterns rather than directly on physical activity outcomes, these studies underscore the role of green spaces as social and movement hubs within urban environments.

The COVID-19 pandemic further highlighted the importance of green spaces for physical activity and well-being. Malaysian research comparing urban green space use before and during the pandemic found shifts in how residents used parks, with many reporting increased visitation for leisure and exercise as indoor facilities were restricted (Razali & Shukor, 2022). Such findings indicate that accessible green spaces became crucial venues for maintaining physical activity and mitigating the negative effects of movement restrictions.

Despite the generally positive associations, some studies note that the relationship between green space and physical activity is nuanced. For example, the meta-analytic evidence suggests weak but consistent support for increased physical activity overall, with stronger associations for domestic activities like gardening than for non-domestic exercise (Kreisler, 2025). Moreover, factors such as subjective perceptions of safety, park maintenance, amenities, and individual socio-demographic characteristics further shape how people use green spaces for physical activity.

From a policy and planning perspective, integrating green space into urban land use planning is essential for promoting active, healthy communities. Malaysian planning frameworks, including the National Physical Plan (NPP), emphasize sustainable city design and the provision of green space as part of healthy built environments, although specific per-capita green space standards and guidelines vary across local authorities (PlanMalaysia, 2020). Research discussing Malaysia's green space provision highlights shortfalls relative to international benchmarks (e.g., WHO recommendations of 9 m^2 per person) and emphasizes the need for equitable distribution and high-quality green infrastructure that supports movement, rest, and social interaction.

In summary, it found that green spaces contribute positively to physical activity by providing environments conducive to walking, active transport, and recreation. While the strength of the association may vary by study context and measurement approach, evidence consistently shows that accessible, well-designed green spaces support active lifestyles and improved health outcomes. In Malaysia, local studies mirror global trends and suggest that enhancing green space availability and quality within urban areas can play a strategic role in promoting physical activity among residents.

2.4.3.3 Park Size and Facilities

While larger parks (over 5 hectares) typically attract more frequent use due to their diverse facilities, smaller community squares play a vital role in dense urban areas by providing accessible, localized recreational space (Wengel & Troelsen, 2020). However, the utility of these spaces depends heavily on the presence of amenities such as lighting, benches, and shaded areas; conversely, poor maintenance and vandalism act as significant deterrents to park usage. Urban parks provide essential environments for physical activity by offering open space, routes for walking and jogging, play and exercise facilities, and social spaces that encourage active engagement. Research indicates that specific characteristics of parks such as size and the availability of supportive facilities can significantly influence the frequency, duration, and intensity of physical activity among users (Leslie et al., 2020; Ward et al., 2018). Scholars argue that while proximity and accessibility to parks are important factors in encouraging use, the internal attributes of parks particularly size and facilities play a distinct and often stronger role in determining park-based physical activity behaviors.

Park size has been hypothesized to affect activity opportunities because larger parks generally accommodate more landscape variety, longer trails, and a greater distribution of activity zones than smaller parks. Observational studies in neighbourhood parks have found that larger parks tend to support higher rates of physical activity, especially when they include multiple features such as paved and unpaved trails, wooded areas, or open spaces that invite a variety of movement types (Kaczynski, Potwarka, & Saelens, 2008). For instance, although classic work by Kaczynski et al. (2008) showed that the number of facilities often predicted park use more strongly than park size itself, it also noted that parks with larger areas tended to integrate more physical activity supportive features, which in turn promoted increased use (Kaczynski et al., 2008). This echoes more recent findings suggesting that size enables diversity in facilities and spaces that accommodate different forms of physical activity from structured sport to unstructured play and leisure walking thereby enhancing overall park attractiveness and utility.

The presence and diversity of park facilities such as jogging tracks, fitness stations, playgrounds, sports courts and trails are widely documented determinants of park-based physical activity. Recent quantitative research shows that each additional type of physical activity facility in a park is independently associated with longer

durations of activity among adults, including both light-intensity movement and moderate-to-vigorous physical activity (MVPA) (Cohen et al., 2018). Cohen and colleagues (2018) reported that parks with a wider variety of physical activity facilities were more likely to encourage active behaviour during visits; specifically, the inclusion of facilities like paved paths, fitness equipment, and courts was linked to an increase in active time among park users (Cohen et al., 2018). Similarly, comparative analysis across multiple parks observed that facilities such as jogging tracks and paved trails were used more frequently for physical activity than open spaces or water features alone, reinforcing the idea that programmed and well-designed facilities stimulate engagement in active behaviours (Dong et al., 2020).

Observational work in Southeast Asian urban contexts further underscores that park size and facilities interact to influence physical activity patterns. A study in Bangkok found that while smaller parks with fewer facilities still attracted large numbers of visitors, the types of activities and levels of MVPA varied by park size and facility composition; larger parks with more extensive jogging paths and multi-purpose spaces tended to host more physical activity overall, despite the presence of high visitation rates in smaller parks (Phulkerd & Suthat, 2020). This suggests that while park size may be less directly related to quantity of use than proximity or accessibility, it shapes the quality and intensity of physical activity experiences by providing space for longer walks, structured exercise groups, or active recreation programs.

From a planning perspective, park guidelines that consider size and facility standards can help promote active use. In Malaysia, national planning policies advocate for the provision of green and open space as part of urban development, including a guideline of 2 hectares of open space per 1,000 population under the National Urbanisation Policy; urban green space is often required to be integrated into development schemes to support recreational activity and environmental quality (National Urbanisation Policy, 2020). Local city plans (e.g., Kuala Lumpur City Plan 2020) adopt park hierarchies that include city parks, district parks, and neighbourhood parks to serve different catchment populations and activity needs, with expectations that larger parks offer more comprehensive facilities for group activities and organised sport while neighbourhood parks provide basic features for daily use (City Plan documents, 2023). These hierarchical guidelines reflect an understanding that larger parks with diverse facilities support broader and more sustained physical activity opportunities,

whereas smaller parks contribute to everyday movement within closer walking distances.

Malaysian studies also point to the importance of park quality and facilities for active use. Research in Batu Gajah, Perak, found that park quality including the range and condition of facilities and amenities was moderately correlated with the level of physical activity reported by park visitors, suggesting that facility provision and maintenance contribute to active engagement (Rosli et al., 2023). Such findings align with broader global evidence that park features that actively support various forms of exercise (e.g., trails, sports courts, fitness equipment) are more influential in encouraging physical activity than aesthetic features alone.

Despite robust evidence linking park facilities to physical activity, the independent role of park size is somewhat mixed and context-dependent. Some studies highlight that smaller parks with targeted facilities can be highly effective in generating physical activity, particularly for populations living within short walking distances, which speaks to the need for multi-scaled park systems that balance neighbourhood accessibility with larger parks catering to leisure and organised sport (Sugiyama et al., 2021). Furthermore, residents' subjective perceptions of safety, attractiveness, and ease of use influence how size and facilities translate into physical activity behaviours indicating that park design must integrate facility quality and user experience, not just size metrics.

In summary, it shows consistently demonstrates that park facilities are strong predictors of physical activity in park settings, contributing to longer and more intense active behaviours among users. Park size matters insofar as it enables the inclusion of a wider variety of movement-supportive features and supports diverse activity types; however, smaller parks with thoughtfully selected facilities can also promote regular physical activity, especially when located within walking distance of residential areas. Malaysian planning guidelines that incorporate size and facility considerations in park hierarchies reflect this relationship, emphasizing that both large parks with extensive amenities and smaller neighbourhood parks with quality facilities are important for fostering active lifestyles.

2.5 Urban Land Use Planning and Dietary Behaviour

Urban land use planning influences dietary behaviour through multiple pathways, particularly by shaping the spatial distribution of food outlets, the organisation of urban form, and everyday lifestyle patterns. These planning-related factors affect not only what food is available and accessible, but also the convenience, affordability, and social norms surrounding food consumption. The following subsections elaborate the key mechanisms through which urban land use planning affects dietary behaviour.

2.5.1 Physical Accessibility and Food Choice

One of the most direct ways in which urban land use planning influences dietary behaviour is through physical accessibility to food outlets, particularly the proximity and density of different types of food retailers. Accessibility determines where residents shop or eat and strongly influences the frequency and type of food consumed.

2.5.1.1 Distance to Food Resources

Distance to food outlets remains a key spatial measure in food environment research. Proximity to food resources is a primary factor in selecting where to shop or eat (Liu, Corkery, & Wiesel, 2016). Shorter distances to supermarkets or grocery stores are associated with higher frequencies of shopping, which in turn encourages the consumption of fresh fruits and vegetables (Liu, Corkery, & Wiesel, 2016; Dixon, Ugwoaba, Brockmann, & Ross, 2021). Residents located farther from supermarkets are less likely to make frequent trips, which reduces opportunities to replenish healthy foods such as fruits and vegetables. Studies using geographic information system (GIS) measures further show that shorter distances to supermarkets are associated with improved perceptions of healthy food availability in neighbourhoods, indicating that proximity plays an important role in how healthy foods are experienced and used (Caspi et al., 2012).

However, evidence on this relationship remains mixed. Some studies find that residents bypass their closest supermarket and instead travel farther to shop at preferred stores, suggesting that distance alone may not determine shopping behaviour (ERS,

2016). Longitudinal research also highlights that changes in the mix of local food outlets increasing healthy outlet exposure while reducing convenience or fast-food stores have a more consistent influence on dietary intake than distance alone, especially for low-income households and families with children (Peeters et al., longitudinal study).

2.5.1.2 Supermarket Versus Convenience Store

The type and mix of retail food outlets in a neighbourhood matter as much as, or even more than, physical distance in shaping dietary behaviour. The presence of large supermarkets is generally a positive predictor of healthy dietary intake, whereas a high density of convenience stores or fast-food outlets is linked to higher body mass index (BMI) and lower diet quality (Liu, Corkery, & Wiesel, 2016; Dixon, Ugwoaba, Brockmann, & Ross, 2021). Supermarkets typically offer a broader range of affordable, fresh, and nutritious foods, and their presence has been associated with higher fruit and vegetable consumption and a lower risk of diet-related diseases. Studies in both developed and developing countries show that greater supermarket accessibility is linked to healthier eating patterns and reduced likelihood of obesity and poor diet quality (Black & Macinko, 2008).

In contrast, convenience stores, small corner stores, and fast-food outlets usually stock limited fresh produce but abundant energy-dense, ultra-processed foods. High densities of these outlets are associated with poorer diet quality and, in some cases, higher overweight prevalence. For example, research in Malaysia indicates that a higher density of fast-food outlets within 1,000 meters of residential locations is significantly associated with increased odds of overweight and obesity among children (Lim et al., 2019).

The local food mix can further influence actual dietary intake. Longitudinal evidence suggests that increased exposure to convenience stores and takeout outlets is associated with higher consumption of unhealthy foods, while a greater proportion of healthy food stores correlates with improved diet quality (Bivoltsis, Trapp, Knuiman, Hooper, & Ambrosini, 2020).

2.5.1.3 Food Deserts

The concept of "food deserts" refers to urban areas with poor access to retail provision of healthy, affordable food (Turrell, Giles-Corti, & Patterson, 2002; Inagami, Cohen, Finch, & Asch, 2006; Liu, Corkery, & Wiesel, 2016). In such areas, residents are often constrained to purchase higher-priced, lower-quality fresh foods from smaller local stores (Wrigley, 2002). Residents in food deserts frequently rely on nearby small retailers or convenience stores, which carry fewer healthy options and higher prices, thereby reducing the overall quality of local food intake (Walker, Keane, & Burke, 2010).

Although the designation of food deserts has been widely used in policy and research, its predictive power for diet quality and health outcomes is not always consistent. Some studies report that living in a food desert is associated with higher body mass index (BMI) and altered shopping patterns, while others find little direct connection between distance to the nearest supermarket and actual diet quality or obesity outcomes. This inconsistency suggests that physical access alone is insufficient to determine dietary behaviour; other factors such as food purchasing preferences, transport mode, household routines, and perceptions of food adequacy also play crucial roles (Turrell et al., 2002; Inagami et al., 2006).

2.5.2 Urban Form and Regulation

Urban form and land use regulation shape the spatial organisation of food environments and influence everyday dietary behaviour by determining where food outlets are located, how visible they are, and how easily they can be accessed during daily routines. Unlike individual-level determinants of diet, urban form operates structurally, embedding food choices within the physical layout and regulatory framework of cities. Through land-use mix, density controls, zoning policies, and micro-scale design, planning decisions influence the availability and appeal of both healthy and unhealthy food options.

2.5.2.1 Land Use Mix and Density

Land-use mix refers to the degree to which residential, commercial, institutional, and recreational uses are integrated within a neighbourhood. Greater diversity in land-use mix is consistently associated with lower weight status and healthier food choices (Liu, Corkery, & Wiesel, 2016; Dixon, Ugwoaba, Brockmann, & Ross, 2021). Mixed-use development allows residents to integrate grocery shopping into daily errands within a walkable radius, thereby reducing travel burden and supporting more frequent food purchasing, particularly of fresh and perishable foods (Liu, Corkery, & Wiesel, 2016).

Empirical evidence further suggests that higher residential density combined with mixed land use increases the economic viability of food retail, including supermarkets, wet markets, and neighbourhood grocery stores, thus improving access to fresh foods (Frank et al., 2010; Giles-Corti et al., 2016). However, compact and mixed-use urban environments may also intensify exposure to unhealthy food outlets. Studies indicate that areas with higher density and pedestrian activity often attract a greater concentration of fast-food outlets and convenience stores due to commercial profitability and consumer demand (Fraser et al., 2010). As a result, the dietary impact of land-use mix depends not only on proximity and density, but also on the composition of food outlets permitted within mixed-use zones. This highlights the importance of planning policies that encourage a balanced food retail mix rather than focusing on density alone.

2.5.2.2 Zoning Strategies and Regulatory Control

Zoning regulations play a central role in shaping food environments by determining which types of food outlets are permitted, restricted, or encouraged in specific locations. Traditional Euclidean zoning, which separates residential and commercial uses, may limit access to food outlets within walking distance, increasing reliance on motorised transport and reducing shopping frequency for fresh foods. In contrast, contemporary planning approaches such as flexible mixed-use zoning and form-based codes allow food retail to be integrated into residential neighbourhoods, thereby improving physical accessibility to healthy food sources (Pothukuchi & Kaufman, 2000).

Built environment professionals can also use zoning and land-use regulation more proactively to support healthy eating. Examples include creating special-use districts or incentive zones to encourage the establishment of supermarkets and fresh food markets, as well as overturning prohibitions on growing food in residential areas. Such regulatory measures enable both commercial and non-commercial food provision to coexist within urban neighbourhoods, strengthening local food access. More recently, zoning has been applied as a public health intervention tool, particularly to regulate the concentration of unhealthy food outlets. Several cities have introduced zoning restrictions on fast-food outlets near schools, residential areas, or low-income neighbourhoods to reduce exposure to energy-dense foods (Mah et al., 2019). While evidence suggests that such approaches can influence food retail patterns over time, their effectiveness depends on enforcement, market dynamics, and complementary policies that actively support healthy food retailers.

2.5.2.3 Visibility and Micro-Design of Food Outlets

Beyond macro-scale land use regulation, micro-scale urban design influences dietary behaviour through visibility, street-level exposure, and everyday encounters with food outlets. Food outlets located along highly visible streets, near public transport nodes, or within pedestrian-oriented environments are more likely to be patronised, particularly for impulse food purchases (Day & Pearce, 2011). The visibility of healthy options such as sidewalk displays of fresh fruits and vegetables can positively influence attitudes toward healthy eating and serve as cues that remind consumers to make healthier food choices (Liu, Corkery, & Wiesel, 2016). In contrast, design features such as prominent signage, transparent shopfronts, outdoor seating, and corner-lot placement can disproportionately promote fast-food and takeaway outlets. Repeated visual exposure to unhealthy food outlets has been shown to reinforce habitual consumption patterns and normalise frequent intake of energy-dense foods (Thornton et al., 2016). Conversely, planning and urban design strategies that enhance the visibility and attractiveness of healthy food outlets such as fresh food markets, greengrocers, and healthy cafeterias can support healthier dietary choices by making nutritious options more prominent within daily urban environments.

Taken together, land-use mix and density, zoning strategies, and micro-design elements illustrate how urban form embeds dietary behaviour within the spatial logic of cities. These structural factors influence not only where food is available, but also how often residents encounter food outlets, which types of food are normalised, and how convenient different food choices become. Importantly, the influence of urban form is often mediated by socioeconomic status, car ownership, and time constraints, with low-income households being more sensitive to regulatory and spatial barriers to healthy food access (Giles-Corti et al., 2016). This body of literature underscores the importance of incorporating dietary considerations into urban land use planning, moving beyond a narrow focus on physical activity alone. It provides a strong justification for examining how planning decisions in urban areas, such as Petaling Jaya, shape food environments and dietary behaviour as part of a broader healthy lifestyle framework.

2.5.3 Socioeconomic Status (SES) and Deprivation Amplification

Urban land use planning interacts closely with socioeconomic status (SES) to shape dietary behaviour, often producing unequal food environments across different neighbourhoods. Planning decisions related to the location of food outlets, transport infrastructure, and land-use regulation can either mitigate or reinforce existing social inequalities, resulting in differential access to healthy food across socioeconomic groups.

2.5.3.1 Socioeconomic Gradient in Food Access

Numerous studies demonstrate a clear socioeconomic gradient in food accessibility, whereby residents of lower-SES neighbourhoods experience more limited access to healthy food options compared to those living in higher-SES areas (Diez Roux & Mair, 2010). Studies consistently show that access to healthy food is more difficult in lower SES areas, where supermarkets, fresh food markets, and affordable healthy food outlets are often scarce (Oliver & Hayes, 2005; Franco et al., 2022). Residents in low-SES neighbourhoods also tend to face greater proximity to unhealthy food outlets, such as fast-food restaurants and convenience stores, compared to residents in higher-SES areas (Franco et al., 2022). This uneven distribution of food retail increases exposure to energy-dense, nutrient-poor foods and constrains healthy dietary choices,

contributing to socioeconomic disparities in diet quality and diet-related health outcomes.

2.5.3.2 Deprivation and Amplification

The concept of "deprivation amplification" explains how individual-level disadvantages are compounded by environmental constraints, resulting in greater health risks. Deprivation amplification occurs when a lack of private transport an individual disadvantage is intensified by inadequate public transport services or the absence of nearby healthy food retail an environmental disadvantage. In such contexts, residents may be forced to rely on nearby convenience stores or takeaway outlets, even when healthier options exist elsewhere. This interaction between personal resources and the built environment further exacerbates dietary inequality and adverse health outcomes, particularly among low-income households, older adults, and families with limited mobility (Macintyre et al., 2008). Urban land use planning plays a crucial role in either reinforcing or alleviating deprivation amplification by influencing transport connectivity, the spatial distribution of food outlets, and the integration of food retail within residential areas.

2.5.4 Community and alternative food systems

Urban land use planning can also support healthier dietary behaviour by protecting and promoting community-based and alternative food systems. By allocating land for non-commercial food production and local food exchange, planning policies can enhance food security, diversify food sources, and improve access to fresh produce, particularly for urban residents who face barriers to conventional food retail.

2.5.4.1 Urban Agriculture

Preserving peri-urban agricultural land is essential for maintaining a local supply of fresh produce to urban populations. Urban and peri-urban agriculture contribute to food security, shorten food supply chains, and enhance access to affordable fresh food, particularly in rapidly growing cities (Mougeot, 2005). In addition, protecting peri-urban agricultural lands is vital for sustaining local food

systems and reducing cities' dependence on long-distance food distribution networks (Mason & Knowd, 2010). Through appropriate land-use zoning and development control, urban planning can safeguard agricultural land from conversion to non-food urban uses, thereby supporting healthier and more resilient urban food environments.

2.5.4.2 Community Gardens and Farmer's Market

Community gardens and farmers' markets are widely recognised as valuable components of a healthy built environment. They provide direct access to fresh fruits and vegetables, encourage social interaction, and improve food literacy by increasing awareness of healthy eating practices. These spaces also foster community cohesion and empowerment, which indirectly support healthier dietary behaviours (Armstrong, 2000; Alkon & Agyeman, 2011). From a planning perspective, community gardens and farmers' markets represent "extremely valuable elements of a healthy built environment" by facilitating community interaction, providing knowledge about healthy eating, and offering access to fresh produce that might otherwise be unavailable, particularly in dense urban areas (Liu, Corkery, & Wiesel, 2016). The integration of such facilities into urban neighbourhoods through land-use planning and policy support can therefore play a meaningful role in promoting healthier diets and sustainable food systems.

2.5.5 Urbanization, Lifestyle and The Pace of Life

Modern urbanisation and the resulting lifestyles create structural barriers to healthy eating that are closely tied to land use, urban design, and planning decisions. Rapid urban growth, dense commercial development, and time pressures collectively shape the food environment, influencing dietary behaviour at both household and individual levels.

2.5.5.1 Obesogenic Environments

Large cities often foster obesogenic environments, characterised by the overabundance of cheap, energy-dense, and highly processed foods. These environments normalise unhealthy eating patterns and increase the likelihood of

excessive calorie consumption, particularly in areas dominated by fast-food outlets and convenience stores (Swinburn et al., 1999). Empirical evidence further highlights that urban areas with high exposure to energy-dense foods are associated with poorer diet quality, higher sugar and fat consumption, and increased risk of overweight and obesity (Liu, Corkery, & Wiesel, 2016; Dixon, Ugwoaba, Brockmann, & Ross, 2021; Chuquitarco-Morales et al., 2024; Rivera-Navarro, Brey, & Franco, 2020).

2.5.5.2 Time Constraints and Convenience

The fast pace of urban life, long commuting times, and the growing participation of both parents in the labour market have reduced the time available for preparing homemade, healthy meals (Popkin, 2017; Chuquitarco-Morales et al., 2024; Amin et al., 2023; Rivera-Navarro, Brey, & Franco, 2020). This often forces reliance on ready-made meals, eating out, or fast-food consumption, even when healthier alternatives are preferred (Chuquitarco-Morales et al., 2024; Amin et al., 2023; Rivera-Navarro, Brey, & Franco, 2020). The convenience-oriented nature of urban lifestyles reinforces frequent consumption of energy-dense, highly processed foods, further entrenching obesogenic patterns.

2.5.5.3 The Globalized Foodscape

Urbanisation and globalisation have facilitated the rapid expansion of multinational fast-food corporations, which offer affordable, accessible, and heavily marketed foods. These outlets tend to be more visible, conveniently located, and heavily promoted than traditional or healthier options, contributing to habitual consumption of energy-dense foods (Hawkes, 2008; Amin et al., 2023). The combined effects of global food chains, urbanisation-driven lifestyle pressures, and limited time for food preparation create structural constraints that make healthy eating more difficult for urban populations.

2.6 Healthy Lifestyle

A healthy lifestyle is a multidimensional concept that encompasses patterns of daily behaviour and living conditions that promote physical, mental, and social well-

being while reducing the risk of non-communicable diseases (NCDs). The World Health Organization (WHO) conceptualises a healthy lifestyle as one that supports optimal health through regular physical activity, healthy dietary practices, avoidance of harmful behaviours, and supportive social and environmental conditions (World Health Organization [WHO], 2014; WHO, 2020). Importantly, contemporary health and planning literature recognises that a healthy lifestyle is not solely determined by individual choice but is strongly influenced by the built environment and land use patterns in which individuals live. Ecological models of health behaviour suggest that lifestyle practices emerge from the interaction between individuals and their physical, social, and policy environments, highlighting the critical role of urban land use planning in shaping opportunities for healthy living (Dahlgren & Whitehead, 1991; Sallis et al., 2016).

Healthy lifestyle behaviours are widely recognised as key preventive factors for chronic diseases, particularly cardiovascular disease (CVD). Masana et al. (2017) emphasise that modifiable lifestyle factors play a significant role in reducing CVD risk, as conditions such as high blood pressure, diabetes mellitus, and dyslipidaemias, including elevated total cholesterol levels, can be improved through lifestyle changes. Behavioural factors such as tobacco smoking, physical inactivity, and unhealthy dietary habits are also modifiable and, when addressed, may reduce the need for pharmacological interventions. Consequently, many studies operationalise the healthy lifestyle concept through a set of cores behavioural factors. Commonly identified factors include regular physical activity, healthy dietary practices, maintenance of a healthy body weight, moderate alcohol consumption, and non-smoking behaviour. For example, King et al. (2009) measured healthy lifestyle using five characteristics: fruit and vegetable intake, regular exercise, healthy body weight, moderate alcohol intake, and non-smoking. However, other researchers argue that assessing fruit and vegetable intake alone does not fully represent a healthy diet. Studies by Haveman-Nies et al. (2003) and Wang et al. (2017) therefore adopted a broader healthy diet indicator rather than focusing solely on fruit and vegetable consumption. While some studies, such as King et al. (2009) and Reeves and Rafferty (2005), include healthy body weight as a component of a healthy lifestyle, others exclude this indicator, arguing that body weight alone does not necessarily reflect healthy lifestyle practices. As noted by Wang et al. (2017), individuals may maintain a healthy weight despite having chronic diseases, whereas consistent healthy dietary practices are more directly associated with positive

health outcomes. Beyond behavioural factors, preventive health behaviours have also been incorporated into the healthy lifestyle concept. Ramachandran et al. (2016), for instance, included preventive screening behaviours, such as regular monitoring of blood pressure and cholesterol levels, as part of healthy lifestyle assessment. Collectively, these perspectives indicate that the healthy lifestyle concept is multifaceted, encompassing health-related behaviours, preventive practices, and environmental influences rather than a single set of uniform indicators.

2.6.1 Physical Activity as a Core Component of Healthy Lifestyle

Physical activity is widely acknowledged as a fundamental component of a healthy lifestyle. WHO (2020) recommends that adults engage in at least 150–300 minutes of moderate-intensity physical activity per week to reduce the risk of cardiovascular diseases, diabetes, obesity, and mental health disorders. However, the ability to achieve these activity levels is closely related to neighbourhood characteristics such as walkability, land use mix, street connectivity, and access to green and recreational spaces. Studies have consistently demonstrated that compact, mixed-use neighbourhoods encourage walking and cycling as part of daily routines, thereby supporting active lifestyles (Frank et al., 2006; Sallis et al., 2016). Conversely, low-density and single-use land development patterns are associated with sedentary behaviour and poorer health outcomes. This evidence highlights that physical activity, as a healthy lifestyle behaviour, is significantly shaped by planning decisions rather than individual motivation alone.

2.6.2 Healthy Diet and the Urban Food Environment

Another key dimension of a healthy lifestyle is healthy dietary behaviour. A healthy diet is characterised by adequate intake of fruits, vegetables, and whole foods, alongside limited consumption of processed foods high in sugar, salt, and unhealthy fats (WHO, 2014). Similar to physical activity, dietary behaviour is influenced by the urban food environment, including the spatial distribution and accessibility of food outlets. Research indicates that neighbourhoods with better access to fresh food markets, supermarkets, and local food sources are more likely to support healthy eating behaviours (Glanz et al., 2005; Story et al., 2008). From a land use planning perspective,

zoning policies, location of commercial centres, and support for local food systems can either facilitate or constrain residents' ability to maintain a healthy diet as part of their lifestyle.

2.7 Measurement of Healthy Lifestyle: Physical Activity and Dietary Behaviour

2.7.1 Measurement of Physical Activity as an Indicator of Healthy Lifestyle

Physical activity, together with healthy eating, is widely recognised as a vital factor contributing to a healthy lifestyle. In health, urban planning, and built environment research, physical activity is frequently used as a key indicator for measuring healthy lifestyle behaviours. Gadais, Boulanger, Trudeau, and Rivard (2017) emphasised that physical activity and nutrition constitute major components of a healthy lifestyle, reflecting both behavioural and environmental influences on health outcomes.

Physical activity is commonly defined as any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above a basal level (Barton, 2009). This broad definition encompasses a wide range of activities performed across different settings and daily routines, including everyday home or work-related activities such as walking, carrying, cleaning, and climbing stairs; children's active play such as running, skipping, and skateboarding; activities conducted in specific places such as gardening, dancing, gym exercise, and swimming; organised sports such as football, rugby, tennis, and hockey; as well as active travel modes including walking and cycling. This inclusive definition is particularly relevant in urban studies, as it captures physical activity embedded in daily life and shaped by neighbourhood design, land use patterns, and accessibility of facilities.

Based on Malaysian Dietary Guideline physical activity is commonly understood to occur across three main domains: occupational work**,** household and domestic activities**,** and leisure-time physical activity. Leisure-time physical activity includes both exercise, which refers to planned and structured movement undertaken to improve fitness, and sports, which often involve competition and organised participation. This domain-based understanding allows researchers to examine how different aspects of the built environment influence physical activity behaviour across daily life contexts (Sallis et al., 2016).

2.7.1.1 Types and Intensity of Physical Activity

Physical activity is commonly classified according to intensity, with two primary categories frequently used: moderate-intensity aerobic activity and vigorous-intensity aerobic activity. Moderate-intensity aerobic activity is characterised by a noticeable increase in breathing and heart rate, during which individuals are still able to talk but not sing, and mild perspiration typically occurs. Examples include brisk walking (approximately 5 km/h), leisure cycling at speeds below 16 km/h, leisure swimming, playing doubles tennis, and line dancing. In contrast, vigorous-intensity aerobic activity results in a substantial increase in heart rate and rapid breathing, making it difficult to maintain a conversation. Examples of vigorous-intensity physical activity include jogging or running, swimming continuous laps, playing singles tennis, rollerblading at a fast pace, playing basketball or football, and skipping rope. This distinction between moderate and vigorous activities is widely adopted in physical activity research and allows for more precise assessment of behavioral patterns and health impacts.

From an urban and built environment perspective, moderate-intensity activities particularly walking are often more strongly associated with neighbourhood characteristics such as walkability, safety, and proximity to facilities, while vigorous activities tend to be less dependent on local environmental conditions and more influenced by individual motivation and access to specialised facilities. National and international guidelines consistently highlight the importance of regular physical activity for adult health. The Malaysian Dietary Guidelines (MDG) and WHO recommendations suggest that adults should accumulate at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity activity per week, which can be achieved through 30-minute sessions on most days of the week (MOH, 2020; WHO, 2020). Importantly, physical activity does not need to be performed in a single continuous session; activities can be accumulated in bouts of at least 10 minutes to achieve the recommended daily total.

In addition to aerobic activity, adults are encouraged to engage in activities that improve muscle strength, flexibility, and endurance two to three times per week. Older adults (aged 65 years and above) are advised to follow similar activity recommendations while placing additional emphasis on muscle strengthening and balance exercises to reduce the risk of falls (MOH, 2020).

The literature further demonstrates a strong association between physical activity levels and the prevention of chronic diseases and unhealthy weight gain. Physical inactivity has been shown to increase the risk of cardiovascular disease by up to 1.5 times, while regular physical activity provides convincing evidence for the prevention of colon and breast cancers and probable evidence for reducing the risk of type 2 diabetes and heart disease (King et al., 2009; WHO, 2020). With regard to body mass index (BMI), engaging in approximately 60 minutes of moderate-intensity physical activity daily is associated with maintaining a normal body weight. Importantly, physical activity confers health benefits independent of weight loss, as higher fitness levels are associated with reduced mortality risk even among individuals with obesity.

Table 2.2
Example of Moderate and Vigorous Activities in The Second Level of Physical Activity Pyramid

Moderate activity	**Vigorous activity**
3.0 to 6.0 METs (3.5 to 7 kcal/min)	**Greater than 6.0 METs (more than 7 kcal/min)**
Aerobic exercise	Aerobic exercise
• Walking at a moderate or brisk pace of 5 to 7 km/h on a level surface inside or outside • Walking (to class, work, store: for pleasure; for break; down stairs or down a hill) • Walking while carrying a child • Walking while pushing or pulling a child in a stroller or an adult in a wheelchair • Race-walking less than 8 km/h • Actively playing with children: walking, running or climbing while playing with children • Carrying a child up a flight of stairs	• Race-walking and aerobic walking at 8 km/h or faster • Race-walking or jogging while pushing a stroller designed for sport use • Jogging or running • Vigorously playing with children: running longer distances or playing strenuous games with children • Walking and climbing briskly up a hill • Roller skating or in-line skating at a brisk pace

Source: Malaysian Dietary Guideline

Table 2.3
Example of Flexibility and Strength Training Activities in The Third Level of Physical Activity Pyramid

Moderate activity **3.0 to 6.0 METs (3.5 to 7 kcal/min)**	**Vigorous activity** **Greater than 6.0 METs (more than 7 kcal/min)**
Flexibility exercises: • Yoga • Tai chi • Gymnastics • General home exercises, light or moderate effort, getting up and down from the floor • Jumping on trampoline • Using a stair climber machine at a light to moderate pace • Using a rowing machine with moderate effort	Aerobic exercise: • Karate, taekwondo, judo • Silat • Jump rope • Performing jumping jacks • Using a stair climber machine at a fast pace • Using a rowing machine with vigorous effort • Using an arm cycling machine with vigorous effort
Strength training: Putting groceries away, walking and carrying especially large or heavy items	Strength training: Carrying several heavy bags of groceries at one time up flight of stairs Grocery shopping while carrying young children and pushing a full grocery cart or pushing two full grocery carts at once.
Strength training (exercise and sports): Weight training and bodybuilding using free weights or universal type weights.	Strength training (exercise and sports): Circuit weight training Boxing in the ring, sparring.

Source: Malaysian Dietary Guideline

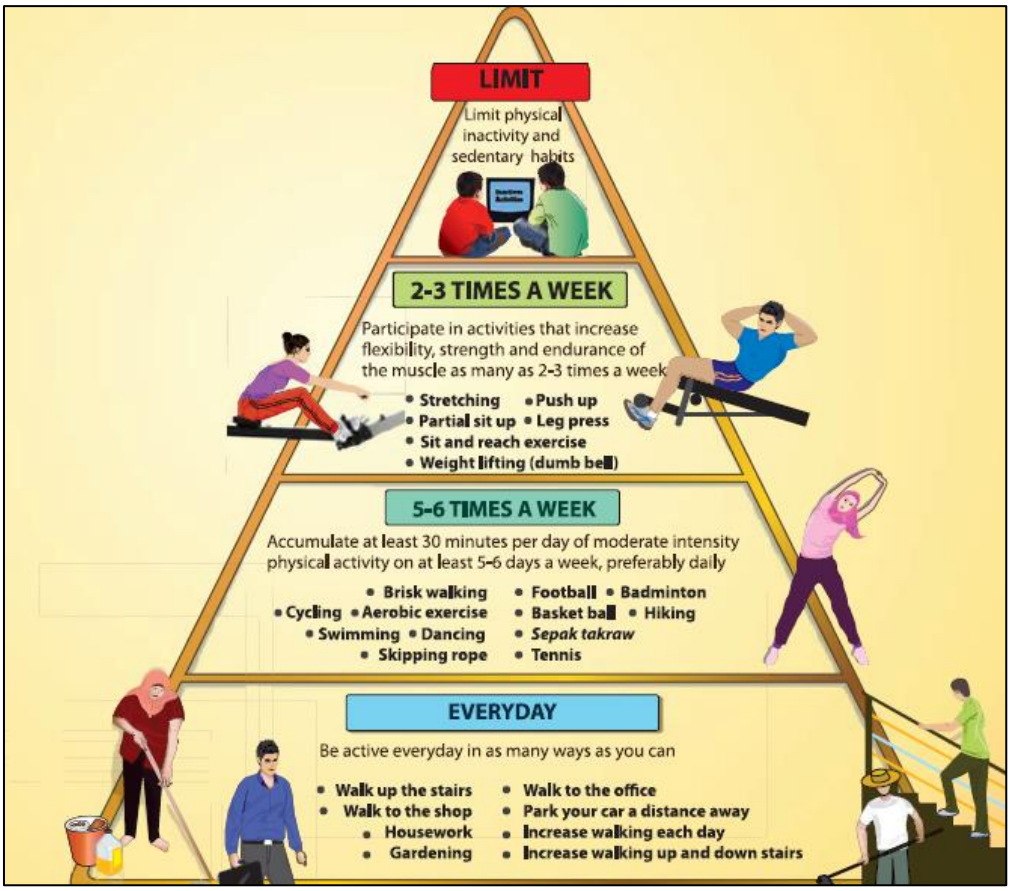


Figure 2.2 Physical Activity Pyramid
Source: Malaysian Dietary Guideline

2.7.1.2 Measurement of Physical Activity in Previous Studies

Various approaches have been employed to measure physical activity in epidemiological and urban health studies. According to the National Health and Nutrition Examination Survey III (NHANES III), as cited by King et al. (2009), physical activity frequency was determined based on participation in leisure-time physical activities within the previous month. These activities included walking, jogging or running, cycling, swimming, aerobic exercise, and aerobic dancing. Physical activity frequency was categorised into two groups: low participation (0–12 times per month) and high participation (>12 times per month), providing a simple yet practical measure of activity engagement.

More recent studies have commonly adopted standardised questionnaires such as the International Physical Activity Questionnaire (IPAQ) to capture a broader range of activity domains. For example, Wang et al. (2017) utilised the IPAQ to collect information on job-related, transportation-related, housework-related, recreational,

sports, and leisure-time physical activity. Participants were asked to report specific activities performed for at least 10 minutes during the previous week, including the intensity, total duration per day, and number of days per week. These data were subsequently converted into metabolic equivalent task (MET) minutes per week, allowing physical activity levels to be categorised into low (less than 600 MET-min/week), moderate (600–3000 MET-min/week), and high (more than 3000 MET-min/week) levels.

The widespread use of IPAQ in urban and public health research reflects its suitability for large-scale population studies and its ability to capture physical activity across multiple life domains. Although self-reported measures may be subject to recall bias, they remain appropriate for examining associations between physical activity behaviour and environmental characteristics, particularly within planning-related research.

2.7.1.3 Relevance to Healthy Lifestyle and Urban Planning Research

Overall, the literature demonstrates that physical activity is a multidimensional behaviour influenced by individual, social, and environmental factors. The classification of physical activity by intensity, frequency, duration, and domain provides a comprehensive framework for assessing healthy lifestyle behaviours in urban contexts. Measuring both moderate- and vigorous-intensity physical activity allows researchers to distinguish activities that are more sensitive to neighbourhood design from those that are less dependent on local environments.

In the context of urban land use planning, the measurement of physical activity through indicators such as frequency and duration of moderate and vigorous activities offers a practical and theoretically grounded approach for evaluating how urban environment features support or constrain healthy lifestyle behaviours. This approach aligns with established practices in the literature and provides a strong foundation for examining the relationship between urban environment characteristics and physical activity participation.

2.7.2 Measurement of Dietary Behaviour and Balanced Diet Consumption

This guidance underscores the importance of consuming a balanced and diverse range of nutrients, as outlined in the Malaysian Food Pyramid 2020 and operationalised through the Malaysian Healthy Plate visual guide. The Healthy Plate translates national dietary recommendations into a practical format using the "quarter–quarter–half" principle, whereby a standard 10-inch plate is composed of approximately 25% carbohydrate-based foods (such as rice, grains, or tubers), 25% protein sources (including fish, poultry, meat, or legumes), and 50% fruits and vegetables. This approach is designed to promote dietary balance, portion control, and adequate micronutrient intake.

In applying these guidelines, individuals are encouraged to adjust portion sizes according to their daily energy requirements, which are commonly categorised at 1,500, 1,800, or 2,000 kilocalories per day, depending on age, sex, and physical activity level. At the same time, the guidelines emphasise the need to limit the consumption of ultra-processed foods, which are typically high in added sugars, unhealthy fats, and sodium, and have been consistently associated with poorer diet quality and increased risk of non-communicable diseases (Monteiro et al., 2019).

Previous studies have demonstrated that adherence to a balanced dietary pattern, characterised by higher consumption of fruits, vegetables, whole grains, and lean protein sources, is associated with improved health outcomes, including healthier body weight, reduced cardiometabolic risk, and better overall diet quality (Hu, 2002; Mozaffarian, 2016). In urban contexts, balanced diet consumption has also been linked to environmental factors such as access to fresh food outlets and the availability of healthy food options within neighbourhoods (Glanz et al., 2005; Lytle & Sokol, 2017). These findings highlight the relevance of balanced dietary guidelines not only as individual behavioural recommendations but also as outcomes influenced by the urban food environment.

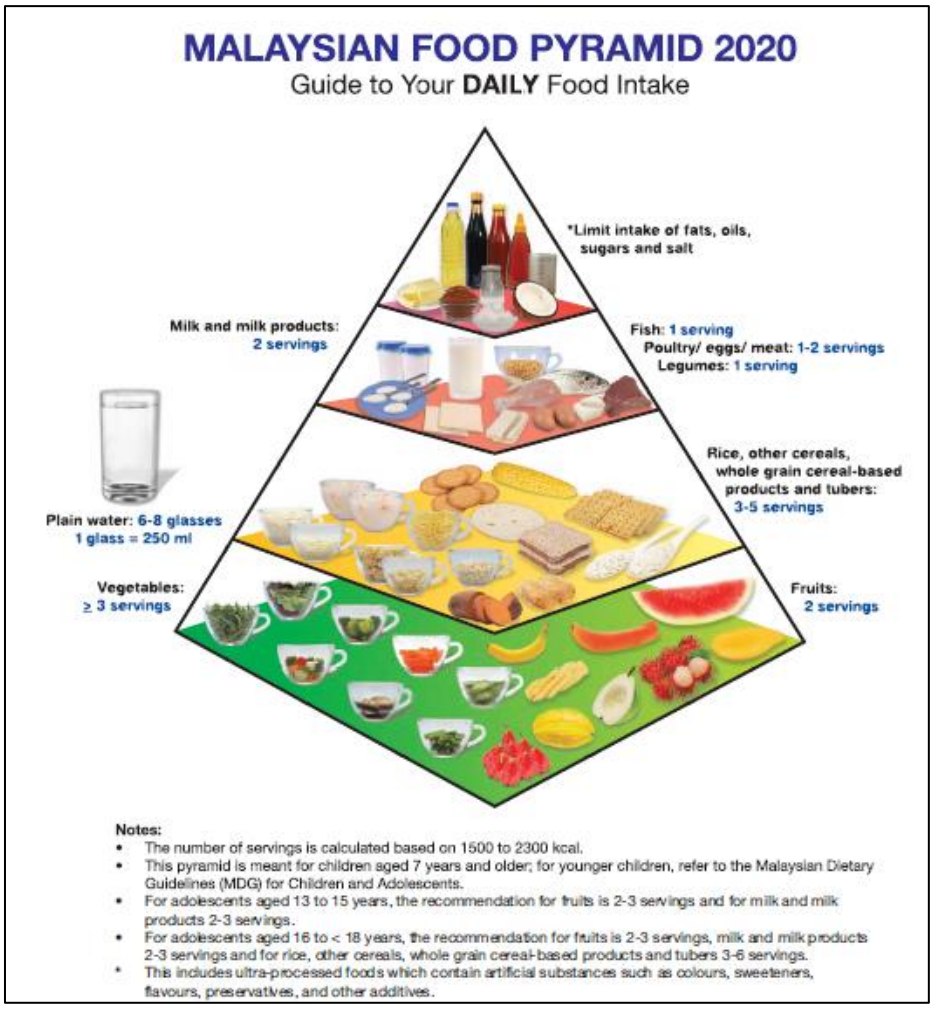


Figure 2.3 Malaysian Food Pyramid 2020
Source: Malaysian Dietary Guideline

2.7.2.1 Dietary Fat Consumption and Healthy Eating Practices

The primary objective of this dietary guideline is to reduce the risk of cardiovascular disease (CVD) by improving both the quantity and quality of dietary fat intake. Current nutritional recommendations consistently advise that saturated fatty acids (SFA) should contribute less than 10% of total daily energy intake, with emphasis placed on replacing saturated fats with healthier unsaturated fatty acids, particularly polyunsaturated and monounsaturated fats (World Health Organization [WHO], 2018; Ministry of Health Malaysia [MOH], 2020). In addition, consumers are strongly encouraged to avoid trans fatty acids (TFA), which are commonly found in partially hydrogenated oils, margarines, and shortenings. Numerous studies have demonstrated a strong association between trans-fat consumption and increased risk of coronary heart disease due to its adverse effects on blood lipid profiles and systemic inflammation

(Mozaffarian et al., 2006). As a result, reducing intake of foods high in trans fats forms a critical component of a balanced and heart-healthy diet.

Practical strategies to support fat reduction include adopting low-fat cooking methods such as steaming, boiling, or grilling, substituting high-fat ingredients such as coconut milk (santan) with lower-fat alternatives, and avoiding the repeated reuse of cooking oil, which can increase the formation of harmful lipid oxidation products. These practices align with recommendations promoting balanced dietary patterns that emphasise moderation, food quality, and healthier preparation methods.

Evidence from previous studies indicates that adherence to a balanced dietary pattern, characterised by lower intake of saturated and trans fats and higher consumption of fruits, vegetables, whole grains, and lean protein sources, is associated with reduced cardiovascular risk and improved overall diet quality (Hu, 2002; Mozaffarian, 2016). In urban contexts, such balanced diet consumption has been shown to be influenced by food availability and accessibility, highlighting the role of the built environment in shaping dietary behaviour (Glanz et al., 2005). Collectively, these findings reinforce the importance of limiting high-fat food intake as part of a broader balanced diet approach to promoting healthy lifestyles.

2.7.2.2 Salt, Sauces and Flavour Enhancers in Healthy Eating Practices

This dietary recommendation emphasises the importance of reducing sodium intake to lower the risk of hypertension and other diet-related chronic diseases. Excessive sodium consumption has been consistently associated with elevated blood pressure, which is a major risk factor for cardiovascular disease and stroke (He & MacGregor, 2011; World Health Organization [WHO], 2012). In line with national and international guidelines, salt intake is recommended to be limited to approximately one teaspoon (5 g) per day, equivalent to a maximum of 2,000 mg of sodium (Ministry of Health Malaysia [MOH], 2020; WHO, 2012). The guidelines further encourage individuals to develop a preference for the natural flavours of foods by reducing reliance on salt, sauces, and flavour enhancers such as monosodium glutamate (MSG), as well as commercially prepared seasoning pastes. High-sodium preserved foods, including salted fish, salted eggs, pickles, and processed meats, should be consumed sparingly, as they contribute substantially to total daily sodium intake. Additionally, individuals are advised to read food labels carefully to identify hidden sources of sodium, such as

sodium benzoate, sodium nitrate, and other sodium-based additives commonly found in processed and packaged foods.

Evidence from previous studies indicates that adherence to a balanced dietary pattern, characterised by lower sodium intake and higher consumption of fresh and minimally processed foods, is associated with improved blood pressure control and reduced cardiovascular risk (DASH Collaborative Research Group, 1997; Mozaffarian, 2016). In urban settings, balanced diet consumption including reduced salt intake has been shown to be influenced by the local food environment, particularly the availability of fresh foods and the prevalence of processed food options (Glanz et al., 2005; Lytle & Sokol, 2017). These findings highlight that limiting salt, sauces, and flavour enhancers is not only an individual dietary choice but also a behaviour shaped by broader environmental and urban contexts.

2.7.2.3 Limiting Free Sugar Consumption in Balanced Dietary Patterns

This dietary recommendation highlights the importance of limiting sugar intake, particularly free sugars, to prevent unhealthy weight gain, dental caries, and other non-communicable diseases. Free sugars refer to sugars added to foods and beverages by manufacturers, cooks, or consumers, as well as sugars naturally present in honey, syrups, fruit juices, and fruit juice concentrates, and are distinct from naturally occurring sugars found in whole fruits and vegetables (World Health Organization [WHO], 2015). Guidelines strongly advise individuals to prioritise plain water over sugar-sweetened beverages, including carbonated drinks, flavoured syrups, cordials, and sweetened fruit drinks, which have been consistently associated with increased total energy intake and obesity risk. To reduce dietary sugar consumption, individuals are encouraged to substitute sugar-rich desserts with fresh fruits, avoid sugary snacks particularly before bedtime and carefully review food labels to identify products in which sugar or its variants (e.g., glucose, fructose, sucrose, corn syrup) appear among the main ingredients.

Evidence from previous studies indicates that adherence to a balanced dietary pattern, characterised by low intake of free sugars and higher consumption of fruits, vegetables, and whole foods, is associated with improved weight management and metabolic health outcomes (Malik et al., 2010; Te Morenga et al., 2013). From an urban health perspective, sugar consumption behaviours are also shaped by the food

environment, including the availability and marketing of sugar-sweetened beverages and processed foods, particularly in urban neighbourhoods (Swinburn et al., 2011). These findings suggest that limiting sugar intake is not solely an individual behavioural choice but is influenced by broader environmental and planning-related factors that affect dietary patterns and balanced food consumption.

2.8 Best Practice in Integrating Urban Land Use Planning and Health

2.8.1 Vancouver's Healthy City Strategy (2014-2025)

Vancouver's Healthy City Strategy (2014–2025) is widely recognised as an international best-practice example of integrating urban land use planning with public health promotion. Branded under the vision "A Healthy City for All," the strategy represents a comprehensive, long-term policy framework aimed at improving health equity, community wellbeing, and environmental sustainability. It is structured around three interrelated pillars healthy people, healthy communities, and healthy environments which together acknowledge that population health outcomes are strongly shaped by urban form, social conditions, and environmental quality (City of Vancouver, 2014). Rather than positioning health as a standalone sectoral concern, the strategy embeds health objectives across land use, transportation, housing, food systems, and environmental planning.

A central component of the Healthy City Strategy is the promotion of compact, walkable neighbourhoods and active transportation. Under the strategic goal of "Getting Around," Vancouver set an ambitious target for more than 50% of all trips to be made by walking, cycling, or public transit, reflecting a strong commitment to integrating physical activity into daily routines (City of Vancouver, 2014). This objective is operationalised through land use and street design interventions, most notably the Greenway Network. Greenways are redesigned streets that prioritise pedestrians and cyclists through traffic calming measures, narrowed vehicle lanes, widened sidewalks, dedicated cycling infrastructure, and enhanced landscaping. The long-term planning target is to ensure that every resident has access to a greenway within a five-minute walk or a ten-minute cycling distance from their home, thereby reinforcing equitable access to active travel infrastructure (City of Vancouver, 2012). Importantly, the implementation of greenways is supported through municipal capital budgets,

development contributions, and community partnerships, demonstrating how financial mechanisms and public participation can reinforce health-oriented land use planning.

In addition to mobility and urban form, Vancouver's Healthy City Strategy places strong emphasis on ensuring access to healthy, affordable, and locally produced food. The Vancouver Food Strategy forms a key supporting policy, aiming to create a just and sustainable food system by promoting urban agriculture, strengthening regional food networks, and improving food literacy among residents (City of Vancouver, 2013). Urban agriculture initiatives include community gardens, rooftop and green roof farming, school-based food gardens, and neighbourhood food-growing spaces, all of which are integrated into land use and zoning frameworks. The city also actively regulates farmers' markets through planning and licensing provisions, specifying market size, vendor composition, and permitted products, with a particular emphasis on local and regional produce to ensure both quality and equity of access (City of Vancouver, 2015).

Furthermore, Vancouver has formalised urban agriculture through detailed guidelines and a structured application process that categorises urban farms according to land use context. Class A urban farms are permitted in residential zones, while Class B farms operate within commercial or industrial areas, each governed by standards related to soil safety, processing limits, waste management, and operational practices (City of Vancouver, 2018). To support implementation, the city provides capital grants of up to CAD 4,000 to non-profit organisations, Indigenous groups, community gardens, and urban farms. These grants assist with infrastructure development, such as irrigation systems, fencing, and storage facilities, and ensure that local food initiatives align with planning regulations while remaining financially viable (City of Vancouver, 2020). This approach illustrates how regulatory support combined with targeted funding can strengthen the role of land use planning in shaping healthier food environments.

Effective governance and integrated planning underpin the success of Vancouver's Healthy City Strategy. The strategy explicitly promotes cross-sector collaboration by bringing together municipal departments, public health authorities, private sector actors, non-governmental organisations, and community groups to co-design and implement health-oriented initiatives (City of Vancouver, 2014). Implementation is guided by phased action plans, including the Phase 1 Action Plan (2014–2025), which establishes long-term foundations, and the Phase 2 Action Plan (2015–2018), which outlines shorter-term priorities, measurable actions, and

monitoring mechanisms. Progress is tracked through performance indicators and publicly accessible tools such as the Healthy City Dashboard, reinforcing transparency, accountability, and evidence-based planning (City of Vancouver, 2019).

Table 2.4
Implementation Domains and Operational Strategies for Vancouver's Healthy City

Domain	Implementation Details
Active Transport & Compactness	Targeted active transport modal share (>50%); Greenway network with access targets; capital and community funding models
Food Access & Urban Agriculture	Food Strategy promoting local and equitable food systems; zoning for farmers' markets; formal guidelines for urban farms; financial support for grassroots food projects
Governance & Collaboration	Multi-stakeholder engagement; phased action planning; transparent dashboards to track progress
Green Infrastructure & Public Space	Greenway integration with climate and sustainability plans; neighborhood and citywide connectivity focused on well-being

From a research perspective, Vancouver's Healthy City Strategy is highly relevant as a model for examining the relationship between urban land use planning and healthy lifestyles. The strategy demonstrates an explicit and deliberate linkage between land use policies, health equity, and sustainability by embedding health objectives into zoning regulations, active transport infrastructure, green corridors, and local food systems. Its structured policy design, phased implementation, cross-sectoral governance, and performance monitoring provide a replicable framework that extends beyond the local context. Moreover, the provision of financial resources and the emphasis on community participation highlight how health-centred planning can be institutionalised while remaining responsive to local needs. As such, Vancouver offers valuable lessons for cities particularly in rapidly urbanising contexts seeking to integrate land use planning as a determinant of physical activity, dietary behaviour, and overall healthy living.

2.8.2 Melbourne's 2 0-Minute Neighbourhood Policy

Melbourne's 20-Minute Neighbourhood policy, embedded within Plan Melbourne 2017–2050, represents a significant shift toward health-oriented and people-centred urban planning. The concept advocates that residents should be able to access their everyday needs such as shops, schools, public transport, open spaces, and community services within a 20-minute walk, cycle, or local public transport trip from their home (State Government of Victoria, 2017; Lowe et al., 2020). By prioritising local accessibility and mixed-use development, the policy aims to reduce car dependency, encourage active transport, and support healthier daily routines. This approach reflects growing recognition within planning and public health literature that proximity to destinations and walkable neighbourhood design are critical determinants of physical activity and overall wellbeing.

The operationalisation of the 20-Minute Neighbourhood concept is guided by six policy "hallmarks" developed by the Victorian Government. These hallmarks define neighbourhoods as safe, accessible, and well-connected for pedestrians and cyclists; supportive of thriving local economies; equipped with essential services and destinations; resilient to climate risks; characterised by high-quality public realms and open spaces; and developed at viable residential densities capable of sustaining local services and public transport (Department of Environment, Land, Water and Planning [DELWP], 2019). To support implementation, a non-mandatory checklist tool was introduced to assist planners and local governments in assessing whether developments align with these hallmarks. While advisory in nature, the checklist provides a practical framework for embedding health, accessibility, and sustainability considerations into statutory and strategic planning processes.

To translate policy into practice, Melbourne adopted a pilot-based and community-led implementation strategy. Early pilot projects were conducted in neighbourhood centres such as Strathmore, Sunshine West, and Croydon South, each receiving approximately AUD 120,000 through the Suburban Revitalisation Program (Department of Jobs, Precincts and Regions, 2019). These pilot interventions focused on relatively low-cost, high-impact urban design measures, including streetscape upgrades, footpath improvements, traffic calming, additional greenery and parklets, and the installation of temporary cycling infrastructure. During the COVID-19 lockdown period, several neighbourhoods also trialled pop-up play spaces and mobile library

services, demonstrating the adaptability of the 20-Minute Neighbourhood concept in supporting local living and social wellbeing during public health crises (Victorian Government, 2020).

A defining strength of Melbourne's approach lies in its emphasis on partnership and stakeholder engagement. Implementation involved collaboration among multiple agencies, including DELWP, local councils, advocacy organisations such as Victoria Walks and the Heart Foundation, and local communities (Victoria Walks, 2019; Premier of Victoria, 2018). This co-design and place-based approach ensured that neighbourhood interventions were responsive to local needs, fostered community ownership, and strengthened alignment between planning objectives and lived experience. Such collaborative governance structures are increasingly recognised as essential for translating health-oriented planning policies into effective, locally grounded action.

Following the pilot phase, the 20-Minute Neighbourhood concept was scaled up through formal planning instruments and targeted funding mechanisms. Around 2018, the Municipal Strategic Planning Project (MSPP) provided planning tools and competitive grants of approximately AUD 70,000 to selected municipalities, including Banyule, Darebin, Maroondah, Moonee Valley, and Whittlesea. These resources supported the application of the 20-Minute Neighbourhood framework in strategic precinct planning and activity centre design (DELWP, 2018). In parallel, the Suburban Grants Program funded a broader range of neighbourhood infrastructure projects such as footpath upgrades, public art installations, greening initiatives, playgrounds, and community gardens to activate local centres and encourage social interaction and economic vitality (State Government of Victoria, 2019).

The policy is underpinned by a growing body of empirical research linking neighbourhood design to health outcomes. Studies conducted by Monash Urban Lab explored the application of the 20-Minute Neighbourhood model in greenfield and growth areas, such as Mambourin, demonstrating how staged delivery of local services, walkable street networks, and community infrastructure can enhance long-term liveability and resilience (Monash University, 2020). Broader international and Australian research has consistently shown that proximity to services often within an 800-metre walking distance is associated with higher levels of walking, improved mental wellbeing, and reduced disease burden related to physical inactivity (Giles-Corti

et al., 2016; Lowe et al., 2020). This evidence base reinforces the rationale for embedding health considerations directly into land use and transport planning.

Table 2.5
Strategic Implementation Areas and Actions for Melbourne's 20-Minute Neighbourhood Policy

Implementation Area	Strategies and Actions
Policy Framework	Defined hallmarks and a checklist tool to operationalize walkable neighbourhood design
Pilot Programs	Streetscape improvements, parklets, cycling lanes, pop-up spaces in selected suburbs
Stakeholder Collaboration	Partnerships with foundations and councils for co-led projects and local buy-in
Strategic Funding & Expansion	Municipal grants and planning tools to scale the approach to other areas
Research & Monitoring	Academic studies and evaluations to inform models in both inner and growth suburbs

From the perspective of this research, Melbourne's 20-Minute Neighbourhood policy offers a compelling best-practice model demonstrating how urban land use planning can be deliberately aligned with healthy lifestyle promotion. Key lessons include the integration of everyday needs into neighbourhood design to shorten travel distances and encourage active transport; the embedding of health objectives within planning policies, assessment tools, and grant programs; and the adoption of a staged, evidence-informed implementation process that progresses from pilot projects to broader institutionalisation. Furthermore, Melbourne's experience highlights the importance of strategic funding and collaborative governance in bridging the gap between high-level policy ambitions and tangible on-the-ground improvements. As such, the 20-Minute Neighbourhood model provides valuable insights for cities particularly in rapidly urbanising contexts seeking to leverage land use planning as a determinant of physical activity, social wellbeing, and healthy living.

2.9 Conceptual framework on Relationship Between Urban Land Use Planning and Healthy Lifestyle

The literature indicates a well-established global relationship between urban land use planning and health outcomes; however, evidence from the Malaysian context remains inconsistent and limited. While certain built environment attributes, such as street connectivity, have been associated with walking behaviour, other core planning principles particularly mixed land use do not consistently demonstrate significant relationships with physical activity in local studies. This inconsistency suggests that widely accepted urban health theories may not be directly transferable to Malaysian cities without contextual adaptation. A further gap lies in the limited consideration of local contextual factors. Characteristics such as pedestrian comfort, tropical climate and traffic conditions, cultural preferences, and distinctive urban forms are likely to influence how residents interact with their neighbourhood environments, yet these factors are insufficiently addressed in existing empirical research. Moreover, much of the Malaysian literature focuses on use patterns, such as park utilisation, rather than examining direct linkages between specific urban planning attributes and health-related behaviours, including physical activity intensity and dietary practices.

Addressing this gap is particularly important given Malaysia's rising burden of non-communicable diseases and the prevalence of sedentary lifestyles, which are closely linked to car-oriented urban development. Locally grounded evidence is therefore required to inform planning authorities, such as PLANMalaysia, in developing context-sensitive and health-promoting land use strategies, while also ensuring that planning interventions do not exacerbate existing health inequalities. In response to these gaps, this study adopts a conceptual framework grounded in built environment and public health theories, which posit that neighbourhood planning and design characteristics shape opportunities for healthy behaviour (Giles-Corti et al., 2016; Sallis et al., 2016). Within the framework, urban environment features act as the independent variable and include access to green areas and sports facilities, availability of shops and markets, proximity to public transport, connectivity of pedestrian walkways and bicycle lanes, and perceptions of safety and facility maintenance. These attributes represent key land use and urban design elements relevant to the Malaysian urban context.

Healthy lifestyle behaviour is the dependent variable and is operationalised through two domains: physical activity and dietary behaviour. Physical activity is

further differentiated into moderate and vigorous activity, measured by frequency and duration, while dietary behaviour is assessed through food consumption patterns and levels of intake. Demographic characteristics, including age, gender, body mass index (BMI), marital status, ethnicity, and income, are incorporated as control or moderating variables, reflecting their influence on individuals' ability to engage in healthy behaviours (Van Dyck et al., 2015; Cerin et al., 2017). Overall, the conceptual framework provides a structured and context-sensitive basis for examining how urban land use planning influences healthy lifestyle behaviours in Malaysian cities and forms the foundation for empirical analysis in subsequent chapters.

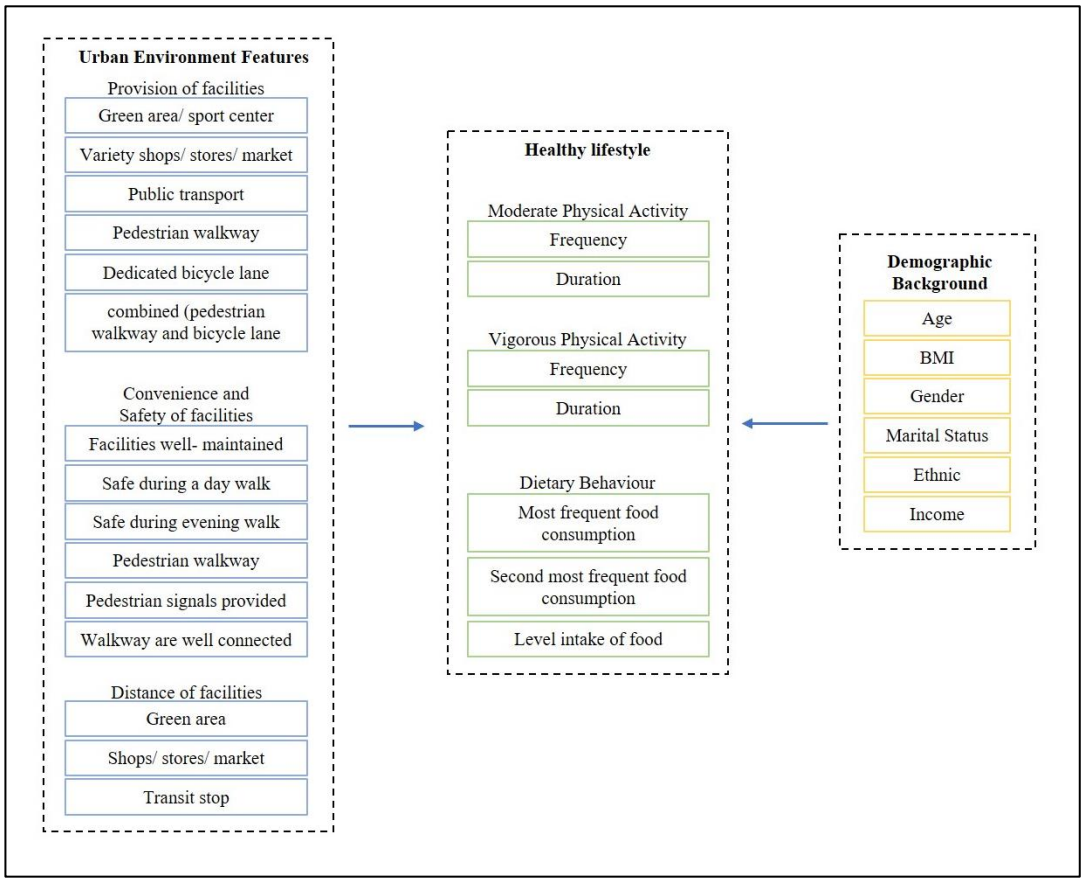


Figure 2.4 Conceptual Framework on Relationship Between Urban Environment Features and Healthy Lifestyle

2.10 Chapter Summary

This chapter has reviewed and synthesised the theoretical, conceptual, and empirical literature relevant to the relationship between urban land use planning and healthy lifestyle. It began by clarifying key concepts related to land use, the built environment, and environmental health, establishing a foundation for understanding how planning decisions influence health outcomes. The review of conceptual and theoretical perspectives highlighted the role of ecological and systems-based models in explaining the pathways through which urban environments shape health-related behaviours, with particular reference to the Malaysian context. The chapter demonstrated that urban land use planning functions as a significant determinant of public health by influencing opportunities for physical activity and access to healthy food. Evidence from previous studies shows that elements such as mixed land use, residential density, walkability, connectivity, safety, and the provision of green spaces and parks play a crucial role in promoting or constraining physical activity. Similarly, urban land use patterns, zoning regulations, and the spatial distribution of food outlets were found to affect dietary behaviour, often interacting with socioeconomic factors to amplify health inequalities.

The review also emphasised that healthy lifestyle is a multidimensional concept, with physical activity and dietary behaviour as its central components. The discussion of measurement approaches provided justification for the indicators used in this study and highlighted their relevance to urban planning research. In addition, international best practices illustrated how integrated planning and health policies can contribute to healthier urban environments. Overall, this chapter provides a robust knowledge base that supports the development of the conceptual framework presented at the end of the chapter. The synthesis of theory and empirical evidence informs the research design, variables, and analytical approach adopted in subsequent chapters. Building on this foundation, Chapter 3 outlines the research methodology employed to empirically examine the influence of urban land use planning on healthy lifestyle.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology adopted to examine the influence of urban land use planning on healthy lifestyle behaviours, with particular emphasis on physical activity and healthy dietary behaviour. The methodological approach was designed to ensure systematic data collection, rigorous analysis, and alignment with the research objectives and conceptual framework of the study. Given the complex and multidimensional nature of the relationship between the built environment and health outcomes, this study employed a mixed-methods research design using methodological triangulation. The integration of quantitative and qualitative methods enabled a comprehensive examination of both perceived and actual urban environment characteristics, as well as behavioural and experiential dimensions of healthy lifestyles. This approach strengthened the validity and reliability of the findings by drawing upon multiple sources of evidence.

The chapter outlines the overall research design, study phases, and rationale for methodological choices. It details the procedures for data collection, including the questionnaire survey, field observation, spatial mapping, and expert interviews. The chapter also explains the development of the research instruments, sampling strategy, and ethical considerations. In addition, it describes the analytical techniques employed, including descriptive statistics, index construction, correlation and regression analyses, qualitative thematic analysis, and triangulation. By clearly presenting the methodological framework and analytical procedures, this chapter provides a transparent and replicable foundation for the interpretation of results presented in the subsequent chapters.

3.2 Research Paradigm

This study is grounded in the pragmatist research paradigm, which emphasises practical problem-solving and the generation of knowledge that is applicable to real-world contexts (Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 2010).

Pragmatism rejects the rigid separation between positivist and interpretivist traditions and instead advocates methodological flexibility, allowing researchers to select methods that are most suitable for addressing specific research objectives (Saunders, Lewis, & Thornhill, 2019). This paradigm is particularly appropriate for applied research in urban planning and public health, where complex problems require both empirical measurement and contextual understanding.

Urban land use planning and healthy lifestyle outcomes are multidimensional phenomena shaped by physical environments, individual perceptions, and institutional and policy contexts. As such, no single methodological approach is sufficient to fully capture these interrelated dimensions. The pragmatist paradigm supports the integration of quantitative and qualitative approaches, enabling the study to draw on the strengths of multiple data sources to provide a more comprehensive understanding of the research problem (Johnson & Onwuegbuzie, 2004).

Within this paradigm, knowledge is viewed as context-dependent and action-oriented, with an emphasis on identifying "what works" in addressing real-world challenges. Quantitative data obtained through questionnaire surveys provide measurable evidence of residents' perceptions and healthy lifestyle behaviours, while qualitative insights derived from on-site observations and expert interviews contribute to a deeper understanding of urban environmental conditions and planning practices. The use of triangulation allows findings from different methods to be compared and integrated, thereby enhancing the credibility and robustness of the research outcomes (Denzin, 2012; Flick, 2018).

Overall, the adoption of a pragmatist research paradigm underpins the study's mixed-methods case study design and supports the development of a context-specific conceptual framework for urban land use planning and healthy lifestyle promotion. By prioritising practical relevance alongside methodological rigour, the paradigm ensures that the findings are both theoretically informed and directly applicable to urban planning policy and practice.

3.3 Research Design

This chapter outlines the research methodology employed in the development and validation of a framework that explains the influence of urban land use planning on healthy lifestyle, with a focus on physical activity and healthy dietary behavior. The

chapter details the overall research design, the methods of data collection and analysis, and the rationale for each methodological decision.

Given the complexity of the relationship between the built environment and health outcomes, this study adopted a mixed-methods approach using methodological triangulation. This allowed the integration of insights from multiple sources including existing literature, community survey data, and expert interviews to enhance the reliability and validity of the resulting framework.

The study was conducted in three main phases: (1) identification of framework components through a comprehensive literature review, (2) quantitative data collection and analysis using a structured questionnaire distributed to residents of Petaling Jaya, and (3) expert validation through semi-structured interviews. Triangulation was used to consolidate and cross-verify findings from these three data sources, ensuring that the framework reflects both theoretical foundations and real-world applicability.

The following sections of this chapter describe the research design, sampling procedures, instrument development, data collection methods, data analysis techniques including descriptive statistics, cross-tabulation, correlation, and factor analysis—as well as ethical considerations and study limitations.

3.4 Conceptual Framework

The first phase of this study involved the systematic identification of key components for the proposed conceptual framework through a comprehensive review of existing literature. This phase served as the theoretical foundation of the research and was essential for ensuring that the framework was grounded in established knowledge on urban land use planning and healthy lifestyle outcomes, particularly physical activity and healthy dietary behaviour. The literature review aimed to identify and synthesise empirical findings, theoretical models, and planning principles that explain how urban land use planning influences health-related behaviours. A wide range of interdisciplinary sources was examined, including peer-reviewed journal articles, books, policy documents, and reports from reputable international and national organisations such as the World Health Organization (WHO), UN-Habitat, and relevant planning and public health agencies. The review focused on literature published primarily within the last two decades to ensure contemporary relevance, while seminal and frequently cited earlier works were also included to capture foundational theories.

Key search terms used in the literature review included urban land use planning, built environment, healthy lifestyle, physical activity, dietary behaviour, food environment, walkability, land use mix, accessibility, green spaces, and public health. Academic databases such as Scopus, Web of Science, PubMed, and Google Scholar were utilised to retrieve relevant studies. The inclusion criteria focused on studies that explicitly examined the relationship between land use planning or built environment characteristics and physical activity and/or dietary outcomes. Studies that lacked a clear linkage to land use or health behaviours were excluded.

The reviewed literature was analysed using a thematic synthesis approach. Key concepts, variables, and relationships identified in previous studies were systematically extracted and categorised. Through this process, recurring themes related to urban land use planning such as residential density, land use mix, accessibility to facilities, availability of green and recreational spaces, transportation infrastructure, and food environment characteristics were identified as critical determinants of healthy lifestyle behaviours. Similarly, outcome variables related to physical activity (e.g., walking, cycling, recreational activity) and dietary behaviour (e.g., access to healthy food, food choice patterns) were consistently highlighted across the literature.

Based on this synthesis, the study identified core framework components comprising (i) urban land use planning elements, (ii) intermediary environmental factors, and (iii) healthy lifestyle outcomes. These components were organised into a preliminary conceptual framework illustrating the hypothesised pathways through which land use planning influences physical activity and healthy dietary behaviour. This preliminary framework informed the development of the survey instrument used in Phase 2 and guided the formulation of interview questions for expert validation in Phase 3.

Overall, this literature-driven phase ensured that the proposed framework was theoretically robust, conceptually coherent, and aligned with international research and planning practice. By systematically grounding the framework components in existing evidence, this phase strengthened the validity of subsequent empirical analyses and provided a solid basis for triangulation with quantitative and expert-based findings.

3.5 Background of Study Area

In the early 1950s, Kuala Lumpur faced severe overcrowding due to a rapid rise in population, which also led to the formation of numerous squatter settlements on the city's outskirts. To address these issues, the Selangor State Government identified a 1,200-acre rubber estate along Jalan Klang Lama as the site for a new planned settlement. This new township in the Petaling District was named Petaling Jaya, symbolizing the aspiration for progress and success (as Jaya means "success"). During its early development, Petaling Jaya placed strong emphasis on infrastructure and public facilities. Efforts were made to promote industrial areas and essential community amenities. Development began in what is now known as Old Town, marked by the construction of shop houses, a community centre, a cinema, a bus station, and other facilities. Jalan 1 now known as Jalan Templar was the first road built in Petaling Jaya.

Up until the end of 1954, Petaling Jaya was administered by the Kuala Lumpur District Officer and the Petaling Jaya Municipal Board. Its administration was later transferred to a statutory body known as the Petaling Jaya Authority. A significant milestone came on 1 January 1964, when the Selangor State Government Gazette No. 2/1964 established a Town Board with financial autonomy to govern Petaling Jaya. It became an incentive for the Board to plan and develop Petaling Jaya in line with the government's liberal development policies. Within two decades, Petaling Jaya had grown into the richest and largest satellite town in the state. As the first planned town in Malaysia, Petaling Jaya achieved remarkable success befitting its name "Jaya" and has remained vibrant with various activities while taking pride in its achievements. Petaling Jaya also emerged as one of the country's leading industrial areas, developing in its own distinctive way.

On 1 January 1977, the Petaling Jaya Town Board was upgraded to the Petaling Jaya Municipal Council (MPPJ) following the enactment of the Local Government Act 1976. The SS areas (numbered sections in the Sungai Way/Subang district), together with newly developed areas such as Subang Jaya and Section 52 (Newtown), were consolidated to form a single municipality under MPPJ. From a town originally planned as a small settlement to accommodate Kuala Lumpur's congestion, Petaling Jaya has grown into a progressive city. In keeping with the wave of modernisation and development at the time, residents participated actively in trade and industry to improve their standard of living. Today, Petaling Jaya is officially known as the City of Petaling

Jaya, Selangor, located within the Petaling District and governed by the Petaling Jaya City Council (PJCC). The city covers a total land area of 97.2 km², and as of July 2022, it had a population exceeding 619,925 people.

3.5.1 Study Site Selection

The selection of study sites was guided by the historical development pattern of Petaling Jaya. As documented in its early growth, development first began in the area now known as Old Town before expanding into the SS areas and subsequently into other newly developed sections. However, not all Sections and SS areas were included in this study. A total of seven areas were selected: SS2, SS4, SS8, SS9, Section 3, Section 9, and Section 21 (Refer Figure 3.1).

In addition, preliminary observations were conducted prior to the questionnaire survey. The findings indicated that these seven sections were the most accessible and demonstrated a higher level of cooperation from residents. Therefore, SS2, SS4, SS8, SS9, Section 3, Section 9, and Section 21 were chosen as the final study sites based on accessibility, feasibility, and their willingness to participate in the survey.

The primary criteria for selecting these areas were the variations in land use characteristics across the sections. Specifically, the study focuses on understanding the relationship between proximity to green areas and residents' engagement in physical activity and accessibility to commercial areas and residents' dietary patterns. Accordingly, several characteristics related to green spaces, commercial environments, accessibility, and neighbourhood conditions were considered in determining the most representative sections for this research.

Table 3.1 show the criteria present in the selected study areas. Figure 3.2 presents the land use patterns of the selected sections, which correspond to the criteria listed in Table 3.1. Based on Figure 3.2, most of the selected sections are predominantly characterized by residential land use, except for SS8, where the main land use is industrial. In terms of green areas, SS2 and SS4 contain green spaces that are distributed throughout their respective sections, compared to other sections such as Section 21 and Section 9, which do not have green areas within the boundary. However, Section 9 has a green area located nearby, just outside the section. Although the primary land use in SS8 is industrial, the section includes a designated sports field. Regarding commercial land use, most sections contain shop lots. Section 9 does not have a commercial area

within its boundary, but there is a shopping mall located nearby. In SS8, there is a serviced apartment development with shop units located on the ground floor. In addition, Section 9 has informal commercial activities, including small-scale vendors operating within the residential area.

Table 3.1
Criteria Present in The Selected Study Areas

Category	Criteria considered	Relevance to study
Green area characteristics	1. Presence of green areas within the section 2. Absence of green areas but presence of adjacent/nearby green spaces 3. Presence of sports or recreational facilities	To determine how the distribution and proximity of green spaces influence residents' participation in physical activity.
Commercial area characteristics	1. Presence of formal commercial areas (shop lot/ market/ mall) 2. Presence of informal food-related activities (hawker stalls, food stalls, mobile vendors) 3. Shop-lot units integrated with residential apartments	To assess whether accessibility to food outlets and commercial environments affects dietary practices
Accessibility characteristics	1. Walkability to green areas and commercial zones 2. Availability of pedestrian infrastructure such as walkways, crossings, direct access routes 3. Connectivity between residential areas and facilities	To evaluate how ease of movement influences physical activity and access to healthy/unhealthy food choices
Safety and convenience characteristics	Convenience of accessing key facilities Overall neighbourhood conditions (cleanliness, maintenance, presence of physical barriers)	To understand how neighbourhood safety and environmental quality encourage or discourage active living

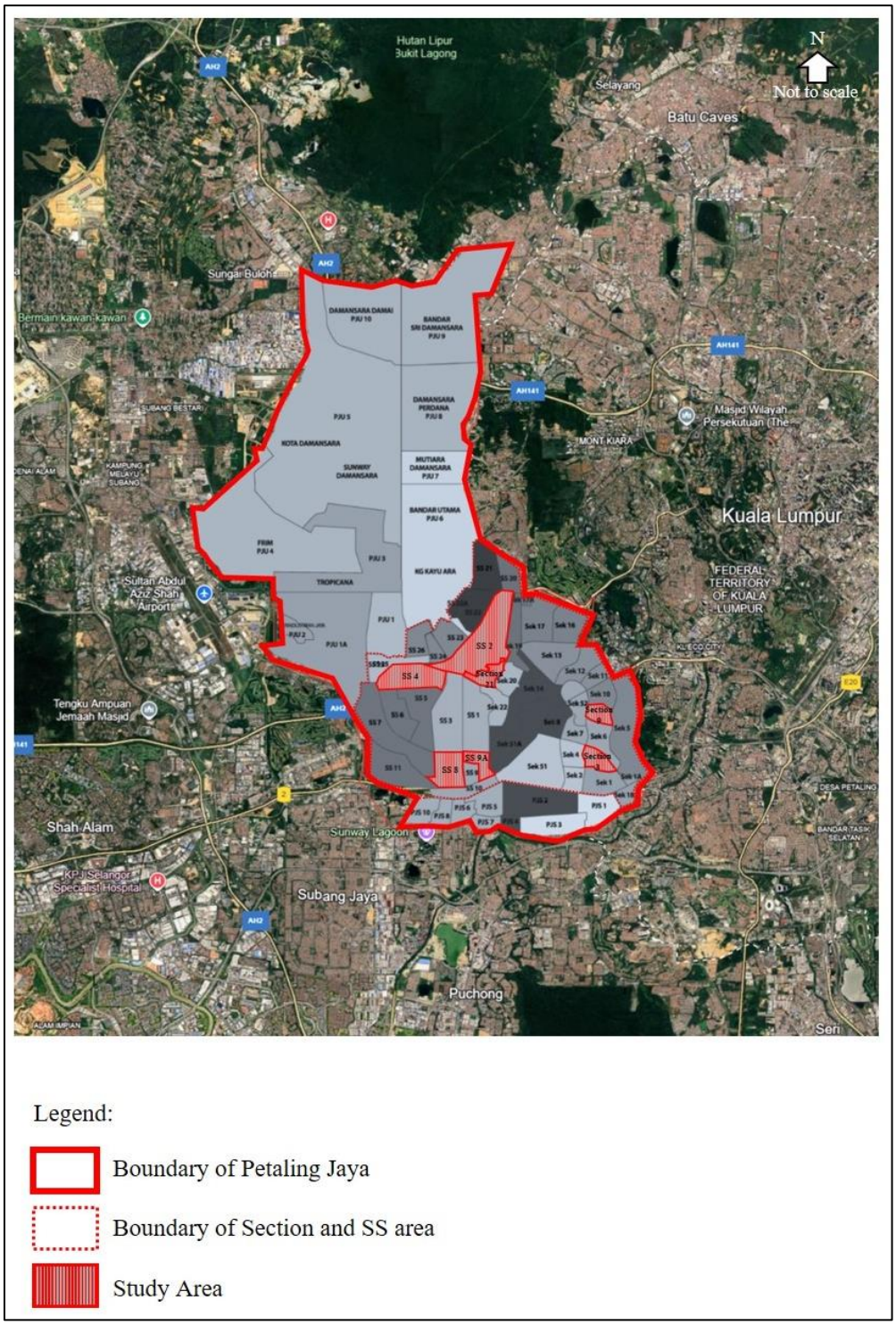


Figure 3.1 Section and SS Selected for Study Area

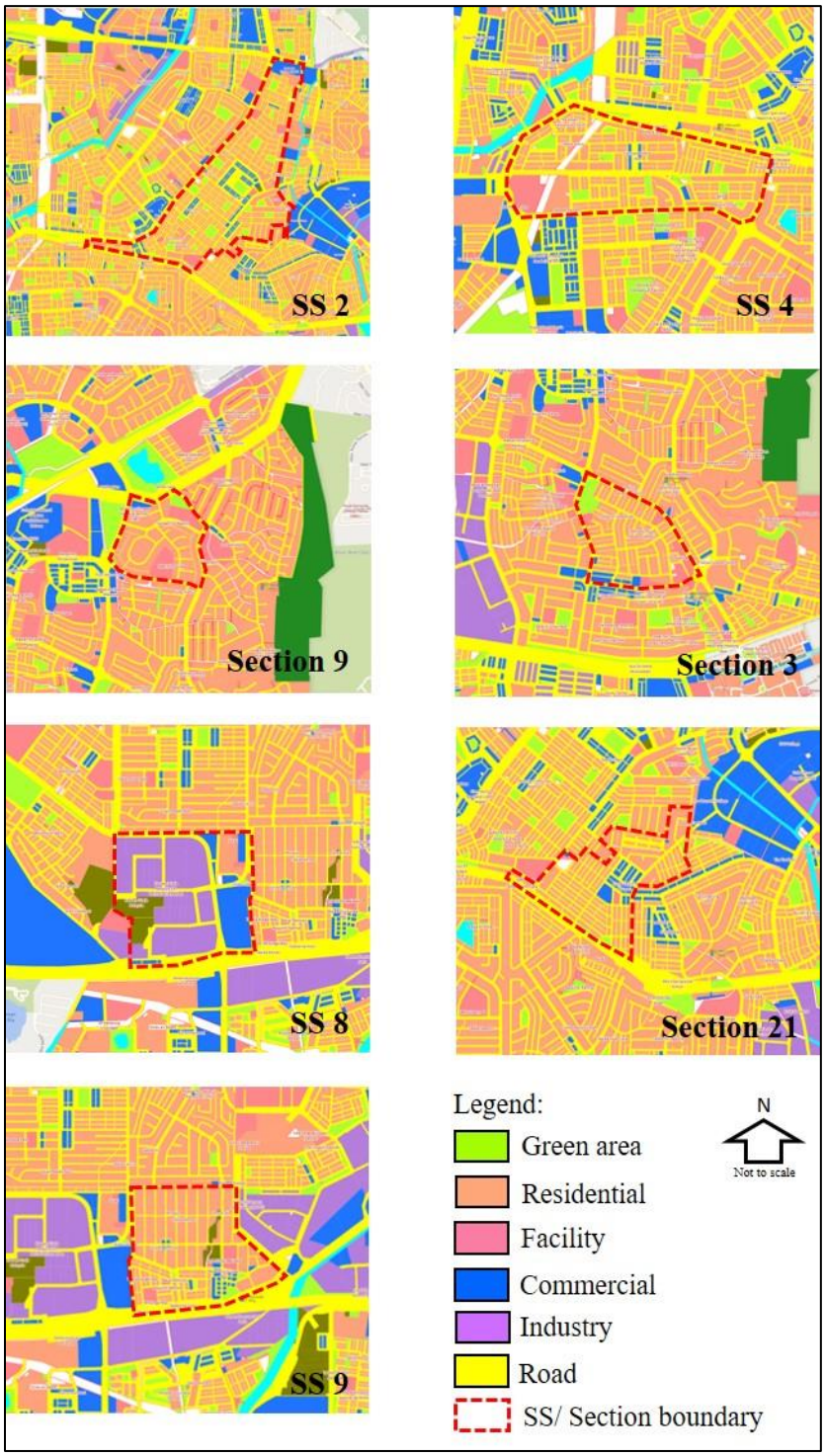


Figure 3.2 Land Use Patterns of The Selected Sections

3.6 Sampling Procedure

The sample size for this study was determined using Cochran's (1977) sample size formula, which is widely applied for large populations. Cochran's method allows researchers to estimate the minimum number of respondents needed to achieve reliable and generalizable results based on a chosen confidence level and margin of error. Using a 95% confidence level (Z = 1.96), an estimated population proportion of 0.5 (used when the true proportion is unknown), and a margin of error of 0.05, the initial sample size for an infinite population was calculated as 384 respondents. This value was then adjusted using Cochran's finite population correction, based on the actual population of Petaling Jaya (543,415 residents). However, because the population is very large, the adjusted sample size remains approximately 384, indicating that the minimum required respondents for this study is 384. This calculation ensures that the sample is statistically representative of the study population, thereby improving the accuracy and generalizability of the findings related to urban land use planning and healthy lifestyle behaviours.

Equation (3.1) shows sample size determination using Cochran's (1977) Formula.

$$\frac{n = z^2(pq)}{e^2} \tag{3.1}$$

$$n = \frac{1.96^2\ (0.5)(1-0.5)}{0.05^2}$$

$$= 384.16$$

n = Sample size

z = Standard Error associated with the chosen level of confidence (Typically 1.96)

p = Population proportion (assumed to be 0.5)

q = 1 – p

e = Acceptable sample error (0.05)

Equation (3.2) show the Adjusted sample size population required.

$$\text{Adjusted } S = S / 1 + [(S-1) / \text{Population}] \quad (3.2)$$

$$= 384.16 / 1 + [(384.16 – 1) / 543415$$
$$= 384.16$$

3.6.1 Sampling Approach

This study employed a non-probability sampling approach, consisting of a combination of purposive sampling and convenience sampling. A preliminary observation was first conducted across all the Sections and SS area in Petaling Jaya to assess neighbourhood accessibility and the potential willingness of residents to participate in the survey. Based on this assessment, seven sections were purposely selected as they were the most accessible and showed higher feasibility for obtaining responses. This selection process reflects purposive sampling, as sections were chosen based on specific criteria rather than random selection.

Within these seven selected sections, convenience sampling was used to recruit respondents. The researcher approached individuals who were available, easily accessible, and willing to participate during questionnaire distribution. Before completing the questionnaire, each potential respondent was asked to confirm their age, ensuring they met the study's inclusion criterion of being 19 years old and above. The initial plan was to distribute questionnaires across all Sections and SS area to achieve the targeted sample of 384 respondents. However, fieldwork constraints such as limited accessibility, time restrictions, and varying levels of response willingness, resulted in data collection being successfully completed in only seven sections. From these seven sections, a total of 213 valid responses were obtained and used for analysis.

3.7 Questionnaire Development

A quantitative research approach was employed through a structured questionnaire survey to empirically examine the relationships between urban land use planning characteristics and healthy lifestyle behaviours, with emphasis on physical activity and healthy dietary behaviour. The development of the questionnaire was guided by the conceptual framework derived from the comprehensive literature review and was designed to capture residents' perceptions, behaviours, and experiences within their neighbourhood environment.

The questionnaire items were derived directly from the key constructs identified in Phase 1 of the study, namely urban land use planning elements, physical activity behaviour, and healthy dietary behaviour. Urban land use planning variables included aspects such as residential density, land use mix, accessibility to facilities, availability and quality of green and recreational spaces, pedestrian and transport infrastructure, and neighbourhood food environment. These constructs were consistently identified in the literature as influential determinants of health-related behaviours and therefore formed the basis of the measurement items. To ensure content relevance and theoretical consistency, items were adapted from validated instruments and previous empirical studies related to the built environment and health, with modifications made to suit the local context of Petaling Jaya. This process enhanced the content validity of the instrument while ensuring clarity and cultural appropriateness for the target population.

The questionnaire was structured into four sections to ensure comprehensive data collection (Refer to Appendix 1). Part A collected respondents' socio-demographic and background information, including gender, ethnicity, marital status, age, body mass index (BMI), residential section, monthly income, and occupation. These variables were included to describe the study population and to allow for comparative and subgroup analyses. Part B assessed physical activity behaviour, focusing on both vigorous and moderate physical activities. Respondents were asked to report the frequency of physical activity, categorised as none, 1–2 days per week, 3–4 days per week, 5–6 days per week, and daily (7 days per week). The duration of physical activity was measured using predefined time ranges, including none, less than 10 minutes, 10–20 minutes, 30–40 minutes, and more than 40 minutes. This section captured routine physical activity within the neighbourhood context, consistent with the study's emphasis on land use planning influences on active lifestyles.

Part C examined healthy dietary behaviour, focusing on dietary habits and food consumption patterns. Items in this section assessed the most frequently and second most frequently consumed food items, as well as the level of intake related to total food consumption, sugar, salt, fat, and calorie intake. These measures were included to reflect dietary behaviours associated with the neighbourhood food environment. Part D focused on neighbourhood urban environmental features, operationalising the urban land use planning components of the conceptual framework. This section assessed respondents' perceptions of the built environment across three main aspects: provision of facilities within the neighbourhood, convenience and accessibility of these facilities, and perceived safety within the neighbourhood. These attributes represent key land use planning characteristics hypothesised to influence physical activity and dietary behaviour.

Most perceptual and behavioural items in the questionnaire were measured using a five-point Likert scale, ranging from "strongly disagree" to "strongly agree" or from "never" to "very often," depending on the nature of the variable. The use of Likert-scale items allowed for the quantification of respondents' perceptions and behaviours and facilitated subsequent statistical analyses, including descriptive statistics, correlation analysis, and factor analysis. The wording of all items was kept clear, concise, and non-technical to ensure respondent comprehension. Where necessary, examples were provided to clarify meaning and minimise response bias. Negatively worded items were minimised to reduce confusion and improve response consistency across the questionnaire.

3.8 Observation

In addition to collecting residents' perceptions through the questionnaire survey, field observations were conducted to obtain a deeper and more objective understanding of the physical characteristics of the selected study areas. Observation was employed as a complementary method to strengthen methodological triangulation by directly examining the built environment features associated with physical activity and healthy dietary behaviour. Two complementary observational approaches were adopted: spatial mapping observation and site survey observation.

3.8.1 Spatial Mapping Observation

Spatial mapping observation was conducted using two digital platforms: IPlanMalaysia and Google Maps, including Google Street View. These tools were used to systematically document and analyse the spatial distribution, accessibility, and connectivity of land use elements relevant to healthy lifestyle outcomes.

3.8.1.1 Land Use Mapping Using IPlanMalaysia

IPlanMalaysia was utilised to examine the detailed land use composition of each selected residential section. Particular attention was given to the spatial distribution and proximity of land uses that support healthy lifestyles. Specifically, the mapping focused on:

a) the distribution of green areas, including parks, playgrounds, and sports facilities;
b) the presence and extent of commercial areas, particularly food-related land uses such as supermarkets, restaurants, and food outlets; and
c) the spatial relationship between residential areas and key facilities.

Using the buffer analysis tool available in IPlanMalaysia, a 500-metre walking-distance radius was generated from green spaces and commercial areas to surrounding residential neighbourhoods. This distance was selected to represent a reasonable and commonly used walking threshold in urban health and planning studies. The buffer analysis enabled assessment of residents' potential access to recreational spaces and food outlets within walking distance and helped verify the presence, distribution, and spatial relationships of land uses relevant to physical activity and dietary behaviour.

3.8.1.2 Connectivity Assessment Using Google Maps and Google Street View

Google Maps and Google Street View were used to assess neighbourhood connectivity and accessibility between residential areas and nearby facilities. Observations focused on:

a) continuity and quality of pedestrian walkways;
b) presence of crossings, safety features, and public transport stops;
c) degree of route directness between residential origins and key destinations such as parks and commercial areas; and
d) overall environmental quality along walking routes.

Google Street View was particularly useful in documenting street-level features and environmental conditions that may not be fully captured through land use maps alone. Virtual environmental audits using Google Street View have been widely recognised as a valid and reliable method for assessing built environment features related to walkability and physical activity (Griew et al., 2013). This approach strengthened the environmental assessment, especially in cases where direct observation was constrained by time or access limitations.

3.8.2 Site survey observation

Site survey observations were conducted to verify and complement findings from spatial mapping and virtual observation. These surveys involved direct field visits to selected neighbourhood sections to record real-time environmental conditions and user experiences. The site survey focused on:

a) the condition, maintenance, and usability of green and recreational spaces;
b) the presence and quality of direct access routes between residential areas and facilities;
c) neighbourhood cleanliness, perceived safety, and walkability; and
d) visibility, activity levels, and overall user experience within recreational and commercial environments.

Structured observation techniques were applied during fieldwork, supported by mapping outputs and informal checklists (Refer Appendix 2), consistent with established built environment research practices. Many urban and built environment studies employ structured observation combined with mapping and visual documentation to systematically record physical characteristics and human interaction with space, as commonly reported in built environment and planning literature.

Overall, the observation component provided objective, spatially grounded evidence to support and contextualise the questionnaire findings. By integrating spatial mapping, virtual audits, and on-site observations, the study enhanced the reliability of environmental assessment and strengthened the triangulation between perceived and actual neighbourhood conditions. This approach ensured that the proposed framework reflects both residents' experiences and the observable realities of urban land use planning in the study area.

3.9 Expert Interview

To complement the primary data obtained from the questionnaire survey and field observations, a semi-structured expert interview was conducted with a professional in environmental health. The purpose of the interview was to obtain supplementary insights that could contextualise and strengthen the interpretation of the study's preliminary findings. This interview was not intended to produce the main results of the study; rather, it served as additional professional input to validate and support the discussion of the empirical data. The expert was selected based on their academic background and professional experience in environmental health, particularly in areas related to urban planning and healthy lifestyle promotion. Prior to the interview, a semi-structured guide was prepared to ensure consistency, focusing on broad themes such as environmental health issues in urban settings, factors influencing physical activity and healthy lifestyle, and the relevance of the study's early findings.

At the beginning of the session, the researcher introduced the research background, scope, methodology, and preliminary results from the questionnaire survey and observation (Refer Appendix 3). The expert was briefed on ethical considerations, including confidentiality and voluntary participation. The interview then proceeded in a semi-structured manner, allowing the expert to share general comments and professional perspectives related to the study area and the research topic. Follow-up questions were asked when clarification or further elaboration was needed. The session was documented through written notes (and audio recording, with permission) (Refer Appendix 4). The insights obtained were incorporated into the discussion chapter to provide professional validation and enhance the interpretation of findings. However, these inputs were treated as supplementary information and were not analysed as a primary dataset.

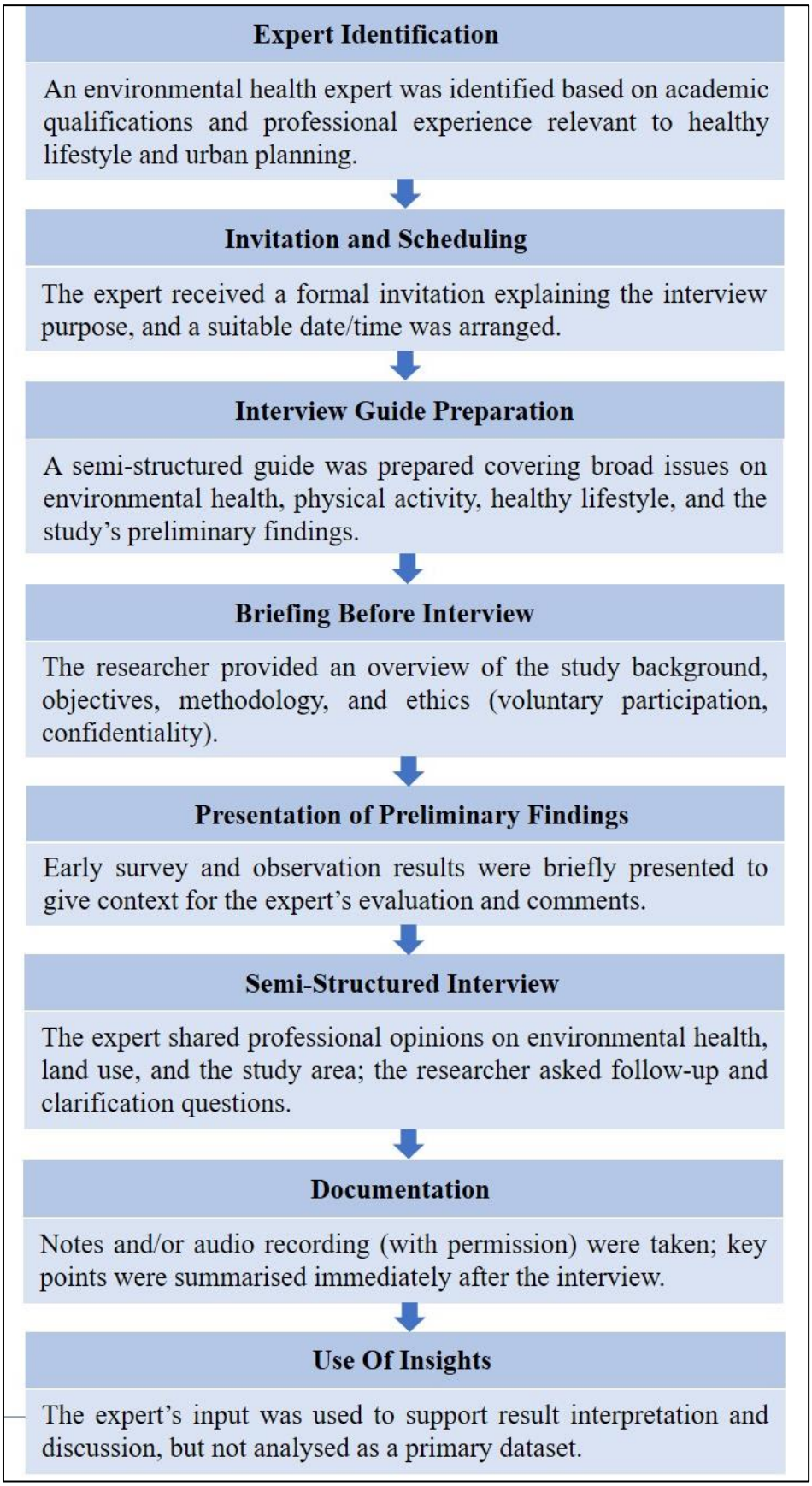


Figure 3.3 Flowchart of Expert Interview Process

3.10 Method of Analysis

This section explains, in a systematic and sequential manner, the analytical procedures employed in this study to address the research objectives. The methods of analysis are organised according to the sequence of data analysis undertaken, encompassing descriptive analysis, index construction, observational analysis, inferential statistics (correlation and regression), qualitative analysis, and triangulation. Each analytical method was selected based on the nature of the data and the specific variables examined.

3.10.1 Descriptive Analysis of Respondent's Profile

The first stage of analysis involved describing the background characteristics of the respondents. The respondents' profile included age, gender, marital status, household income, ethnicity, body mass index (BMI), and length of residence in Petaling Jaya. Descriptive statistical analysis was conducted using frequency and percentage distributions. This approach is appropriate for summarising categorical and grouped variables and provides an overall understanding of the sample composition. The results were presented in tabular form, followed by a brief narrative explanation highlighting dominant categories and notable patterns among the respondents. This analysis serves two primary purposes: (i) to contextualise the study population, and (ii) to support subsequent analyses by clarifying the demographic characteristics of the respondents.

3.10.2 Descriptive Analysis of Respondent's Perceptions of Urban Environment Features

Respondents' perceptions of urban environment features (UEF) were analysed using descriptive statistics. The UEF variables were grouped into three main dimensions:

a) Provision of facilities within the neighbourhood;
b) Convenience and safety of neighbourhood facilities; and
c) Distance of facilities from residential areas.

For each item measured using a Likert-scale response, frequency and percentage analyses were conducted to describe the distribution of agreement levels among respondents. This method enabled the identification of general perception trends, such as facilities perceived as adequate or inadequate, safe or unsafe, and accessible or inaccessible. The descriptive findings provide an initial overview of perceived neighbourhood conditions and serve as a foundation for subsequent comparative and inferential analyses.

3.10.3 Weighted Scoring Index for Respondent's Perception on Urban Environment Features

To enable systematic comparison of respondents' perceptions across neighbourhood sections, this study adopted a weighted scoring index approach. This method translates subjective agreement levels into standardised numerical values, allowing multiple dimensions of the urban environment to be aggregated and compared in a transparent and replicable manner. Each Likert-scale response was assigned a numerical weight based on the level of agreement. The weighted scores for individual items were then summed and averaged to generate composite index scores for each UEF dimension. Higher index values indicate more favourable urban environment conditions, while lower values reflect less favourable conditions. This index-based analysis supports cross-neighbourhood comparison and provides standardised UEF measures for subsequent correlation and regression analyses.

3.10.4 Observational Analysis of Urban Environment Features

In addition to the questionnaire survey, systematic observation was conducted to assess actual urban environment conditions. The observation focused on the presence, quality, and condition of neighbourhood facilities, as well as safety-related and walkability features. Observational data were analysed using a descriptive qualitative approach, supported by simple counts and categorical classifications where applicable. The findings were used to complement and validate the survey-based perception data. This approach strengthens the robustness of the study by reducing reliance on self-reported perceptions alone.

3.10.5 Analysis of Healthy Lifestyle: Physical Activity

3.10.5.1 Frequency and Duration of Physical Activity

Physical activity was analysed based on two key components: frequency and duration. Physical activity was further categorised into moderate-intensity and vigorous-intensity activities. Descriptive statistical analysis using frequency and percentage distributions was applied to examine how often respondents engaged in physical activity and the typical duration of each activity session. This approach provides an overview of physical activity patterns among respondents and facilitates comparison between moderate and vigorous activity levels. The results were presented in tabular form, followed by a brief interpretation highlighting dominant activity patterns.

3.10.6 Analysis of Healthy Lifestyle: Dietary Behaviour

3.10.6.1 Food consumption Patterns

Respondents' food consumption was analysed based on:

a) Most frequently consumed food items; and
b) Second-most frequently consumed food item

Frequency and percentage analyses were used to identify dominant food types consumed by respondents, providing insight into habitual dietary patterns within the study area.

3.10.6.2 Level of Food Intake

The overall level of food intake was categorised into:

a) imbalanced diet;
b) moderately balanced diet; and
c) balanced diet.

Descriptive statistical analysis using frequency and percentage was applied to determine the distribution of respondents across these categories.

3.10.6.3 Intake of /sugar, Salt, Fat and Calorie

The levels of sugar, salt, fat, and calorie intake were analysed descriptively using frequency and percentage distributions. This analysis helped identify potential nutritional risks and complemented the broader assessment of dietary behaviour.

3.10.7 Correlation Analysis

Correlation analysis was conducted to examine the relationships between key variables and to identify the strength and direction of associations without implying causality. The following relationships were examined:

a) Urban environment features and physical activity (frequency and duration of moderate- and vigorous-intensity activity);
b) Urban environment features and food consumption patterns (most and second most frequent consumption); and
c) Food consumption patterns and overall food intake level, as well as intake of sugar, salt, fat, and calories.

Statistical significance was assessed using a conventional threshold, whereby a relationship was considered statistically significant when $p < 0.05$. Relationships with $p \geq 0.05$ were considered not statistically significant.

3.10.8 Regression Analysis

To further examine predictive relationships between variables, multiple regression analysis was conducted. Regression analysis allows for the identification of significant predictors while controlling for the influence of other variables.

3.10.8.1 Regression between Frequency of Physical Activity and Urban Environment Features

In this model, frequency of physical activity was treated as the dependent variable, while urban environment features were included as independent variables. Statistical significance was evaluated using p-values, with $p < 0.05$ indicating a significant predictor.

3.10.8.2 Regression between Duration of Physical Activity and Urban Environment Features

A similar regression model was applied with duration of physical activity as the dependent variable. This analysis identified which urban environment features significantly influenced the length of time respondents engaged in physical activity.

3.10.8.3 Regression Between Food Consumption and Urban Environment Features

For dietary behaviour, food consumption indicators were treated as dependent variables, while urban environment features were included as independent variables.

3.10.8.4 Interpretation of Regression Output

Each regression model was interpreted using three key outputs:

a) Model Summary, which indicates the overall explanatory power of the model (e.g. R and R^2 values);
b) ANOVA Table, which assesses whether the regression model is statistically significant; and
c) Coefficients Table, which identifies individual predictors that significantly influence the dependent variable. The sign of the coefficient indicates the direction of the relationship, while the p-value determines statistical significance.

3.10.9 Qualitative Analysis of Expert Interview

In addition to the questionnaire survey and observation, expert interviews were conducted to obtain in-depth professional insights into urban land use planning and healthy lifestyle outcomes. The interview data were analysed using a thematic analysis approach. The analysis followed a structured process. First, interview transcripts were reviewed to achieve familiarity with the data. Second, key statements and recurring ideas relevant to urban environment features, physical activity, and dietary behaviour were identified. Third, these statements were coded and grouped into themes based on conceptual similarity and relevance to the research objectives. The resulting themes reflect expert perspectives on how urban land use planning influences healthy lifestyle behaviours and provide contextual and policy-relevant insights that complement the quantitative findings.

3.10.10 Triangulation Analysis

Finally, triangulation analysis was employed to integrate findings from multiple methods, including questionnaire survey results, observational analysis, correlation analysis, regression analysis, and expert interview themes. The purpose of triangulation was to enhance the credibility and validity of the findings through cross-verification of results derived from different analytical approaches. Convergent findings strengthened the evidence for identified relationships, while divergent findings provided insights into contextual, behavioural, or planning-related explanations. The triangulated findings formed the basis for the development and refinement of the proposed framework of urban land use planning for a healthy lifestyle. To ensure clarity and methodological rigour, this study systematically aligned the data sources, variables with methods of analysis. Table 3.2 summarises the analytical framework adopted in this study, demonstrating how each objective was operationalised and analysed.

Table 3.2
Alignment of Data Sources, Variables, and Methods of Analysis

Data Source	Key Variables / Indicators	Type of Data	Method of Analysis
Questionnaire survey	Age, gender, marital status, income, ethnicity, BMI, period of residence	Quantitative	Descriptive analysis (frequency, percentage)
Questionnaire survey	Provision of facilities; convenience and safety; distance to facilities	Quantitative	Descriptive analysis (frequency, percentage)
Questionnaire survey	Composite scores of UEF dimensions	Quantitative	Weighted scoring index
Observation checklist and field notes	Presence, quality, condition, and safety of facilities	Qualitative	Observational analysis (descriptive qualitative)
Questionnaire survey	Frequency and duration of moderate and vigorous physical activity	Quantitative	Descriptive analysis (frequency, percentage)
Questionnaire survey	Food consumption patterns; level of diet balance; intake of sugar, salt, fat, and calories	Quantitative	Descriptive analysis (frequency, percentage)
Questionnaire survey	UEF indices; frequency and duration of physical activity	Quantitative	Correlation analysis
Questionnaire survey	UEF indices; food consumption indicators	Quantitative	Correlation analysis
Questionnaire survey	Food consumption; diet balance; sugar, salt, fat, and calorie intake	Quantitative	Correlation analysis
Questionnaire survey	Physical activity frequency (DV); UEF variables (IVs)	Quantitative	Multiple regression analysis
Questionnaire survey	Physical activity duration (DV); UEF variables (IVs)	Quantitative	Multiple regression analysis
Questionnaire survey	Food consumption (DV); UEF variables (IVs)	Quantitative	Multiple regression analysis
Expert interviews	Planning principles; UEF; physical activity; dietary behaviour	Qualitative	Thematic analysis
Survey, observation, interviews	Convergent and divergent findings	Mixed-methods	Triangulation analysis

This analytical framework illustrates the logical progression from descriptive analysis to inferential and integrative analyses. The combination of quantitative and

qualitative methods ensures methodological triangulation and strengthens the validity of the proposed framework of urban land use planning for a healthy lifestyle.

3.11 Chapter Summary

This chapter outlined the research methodology adopted to develop and validate a framework explaining the influence of urban land use planning on healthy lifestyle behaviours, with particular emphasis on physical activity and healthy dietary behaviour. A mixed-methods research design employing methodological triangulation was adopted to address the complexity of relationships between the built environment and health outcomes. The study was conducted in three main phases. The first phase involved the identification of framework components through a comprehensive literature review, which provided the theoretical foundation for the study. The second phase comprised quantitative data collection using a structured questionnaire survey administered to residents of Petaling Jaya. The questionnaire was developed based on the conceptual framework and measured socio-demographic characteristics, urban environment features, physical activity, and dietary behaviour. The third phase involved expert validation through semi-structured interviews, providing professional insights into urban land use planning and healthy lifestyle outcomes.

Multiple methods of data analysis were employed to ensure a comprehensive examination of the research objectives. Descriptive statistical analysis was used to profile respondents and summarise perceptions of urban environment features and healthy lifestyle behaviours. A weighted scoring index was developed to enable systematic comparison of urban environment features across neighbourhood sections. Observational analysis was conducted to assess actual neighbourhood conditions and to complement survey-based perception data. Inferential statistical analyses, including correlation and multiple regression, were applied to examine relationships and predictive effects between urban environment features and healthy lifestyle behaviours. Qualitative thematic analysis was used to analyse expert interview data, while triangulation analysis integrated findings from quantitative, observational, and qualitative sources.

Overall, the methodological approach adopted in this study ensured rigour, validity, and reliability through the integration of multiple data sources and analytical techniques. The combination of quantitative and qualitative methods strengthened the

robustness of the findings and provided a solid empirical basis for the development of a context-sensitive framework of urban land use planning for a healthy lifestyle. The results of these analyses are presented and discussed in the subsequent chapters.

CHAPTER 4
RESULTS AND ANALYSIS

4.1 Introduction

This chapter presents and analyses the empirical findings of the study based on data collected through questionnaire surveys and structured observations conducted within the selected urban residential areas. The purpose of this chapter is to systematically examine residents' perceptions of the urban built environment, observed neighbourhood characteristics, and healthy lifestyle behaviours, with particular emphasis on physical activity and dietary practices. The analyses are undertaken to address the research objectives and research questions by identifying patterns, relationships, and predictive factors linking urban land use planning to healthy lifestyle outcomes.

The chapter begins with a descriptive analysis of respondents' socio-demographic characteristics to provide an overview of the study sample and to establish the context for subsequent analyses. This is followed by an analysis of residents' perceptions of urban built environment features, including land use mix, transportation systems, accessibility, and urban design elements. In parallel, observational findings are presented to describe the actual physical characteristics of the study areas, allowing for comparison between perceived and objectively observed urban environment attributes.

Subsequently, the chapter examines healthy lifestyle behaviours among respondents, focusing on levels of physical activity and dietary practices. These findings provide insights into prevailing lifestyle patterns within the study population and form the basis for further inferential analyses. Correlation analysis is then employed to explore the relationships between built environment variables and healthy lifestyle indicators, identifying the strength and direction of associations among key constructs.

Finally, multiple regression analysis is conducted to determine the extent to which urban built environment factors significantly predict healthy lifestyle outcomes. This analysis identifies key planning-related variables influencing physical activity and dietary behaviour while controlling for relevant socio-demographic factors. The integration of perception data, observational findings, and statistical analyses in this

chapter provides a comprehensive understanding of the role of urban land use planning in shaping healthy lifestyle outcomes. These findings are further interpreted and triangulated in Chapter 5 (Discussion).

4.2 Background of Respondents

This section presents the socio-demographic background of respondents, including age, gender, ethnic background, marital status, period of residence in Petaling Jaya, and body mass index (BMI). These characteristics are presented to provide contextual understanding for interpreting respondents' perceptions of the urban environment, their physical activity levels, and dietary practices in the subsequent analyses.

4.2.1 Age of the Respondents

The age distribution of respondents is presented in Table 4.1. The results show that most respondents are within the 20–29 years old (38.5%) and 30–39 years old (29.6%) age groups, followed by those aged 40–49 years old (17.4%). Respondents aged 50 years old and above constitute a smaller proportion of the sample. This distribution indicates that the study sample is predominantly composed of young and middle-aged adults, who are generally more mobile and more likely to interact actively with the urban environment for work, recreation, and daily activities. As such, the findings related to urban environment perception and physical activity levels are particularly reflective of this age group.

Age is a critical factor in interpreting healthy lifestyle behaviour, as younger respondents may demonstrate higher levels of physical activity, while older respondents may place greater emphasis on safety, accessibility, and comfort within the urban environment. Therefore, understanding the age background of respondents is essential for contextualising the subsequent analysis of urban environment features, physical activity participation, and dietary practices.

Table 4.1
Age of Respondents

Age	Frequency	Percentage
20-29 years old	82	38.5
30-39 years old	63	29.6
40-49 years old	37	17.4
50-59 years old	14	6.6
60-69 years old	11	5.2
70 years old and above	6	2.8
Total	**213**	**100.0**

4.2.2 Gender of Respondents

Table 4.2 presents the gender distribution of respondents in the study. The results indicate that 56.3% of respondents are male, while 43.7% are female. This relatively balanced gender composition enhances the representativeness of the sample and allows perceptions of the urban environment and healthy lifestyle behaviours to be examined across both male and female respondents. Gender differences are relevant in the context of this study, as previous research suggests that perceptions of safety, walkability, and participation in physical activity may vary by gender. Therefore, the inclusion of both male and female respondents provides meaningful context for interpreting the subsequent analysis of urban environment features and healthy lifestyle outcomes.

Table 4.2
Gender of Respondents

Gender	Frequency	Percentage
Male	120	56.3
Female	93	43.7
Total	**213**	**100.0**

4.2.3 Ethnic of Respondents

In terms of ethnic composition (Refer Table 4.3), most respondents are Malay (47.4%), followed by Chinese (37.1%) and Indian (14.1%), with a small proportion categorised as other ethnicities (1.4%). This distribution broadly reflects the multi-ethnic urban population of Petaling Jaya. The diversity of ethnic backgrounds is

important in interpreting lifestyle behaviours, particularly dietary practices, which are often influenced by cultural norms and food preferences. As such, the ethnic composition of the sample provides an appropriate context for analysing healthy diet behaviour within an urban Malaysian setting.

Table 4.3
Ethnic of Respondents

Ethnic	Frequency	Percentage
Malay	101	47.4
Chinese	79	37.1
Indian	30	14.1
Others	3	1.4
Total	213	100.0

4.2.4 Marital Status of Respondents

Regarding marital status (Refer Table 4.4), more than half of the respondents are married (55.4%), while 35.2% are single, and the remainder are widowed (3.8%) or divorced (5.6%). The dominance of married respondents suggests that family-oriented lifestyles may influence daily routines, physical activity patterns, and food choices. This background characteristic is relevant to the interpretation of healthy lifestyle behaviours, as married individuals may have different time constraints, responsibilities, and mobility patterns compared to single respondents.

Table 4.4
Marital Status of Respondents

Marital Status	Frequency	Percentage
Single	101	47.4
Married	79	37.1
Divorced	33	15.5
Total	213	100.0

4.2.5 BMI of Respondents

The BMI distribution (Refer Table 4.5) indicates that only 35.2% of respondents fall within the normal weight category, while a substantial proportion are classified as overweight (43.7%) or obese (19.7%). A very small percentage of respondents are underweight (1.4%). This finding highlights the presence of weight-related health concerns among the study population and underscores the importance of examining environmental factors that may influence physical activity and dietary behaviour. The BMI profile provides further justification for analysing the role of urban environment features in supporting healthier lifestyles.

Table 4.5
BMI of Respondents

BMI	Frequency	Percentage
Underweight	3	1.4
Normal	75	35.2
Overweight	93	43.7
Obesity	42	19.7
Total	213	100.0

4.2.6 Income of Respondents

The socioeconomic profile of the participants was assessed through their monthly income distribution, based on a total sample of 213 respondents. Based on the Table 4.6, the data reveals a population predominantly situated within the lower-income brackets. The most striking finding is that 30.0% of the respondents reported having no income. This suggests a significant portion of the sample may be composed of students, unemployed individuals, or dependents. Among those who are earning, the largest concentration is found in the 2000–2999 range, representing 29.1% of the total sample. This is followed by the 1000–1999 bracket at 16.4% and the 3000–3999 bracket at 15.5%. Conversely, higher income levels are poorly represented in this study. Only 5.6% of respondents earn between 4000–4999, and the frequency drops sharply beyond the 5000 mark. In fact, respondents earning above 6000 account for a combined total of only 1.0% of the population.

Table 4.6
Income of Respondents

Income	Frequency	Percentage
less than 1000	1	.5
1000-1999	35	16.4
2000-2999	62	29.1
3000-3999	33	15.5
4000-4999	12	5.6
5000-5999	4	1.9
6000-6999	1	0.5
8000-8999	1	0.5
no income	64	30.0
Total	213	100.0

4.2.7 Period of Staying in Petaling Jaya

Most respondents have resided in Petaling Jaya for a considerable period, with 40.8% living in the area for 10 years or more, and 34.5% residing for 5–9 years. Only a small proportion of respondents have lived in the area for less than one year (Refer Table 4.7). The relatively long duration of residence suggests that respondents are familiar with the local urban environment and are therefore well positioned to provide informed perceptions of accessibility, walkability, safety, and green space availability. This strengthens the reliability of the perception data used in the analysis.

Table 4.7
Period of Staying in Petaling Jaya

Period of Staying	Frequency	Percentage
Less than a year	10	4.7
1-4 years	41	19.2
5-9 years	71	33.3
10 years and above	84	39.4
Total	206	96.7
Missing	7	3.3
Total	**213**	**100.0**

The socio-demographic profile of respondents in this study indicates a sample predominantly composed of young to middle-aged adults (20–39 years old), with a slightly higher proportion of males (56.3%) and a multi-ethnic composition reflective

of the Petaling Jaya urban population, primarily Malay, Chinese, and Indian. More than half of the respondents are married, suggesting that family-oriented lifestyles may influence daily routines, physical activity, and dietary habits. The BMI distribution shows a considerable prevalence of overweight and obesity, highlighting the importance of examining environmental factors that support healthy lifestyles. Most respondents have resided in Petaling Jaya for five years or more, indicating familiarity with the local urban environment and enhancing the reliability of their perceptions regarding accessibility, walkability, safety, and green space availability. Overall, these socio-demographic characteristics provide essential context for interpreting respondents' perceptions of the urban environment, as well as their physical activity levels and dietary practices in the subsequent analyses.

4.3 Analysis of Urban Environment Features

Based on the conceptual framework, urban environment features are hypothesised to influence residents' healthy lifestyle behaviours, particularly physical activity and dietary practices. To operationalise this construct, respondents were asked to rate their perception of selected urban environment features using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A descriptive statistical analysis was conducted to examine residents' perception of the provision of green spaces and sports facilities across different residential sections. Frequencies and percentages were used to summarise respondents' responses. The measured features include provision of the facilities, convenience and safety of the facilities and distance to facilities, which reflect key planning elements emphasised in urban health and land use planning literature.

4.3.1 Provision of The Facilities in The Neighbourhood

Based on Table 4.8, residents' perception of the provision of green spaces and sports facilities varies across the study sections, indicating differing levels of environmental support for recreational and physical activity. Section 9 demonstrates the most positive perception, with all respondents (100.00%) agreeing that green spaces and sports facilities are adequately provided, suggesting a highly supportive urban environment in this section. Similarly, Section 3 and SS9 record very high levels of

agreement at 97.06% and 90.32%, respectively, reflecting strong perceived availability and accessibility of such facilities.

In contrast, SS8, SS4, and Section 21 exhibit moderately positive perceptions, with more than half of respondents agreeing that green spaces and sports facilities are provided (76.47%, 65.85%, and 59.38%, respectively). While these sections appear to offer some level of provision, the lower agreement percentages compared to Section 9, Section 3, and SS9 suggest potential limitations in terms of facility quality, quantity, or accessibility.

SS2 records the lowest level of agreement (43.75%), indicating comparatively weaker perceived provision of green spaces and sports facilities. This is further reflected by the high proportion of respondents in SS2 (50.00%) who rated the provision as moderate, implying that existing facilities may be insufficient or do not fully meet residents' needs. A similar pattern of moderate perception is observed in SS4, Section 21, and SS8, where approximately one-quarter to one-third of respondents rated the provision at a moderate level, suggesting variability in residents' experiences of facility adequacy.

Although disagreement levels are generally low across all sections, Section 21 records the highest proportion of respondents expressing disagreement (9.38%), followed by SS2 (6.26%) and SS4 (2.44%). The absence of disagreement in SS8, SS9, Section 3, and Section 9 further reinforces the perception that these sections provide a more supportive urban environment for physical activity. Overall, the findings indicate spatial differences in perceived green space and sports facility provision, which may have implications for residents' engagement in physical activity, as conceptualised in the study's framework.

Table 4.8
Provision of Green Space and Sports Facilities

Section/ SS	**Provision of Green Space and Sports Facilities**										**Total**
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	1	3.13	1	3.13	16	50.00	14	43.75	0	0.00	32
SS4	0	0.00	1	2.44	13	31.71	27	65.85	0	0.00	41
SS8	0	0.00	0	0.00	8	23.53	26	76.47	0	0.00	34
SS9	0	0.00	0	0.00	3	9.68	9	29.03	19	61.29	31
Section 3	0	0.00	0	0.00	1	2.94	24	70.59	9	26.47	34

Section 9	0	0.00	0	0.00	0	0.00	5	55.56	4	44.44	9
Section 21	0	0.00	3	9.38	10	31.25	6	18.75	13	40.63	32
Total	1	0.47	5	2.35	51	23.94	111	52.11	45	21.13	213

Table 4.9 presents respondents' satisfaction with the provision of shops, stores, and markets across the study sections. Overall, the findings indicate a generally positive perception of access to retail and food-related facilities, as no respondents from any section expressed dissatisfaction with the provision of shops, stores, or markets in their area.

Sections 3 and Section 9 demonstrate the highest level of satisfaction, with all respondents (100.00%) reporting satisfaction with the provision of a variety of shops, stores, and markets. This suggests that these sections offer a well-distributed and accessible retail environment that adequately meets residents' daily needs. Similarly, high levels of satisfaction are observed in SS9 (93.55%), SS8 (91.18%), and Section 21 (90.62%), indicating that most residents in these sections perceive the availability of shops and markets as sufficient and convenient.

In contrast, SS4 records the lowest satisfaction level at 56.10%, reflecting a comparatively weaker perceived provision of shops, stores, and markets. This section also exhibits the highest proportion of respondents reporting moderate satisfaction (43.90%), suggesting that while retail facilities are present, they may be limited in terms of variety, proximity, or accessibility. A similar but less pronounced pattern of moderate satisfaction is observed in SS2, Section 21, SS8, and SS9, where between 6.45% and 18.75% of respondents rated the provision as moderate.

Overall, the results indicate that the provision of shops, stores, and markets is perceived as adequate across most sections, with variations in satisfaction levels reflecting spatial differences in retail accessibility and diversity. Within the study's conceptual framework, access to shops and markets represents an important urban environment feature that may influence dietary behaviour by shaping residents' ability to obtain healthy food options. These variations are therefore relevant for understanding differences in healthy lifestyle outcomes across the study area.

Table 4.9
Provision of Variety of Shops/ Stores/ Market

Section/ SS	Provision of Variety of Shops/ Stores/ Market										Total
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	0	0.00	6	18.75	24	75.00	2	6.25	32
SS4	0	0.00	0	0.00	18	43.90	23	56.10	0	0.00	41
SS8	0	0.00	0	0.00	3	8.82	31	91.18	0	0.00	34
SS9	0	0.00	0	0.00	2	6.45	26	83.87	3	9.68	31
Section 3	0	0.00	0	0.00	0	0.00	17	50.00	17	50.00	34
Section 9	0	0.00	0	0.00	0	0.00	6	66.67	3	33.33	9
Section 21	0	0.00	0	0.00	3	9.38	18	56.25	11	34.38	32
Total	0	0.00	0	0.00	32	15.02	145	68.08	36	16.90	213

Table 4.10 presents respondents' perception of the provision of public transport across the study sections. Overall, the findings indicate a very high level of agreement regarding the adequacy of public transport services, suggesting that public transport is generally perceived as well-provided within the study area. Notably, no respondents from any section expressed strong disagreement, and only a very small proportion reported disagreement, indicating minimal dissatisfaction with public transport provision.

Section 3 demonstrates the strongest positive perception, with all respondents expressing agreement or strong agreement, evenly divided between "agree" (50.00%) and "very agree" (50.00%). Similarly, Section 9 records a high level of positive perception, with all respondents agreeing or strongly agreeing that public transport is adequately provided. These findings suggest that public transport services in these sections are highly accessible and meet residents' mobility needs effectively.

High levels of agreement are also observed in SS4, SS8, and SS9, where more than 95% of respondents expressed agreement or strong agreement. SS4 records the highest proportion of agreement (95.12%), while SS8 and SS9 show similarly strong positive perceptions, indicating consistent and satisfactory public transport availability in these sections. SS2 also demonstrates a high level of agreement (90.63%), although a small proportion of respondents (9.38%) rated the provision as moderate, suggesting minor variability in perceived service adequacy.

Section 21 exhibits a slightly more mixed perception compared to other sections, with 68.75% of respondents agreeing and 25.00% strongly agreeing, while 6.25% reported a moderate level of satisfaction. Although overall perception remains positive,

the higher proportion of moderate responses suggests that public transport provision in this section may be less consistent in terms of coverage, frequency, or proximity.

Overall, the descriptive analysis indicates that public transport provision is perceived as highly adequate across most sections, with only minor spatial variation. Within the study's conceptual framework, public transport represents a key urban environment feature that supports active and healthy lifestyles by facilitating mobility, access to daily destinations, and integration with walking activities. The generally high level of perceived provision suggests a supportive transport environment, while the observed variations may contribute to differences in residents' travel behaviour and associated physical activity levels, which are further examined in subsequent analyses.

Table 4.10
Provision of Public Transport

Section/ SS	**Provision of Public Transport**										**Total**
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	0	0.00	3	9.38	28	87.50	1	3.13	32
SS4	0	0.00	1	2.44	1	2.44	39	95.12	0	0.00	41
SS8	0	0.00	0	0.00	2	5.88	32	94.12	0	0.00	34
SS9	0	0.00	0	0.00	1	3.23	26	83.87	4	12.90	31
Section 3	0	0.00	0	0.00	0	0.00	17	50.00	17	50.00	34
Section 9	0	0.00	0	0.00	0	0.00	5	55.56	4	44.44	9
Section 21	0	0.00	0	0.00	2	6.25	22	68.75	8	25.00	32
Total	0	0.00	1	0.47	9	4.23	169	79.34	34	15.96	213

Table 4.11 presents respondents' perception of the provision of pedestrian walkways across the study sections. Overall, the findings indicate variation in perceived pedestrian infrastructure, suggesting differing levels of walkability and support for active movement across the residential areas. Sections 9, Section 3, and SS9 demonstrate the most positive perceptions of pedestrian walkway provision. In Section 9, all respondents expressed agreement or strong agreement, with a majority indicating strong agreement (66.67%), suggesting a highly walkable environment with adequate pedestrian infrastructure. Similarly, Section 3 and SS9 record high levels of agreement (100.00% and 93.55%, respectively), indicating that pedestrian walkways in these sections are perceived as accessible and supportive of walking activities.

In contrast, SS2 and SS8 exhibit a more moderate perception of pedestrian walkway provision. In SS2, more than half of respondents (56.25%) rated the provision

as moderate, while only 43.75% expressed agreement. SS8 shows an even higher proportion of moderate responses (76.47%), indicating that although pedestrian walkways may exist, their continuity, safety, or comfort may be perceived as insufficient. These findings suggest potential limitations in pedestrian infrastructure quality in these sections.

SS4 and Section 21 display mixed perceptions. While the majority of respondents in SS4 (68.29%) and Section 21 (81.25% combining agree and very agree) reported positive perceptions, a notable proportion rated the provision as moderate. The presence of a small proportion of disagreement in SS4 (2.44%) further indicates variability in pedestrian infrastructure adequacy.

Within the conceptual framework of this study, pedestrian walkways represent a key urban environment feature influencing walking behaviour and overall physical activity. The observed spatial differences in perception suggest unequal levels of environmental support for walking, which may contribute to variations in residents' physical activity levels across sections.

Table 4.11
Provision of Pedestrian Walkaway

Section/ SS	**Provision of Pedestrian Walkaway**										**Total**
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	0	0.00	18	56.25	14	43.75	0	0.00	32
SS4	1	2.44	0	0.00	12	29.27	28	68.29	0	0.00	41
SS8	0	0.00	0	0.00	26	76.47	8	23.53	0	0.00	34
SS9	0	0.00	0	0.00	2	6.45	9	29.03	20	64.52	31
Section 3	0	0.00	0	0.00	0	0.00	22	64.71	12	35.29	34
Section 9	0	0.00	0	0.00	0	0.00	3	33.33	6	66.67	9
Section 21	0	0.00	0	0.00	6	18.75	14	43.75	12	37.50	32
Total	1	0.47	0	0.00	64	30.05	98	46.01	50	23.47	213

Table 4.12 illustrates respondents' perception of the provision of dedicated bicycle lanes across the study sections. Compared to pedestrian walkways, perceptions of bicycle lane provision are more mixed, indicating greater spatial disparity in cycling infrastructure availability. Sections 3 and Section 9 demonstrate relatively stronger perceptions of bicycle lane provision, with most respondents expressing agreement or strong agreement. In Section 3, 70.59% of respondents reported positive perceptions, while Section 9 shows a similar trend despite a small proportion expressing

disagreement. These findings suggest that dedicated cycling infrastructure is more visible or functional in these sections.

In contrast, SS8 and SS2 record high proportions of moderate responses (82.35% and 50.00%, respectively), indicating that while bicycle lanes may be present, they may be limited in coverage, continuity, or usability. SS9 and Section 21 also exhibit mixed perceptions, with substantial proportions of respondents reporting moderate or negative views, particularly in Section 21 where disagreement reaches 18.76%.

Overall, the descriptive analysis indicates that dedicated bicycle lanes are less consistently perceived as adequate compared to pedestrian walkways. From the conceptual framework perspective, limited or inconsistent cycling infrastructure may reduce residents' willingness to engage in cycling as a form of physical activity or active transport, thereby weakening the supportive role of the built environment in promoting healthy lifestyles.

Table 4.12
Provision of Dedicated Bicycle Lanes

Section/ SS	**Provision of Dedicated Bicycle Lanes**										**Total**
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	1	3.13	16	50.00	15	46.88	0	0.00	32
SS4	1	2.44	0	0.00	12	29.27	28	68.29	0	0.00	41
SS8	0	0.00	0	0.00	28	82.35	6	17.65	0	0.00	34
SS9	0	0.00	2	6.45	16	51.61	10	32.26	3	9.68	31
Section 3	0	0.00	0	0.00	10	29.41	15	44.12	9	26.47	34
Section 9	0	0.00	1	11.11	2	22.22	4	44.44	2	22.22	9
Section 21	1	3.13	5	15.63	16	50.00	8	25.00	2	6.25	32
Total	2	0.94	9	4.23	100	46.95	86	40.38	16	7.51	213

Table 4.13 presents respondents' perception of the provision of shared bicycle lanes combined with pedestrian walkways. The findings show a predominance of moderate responses, indicating that shared infrastructure is commonly present but may not fully meet users' needs. SS8 records the highest proportion of moderate responses (82.35%), suggesting that combined facilities exist but may lack clear segregation, safety features, or sufficient width to comfortably accommodate both pedestrians and cyclists. Similar patterns are observed in SS2 and Section 21, where approximately half

or more of respondents rated the provision as moderate, reflecting potential usability concerns.

More positive perceptions are observed in SS4, Section 3, and Section 9, where the majority of respondents expressed agreement or strong agreement. In these sections, combined pedestrian–bicycle facilities may be better designed or better integrated within the street network, contributing to higher levels of user satisfaction.

However, the presence of disagreement in SS9, Section 9, and Section 21 indicates that shared facilities may not be universally accepted, potentially due to conflicts between pedestrians and cyclists or perceived safety risks. Within the study's conceptual framework, while combined pedestrian–bicycle lanes may support active mobility, inadequate design or unclear prioritisation may limit their effectiveness in promoting physical activity.

Table 4.13
Provision of Bicycle Lane Combined with Pedestrian Walkaway

Section/ SS	**Provision of Bicycle Lane combined with pedestrian walkaway**										**Total**
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	1	3.13	16	50.00	15	46.88	0	0.00	32
SS4	1	2.44	0	0.00	12	29.27	28	68.29	0	0.00	41
SS8	0	0.00	0	0.00	28	82.35	6	17.65	0	0.00	34
SS9	0	0.00	3	9.68	21	67.74	1	3.23	6	19.35	31
Section 3	0	0.00	0	0.00	12	35.29	15	44.12	7	20.59	34
Section 9	0	0.00	1	11.11	4	44.44	1	11.11	3	33.33	9
Section 21	1	3.13	6	18.75	19	59.38	4	12.50	2	6.25	32
Total	2	0.94	11	5.16	112	52.58	70	32.86	18	8.45	213

4.3.2 Facilities Convenience and Safety in Neighbourhood

Based on Table 4.14, the findings indicate marked spatial variation in perceptions of green space and sports facility maintenance. Section 9 demonstrates the strongest environmental support for physical activity, with 100% of respondents agreeing that facilities are well maintained, suggesting highly favourable conditions for recreational use. Similarly, Section 3 (94.12% agreement) and SS9 (90.33% agreement) show very high levels of satisfaction, indicating environments that are likely to encourage frequent engagement in outdoor physical activity.

In contrast, SS2, SS4, and SS8 record substantially lower agreement levels, with only 21.88%, 24.39%, and 26.47% of respondents respectively agreeing that facilities are well maintained. Instead, the majority in these sections reported moderate agreement, reaching 75.00% in SS2, 73.17% in SS4, and 70.59% in SS8, suggesting acceptable but suboptimal facility conditions. Such environments may limit the intensity or frequency of recreational physical activity.

Section 21 presents a mixed pattern, with 59.38% agreement and a comparatively higher level of disagreement (9.38%), indicating uneven maintenance quality. Overall, the results confirm that better-maintained recreational facilities are unevenly distributed, and sections with higher maintenance satisfaction are more strongly positioned to support physical activity, consistent with the conceptual framework.

Table 4.14
Green Space and Sports Facilities Are Well Maintained

Section/ SS	**Green Space and Sports Facilities are well maintained**										**Total**
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	1	3.13	24	75.00	7	21.88	0	0.00	32
SS4	1	2.44	0	0.00	30	73.17	10	24.39	0	0.00	41
SS8	1	2.94	0	0.00	24	70.59	9	26.47	0	0.00	34
SS9	0	0.00	0	0.00	3	9.68	27	87.10	1	3.23	31
Section 3	0	0.00	0	0.00	2	5.88	25	73.53	7	20.59	34
Section 9	0	0.00	0	0.00	0	0.00	9	100.00	0	0.00	9
Section 21	0	0.00	3	9.38	9	28.13	19	59.38	1	3.13	32
Total	2	0.94	4	1.88	92	43.19	106	49.77	9	4.23	213

Perceptions of pedestrian walkway connectivity reveal significant spatial differences across neighbourhood sections. Based on Table 4.15 Sections 3 and 9 exhibit the highest levels of perceived walkability, with 100% of respondents agreeing that pedestrian walkways are well connected, indicating environments that strongly support walking as a form of active transport.

High agreement levels are also observed in Section 21 (90.63%) and SS9 (90.32%), suggesting that pedestrian infrastructure in these areas effectively facilitates continuous movement between destinations. Such connectivity is a key determinant of walkability and is associated with increased walking frequency.

Conversely, SS2 and SS8 show notably lower agreement levels, with only 34.38% and 26.47% of respondents respectively agreeing that walkways are well connected. In these sections, the majority expressed moderate agreement (65.63% in SS2 and 70.59% in SS8), implying partial or inconsistent connectivity that may discourage walking for daily travel. SS4 exhibits a similar pattern, with 63.41% agreement and 34.15% moderate agreement, reflecting intermediate walkability conditions.

These findings indicate that higher pedestrian connectivity corresponds with stronger support for active transport, reinforcing the central role of walkability within the conceptual framework.

Table 4.15
Pedestrian Walkaways Are Well Connected

Section/ SS	**Pedestrian walkaways are well connected**										**Total**
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	0	0.00	21	65.63	11	34.38	0	0.00	32
SS4	1	2.44	0	0.00	14	34.15	26	63.41	0	0.00	41
SS8	1	2.94	0	0.00	24	70.59	9	26.47	0	0.00	34
SS9	0	0.00	0	0.00	3	9.68	23	74.19	5	16.13	31
Section 3	0	0.00	0	0.00	0	0.00	23	67.65	11	32.35	34
Section 9	0	0.00	0	0.00	0	0.00	7	77.78	2	22.22	9
Section 21	0	0.00	1	3.13	2	6.25	23	71.88	6	18.75	32
Total	2	0.94	1	0.47	64	30.05	122	57.28	24	11.27	213

Perceived safety during daytime walking is generally high, though notable spatial differences remain. Based on Table 4.16 Sections 3 and 9 show the strongest safety perceptions, with 100% of respondents reporting feeling safe, indicating environments highly conducive to walking-based physical activity. High safety perceptions are also evident in SS4 (95.12% agreement), SS9 (90.32%), Section 21 (87.50%), and SS2 (84.38%), suggesting that daytime walking conditions in these areas are broadly supportive of routine walking and active transport.

In contrast, SS8 records a substantially lower level of perceived safety, with only 26.47% of respondents agreeing that they feel safe during daytime walks, while 70.59% report feeling only moderately safe. This indicates potential environmental deficiencies that may limit walking frequency despite the availability of pedestrian infrastructure.

Overall, the findings demonstrate that higher perceived daytime safety is closely linked to increased walkability and physical activity participation.

Table 4.16
Respondent Feeling Safe During A Day Walk

Section/ SS	Feeling safe during a day walk										Total
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	0	0.00	5	15.63	27	84.38	0	0.00	32
SS4	0	0.00	1	2.44	1	2.44	39	95.12	0	0.00	41
SS8	1	2.94	0	0.00	24	70.59	9	26.47	0	0.00	34
SS9	0	0.00	0	0.00	3	9.68	16	51.61	12	38.71	31
Section 3	0	0.00	0	0.00	0	0.00	16	47.06	18	52.94	34
Section 9	0	0.00	0	0.00	0	0.00	1	11.11	8	88.89	9
Section 21	0	0.00	0	0.00	4	12.50	14	43.75	14	43.75	32
Total	1	0.47	1	0.47	37	17.37	122	57.28	52	24.41	213

Evening walking safety perceptions show greater spatial disparity compared to daytime. Based on Table 4.17 Sections 3 and 9 again demonstrate optimal conditions, with 100% of respondents feeling safe, indicating strong environmental support for walking beyond daylight hours. SS4 (95.12%), Section 21 (90.63%), SS9 (83.87%), and SS2 (75.00%) also report high levels of perceived safety, suggesting that these areas remain relatively supportive of evening walking and active transport.

However, SS8 continues to exhibit lower safety perceptions, with only 26.47% of respondents agreeing that they feel safe during evening walks, while 70.59% report moderate safety. This persistent pattern suggests structural or environmental limitations such as inadequate lighting or surveillance that restrict residents' willingness to walk during the evening.

Comparatively, the results indicate that evening safety concerns are more pronounced than daytime concerns, particularly in sections with weaker environmental quality, which may substantially reduce overall physical activity levels.

Table 4.17
Respondent Feeling Safe During an Evening Walk

Section/ SS	Feeling safe during an evening walk										Total
	Very disagree		Disagree		Moderate		Agree		Very agree		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	1	3.13	7	21.88	24	75.00	0	0.00	32
SS4	0	0.00	1	2.44	1	2.44	39	95.12	0	0.00	41
SS8	1	2.94	0	0.00	24	70.59	9	26.47	0	0.00	34
SS9	0	0.00	2	6.45	3	9.68	22	70.97	4	12.90	31
Section 3	0	0.00	0	0.00	0	0.00	25	73.53	9	26.47	34
Section 9	0	0.00	0	0.00	0	0.00	9	100.00	0	0.00	9
Section 21	0	0.00	0	0.00	3	9.38	19	59.38	10	31.25	32
Total	1	0.47	4	1.88	38	17.84	147	69.01	23	10.80	213

4.3.3 Distance of Facilities to The Neighbourhood

Table 4.18 presents respondents' perceived walking distance to shops, stores, or markets across seven residential sections. Overall, nearly half of the respondents (48.36%) reported that retail facilities were accessible within 10 minutes, while 38.03% required 10–15 minutes and 13.62% more than 15 minutes.

A marked spatial disparity is evident between sections. Section 9 demonstrates the highest level of accessibility, with 100% of respondents reporting access within 10 minutes, indicating a highly compact and service-oriented neighbourhood structure. Similarly, SS8 (97.06%) and Section 21 (90.63%) show strong proximity to retail services, suggesting effective land-use planning and favourable neighbourhood design.

In contrast, SS2 and Section 3 display significantly lower levels of immediate accessibility. Only 28.13% of respondents in SS2 and 2.94% in Section 3 reported distances of less than 10 minutes. Instead, these sections are dominated by 10–15 minute walking distances, indicating moderate accessibility but reduced convenience. Notably, SS4 exhibits the highest proportion of respondents (43.90%) reporting distances exceeding 15 minutes, reflecting a potential mismatch between residential areas and daily commercial services.

The findings indicate uneven retail accessibility across neighbourhoods, with some sections (e.g., Section 9, SS8) benefiting from highly walkable access to shops, while others (particularly SS4 and Section 3) experience relative service deprivation. This spatial imbalance may influence residents' daily mobility patterns, reliance on motorised transport, and overall neighbourhood satisfaction.

Table 4.18
Distance to Shop/ Stores/ Market

Section/ SS	Distance to shop/ stores/ market						Total
	< 10 minutes		10-15 minutes		>15 minutes		
	f	%	*f*	%	*f*	%	
SS2	9	28.13	23	71.88	0	0.00	32
SS4	0	0.00	23	56.10	18	43.90	41
SS8	33	97.06	1	2.94	0	0.00	34
SS9	22	70.97	8	25.81	1	3.23	31
Section 3	1	2.94	23	67.65	10	29.41	34
Section 9	9	100.00	0	0.00	0	0.00	9
Section 21	29	90.63	3	9.38	0	0.00	32
Total	103	48.36	81	38.03	29	13.62	213

Table 4.19 illustrates respondents' perceived walking distance to green areas or sports facilities. Overall, only 27.70% of respondents reported access within 10 minutes, while the majority required 10–15 minutes (40.85%) or more than 15 minutes (31.46%). This suggests that recreational facilities are generally less accessible than retail services within the study area.

Section 9 again emerges as the most advantaged location, with 100% of respondents reporting access within 10 minutes, indicating strong integration of green and recreational spaces within the neighbourhood. SS4 and SS9 also show relatively good accessibility, with approximately two-thirds of respondents able to reach facilities within 10 minutes.

Conversely, SS8 and Section 3 are characterised by substantial accessibility constraints. In SS8, 88.24% of respondents reported distances exceeding 15 minutes, while in Section 3 the figure reached 73.53%. These findings suggest that recreational and green spaces are either insufficiently provided or spatially segregated from residential areas in these sections. Meanwhile, SS2 and Section 21 display moderate accessibility, with most respondents reporting distances of 10–15 minutes, which may still be considered acceptable but less supportive of frequent recreational use.

The results reveal a clear spatial inequality in access to recreational and green facilities, with only a few neighbourhoods offering proximity. Limited access in several sections may negatively affect residents' physical activity, social interaction, and overall quality of life. The findings highlight the need for more equitable distribution of recreational spaces in residential planning.

Table 4.19
Distance to Recreational Area/ Sports Facilities

Section/ SS	Distance to recreational area/ sports facilities						Total
	< 10 minutes		10-15 minutes		>15 minutes		
	f	%	*f*	%	*f*	%	
SS2	2	6.25	27	84.38	3	9.38	32
SS4	26	63.41	14	34.15	1	2.44	41
SS8	1	2.94	3	8.82	30	88.24	34
SS9	20	64.52	10	32.26	1	3.23	31
Section 3	1	2.94	8	23.53	25	73.53	34
Section 9	9	100.00	0	0.00	0	0.00	9
Section 21	0	0.00	25	78.13	7	21.88	32
Total	59	27.70	87	40.85	67	31.46	213

Table 4.20 shows respondents' perceived distance to the nearest transit stop. Overall, public transport accessibility appears relatively strong, with 77.00% of respondents reporting access within 10 minutes, indicating a generally transit-supportive urban structure.

Section 9 again demonstrates optimal accessibility, with 100% of respondents reporting distances of less than 10 minutes, followed closely by SS8 (97.06%), SS4 (95.12%), and SS2 (87.50%). These results suggest effective integration of public transport infrastructure within these neighbourhoods.

However, Section 3 stands out as a significant outlier. Only 11.76% of respondents reported access within 10 minutes, while the majority indicated distances of 10–15 minutes (52.94%) or more than 15 minutes (35.29%). This contrasts sharply with other sections and suggests weaker public transport connectivity, which may constrain mobility options for residents.

The findings indicate that public transport accessibility is generally high across most sections, supporting sustainable mobility and reduced car dependence. Nevertheless, the poor accessibility observed in Section 3 highlights a critical planning gap that may exacerbate social and spatial exclusion, particularly for transit-dependent populations.

Table 4.20
Distance to Transit Stop

Section/ SS	Distance to transit stop						Total
	< 10 minutes		10-15 minutes		>15 minutes		
	f	%	*f*	%	*f*	%	
SS2	28	87.50	4	12.50	0	0.00	32
SS4	39	95.12	1	2.44	1	2.44	41
SS8	33	97.06	1	2.94	0	0.00	34
SS9	24	77.42	7	22.58	0	0.00	31
Section 3	4	11.76	18	52.94	12	35.29	34
Section 9	9	100.00	0	0.00	0	0.00	9
Section 21	27	84.38	4	12.50	1	3.13	32
Total	164	77.00	35	16.43	14	6.57	213

4.3.4 Comparative Evaluation of Urban Environment Features Using a Weighted Scoring Index

To facilitate systematic comparison of respondents' perceptions across neighbourhood sections, this study adopted a weighted scoring index that translates subjective agreement levels into standardised numerical values. This approach allows multiple dimensions of the urban environment to be aggregated and compared in a transparent and replicable manner.

Respondents' levels of agreement with various urban environment indicators were first expressed as percentages. These percentages were subsequently converted into ordinal scores using a five-point weightage scale, as presented below:

Very poor (0-20% agreement) - Score 1
Poor (21-40% agreement) - Score 2
Moderate (41-60% agreement) - Score 3
Good (61-80% agreement) - Score 4
Very good (81-100% agreement) - Score 5

Three core dimensions of neighbourhood urban environment quality were assessed:

1. Provision of facilities (maximum score = 30)
2. Facilities convenience and safety (maximum score = 20)

3. Distance of facilities to the neighbourhood (maximum score = 15)

The unequal maximum scores reflect the relative number of indicators within each dimension rather than an assumed difference in importance. The summation of these three dimensions produced an overall urban environment perception score with a maximum value of 65.

4.3.4.1 Provision of the Facilities

Based on Table 4.21, the results indicate substantial variation in respondents' perceptions of facility provision across neighbourhood sections. Section 3 achieved the highest score (28/30), followed closely by Section 9 (27/30) and SS9 (25/30). These sections recorded very high agreement levels for most facilities, particularly public transport, retail services, and pedestrian infrastructure, suggesting well-integrated neighbourhood planning.

In contrast, SS8 recorded the lowest provision score (18/30). Although respondents acknowledged the availability of public transport and shops, very low agreement regarding pedestrian walkways and cycling-related infrastructure significantly reduced the overall score. This suggests a neighbourhood structure that prioritises motorised accessibility while offering limited support for active transport.

Sections SS2 and Section 21 achieved moderate scores, indicating reasonable availability of basic facilities but persistent gaps in cycling infrastructure provision.

Facility provision is unevenly distributed, with active mobility infrastructure (particularly cycling facilities) emerging as the weakest component across several neighbourhoods.

Table 4.21
Percentage of Respondents Who Agreed with The Provision of The Facilities

Section / SS	**Range of weightage**	**Provision of facilities**						**Total score /30**
		Green area and sports facilities	Shop/ Stores/ Market	Public Transport	Pedestrian walkway	Dedicated bicycle lane	Bicycle lane combine with pedestrian walkway	
SS2	Percentage of agreement (%)	43.75	81.25	90.62	43.75	46.88	46.88	22
	Score	3	5	5	3	3	3	
SS4	Percentage of agreement (%)	65.58	56.10	95.12	68.29	68.29	68.29	24
	Score	4	3	5	4	4	4	
SS8	Percentage of agreement (%)	76.47	91.18	94.12	23.53	17.65	17.65	18
	Score	4	5	5	2	1	1	
SS9	Percentage of agreement (%)	90.32	93.55	96.77	93.55	41.94	22.58	25
	Score	5	5	5	5	3	2	
Section 3	Percentage of agreement (%)	97.06	100%	100	100	70.59	64.71	28
	Score	5	5	5	5	4	4	
Section 9	Percentage of agreement (%)	100	100%	100	100	66.66	44.44	27
	Score	5	5	5	5	4	3	
Section 21	Percentage of agreement (%)	59.38	90.62	93.75	81.25	31.25	18.75	21
	Score	3	5	5	5	2	1	

4.3.4.2 Facilities Convenience and Safety in The Neighbourhood

Perceptions of facility convenience and safety display a clearer spatial polarisation. Based on Table 4.22 Section 3, Section 9, and SS9 attained the maximum score (20/20), reflecting consistently high agreement that facilities are well maintained, pedestrian networks are connected, and walking is safe during both daytime and evening hours. Section 21 followed closely (19/20), indicating similarly positive perceptions. SS4 and SS2 recorded moderate scores, largely due to lower agreement regarding maintenance of green spaces and pedestrian connectivity, despite high perceived safety.

SS8 again emerged as the lowest-performing section (8/20), with poor ratings across all indicators. These findings suggest deficiencies not only in physical infrastructure but also in perceived environmental quality and personal security. While perceptions of personal safety are generally high across most neighbourhoods, maintenance and pedestrian connectivity remain critical weaknesses, particularly in lower-performing sections.

Table 4.22
Percentage of Respondents Who Agreed with Facilities Convenience and Safety in The Neighbourhood

Section / SS	**Range of weightage**	**Facilities convenience and safety in neighbourhood**				**Total score / 20**
		Green space and sports facilities are well maintained	Pedestrian walkway is well connected	Feeling safe during a day walk	Feeling safe during an evening walk	
SS2	Percentage of agreement (%)	21.88	34.38	84.38	75	
	Score	2	2	5	4	13
SS4	Percentage of agreement (%)	24.39	63.41	95.12	95.12	
	Score	2	4	5	5	16
SS8	Percentage of agreement (%)	26.47	26.47	26.47	26.47	
	Score	2	2	2	2	8
SS9	Percentage of agreement (%)	90.33	90.32	90.32	83.87	
	Score	5	5	5	5	20

Section 3	Percentage of agreement (%)	94.12	100	100	100	
	Score	5	5	5	5	20
Section 9	Percentage of agreement (%)	100	100	100	100	
	Score	5	5	5	5	20
Section 21	Percentage of agreement (%)	62.51	90.63	87.5	90.63	
	Score	4	5	5	5	19

4.3.4.3 Distance Facilities to The Neighbourhood

Accessibility to key facilities also varies considerably. Based on Table 4.23 Section 9, SS9, and SS2 achieved the maximum score (15/15), indicating that green spaces, shops, and transit stops are perceived as being within convenient walking distance. Section 21 and SS4 also demonstrated strong accessibility, whereas Section 3 recorded a lower score (10/15), primarily due to limited proximity to green and recreational spaces. SS8 again performed poorly, with particularly low agreement regarding access to green areas. Although access to shops and transit stops is generally strong, access to green and recreational facilities remains spatially uneven, reinforcing earlier findings of neighbourhood-level inequality.

Table 4.23
Percentage of Respondents Who Agreed with The Distance Facilities to The Neighbourhood

		Distance facilities to the neighbourhood			
Section / SS	**Range of weightage**	Green area and sports facilities	Shop/ Stores/ market	Transit stop	**Total score/ 15**
SS2	Percentage of agreement (%)	90.62	100.00	100	
	Score	5	5	5	15
SS4	Percentage of agreement (%)	97.56	56.10	97.56	
	Score	5	3	5	13
SS8	Percentage of agreement (%)	11.76	100	100	

	Score	1	5	5	11
SS9	Percentage of agreement (%)	96.77	96.77	100	
	Score	5	5	5	15
Section 3	Percentage of agreement (%)	26.47	70.59	64.71	
	Score	2	4	4	10
Section 9	Percentage of agreement (%)	100.00	100	100	
	Score	5	5	5	15
Section 21	Percentage of agreement (%)	78.13	86.38	96.87	
	Score	4	5	5	14

4.3.4.4 Overall Urban Environment Perception

The aggregated results highlight clear differentiation among neighbourhoods. Based on Table 4.24 Section 9 achieved the highest overall score (62/65), followed by SS9 (60/65) and Section 3 (58/65). These neighbourhoods consistently perform well across all three dimensions, indicating a highly supportive urban environment. Middle-ranking sections (Section 21, SS4, and SS2) exhibit generally adequate conditions but with identifiable weaknesses in either facility provision or convenience and safety. SS8 recorded the lowest overall score (37/65), reflecting cumulative deficiencies across all dimensions. The weighted scoring index reveals pronounced spatial disparities in perceived neighbourhood quality. Neighbourhoods that combine comprehensive facility provision, safe and well-maintained environments, and proximity to essential services consistently achieve higher overall scores. Conversely, neighbourhoods lacking active mobility infrastructure, maintenance quality, and access to green spaces exhibit substantially lower resident satisfaction. To further illustrate the spatial variation in urban environment perception, an interactive map was developed to visualise the distribution of overall scores across the seven study sections (Figure 4.1). The map enables users to explore neighbourhood-level differences by selecting individual sections to view detailed information regarding facility provision, safety and convenience, and accessibility. The visualisation highlights a clear spatial pattern where Section 9, SS9, and Section 3 demonstrate the highest environmental support for healthy

lifestyles, while SS8 records comparatively weaker performance across several indicators.

Table 4.24
Total Score of The Respondents Towards the Urban Environment Features in Their Neighbourhood

Section / SS	Provision of facilities in the neighbourhood / 30	Facilities convenience and safety in the neighbourhood /20	Distance of facilities to the neighbourhood / 15	Total score / 65
Section 9	27	20	15	62
SS 9	25	20	15	60
Section 3	28	20	10	58
Section 21	21	19	14	54
SS 4	24	16	13	53
SS 2	22	13	15	50
SS 8	18	8	11	37

The interactive map (Refer Figure 4.1) visualises spatial variation in the overall urban environment perception scores across the seven study sections. Darker colours indicate higher levels of perceived environmental support for healthy lifestyles. Users can interact with each section to view detailed scores for facility provision, convenience and safety, and accessibility to neighbourhood facilities. The map highlights the concentration of highly supportive environments in Section 9, SS9, and Section 3, while SS8 demonstrates comparatively weaker environmental support.

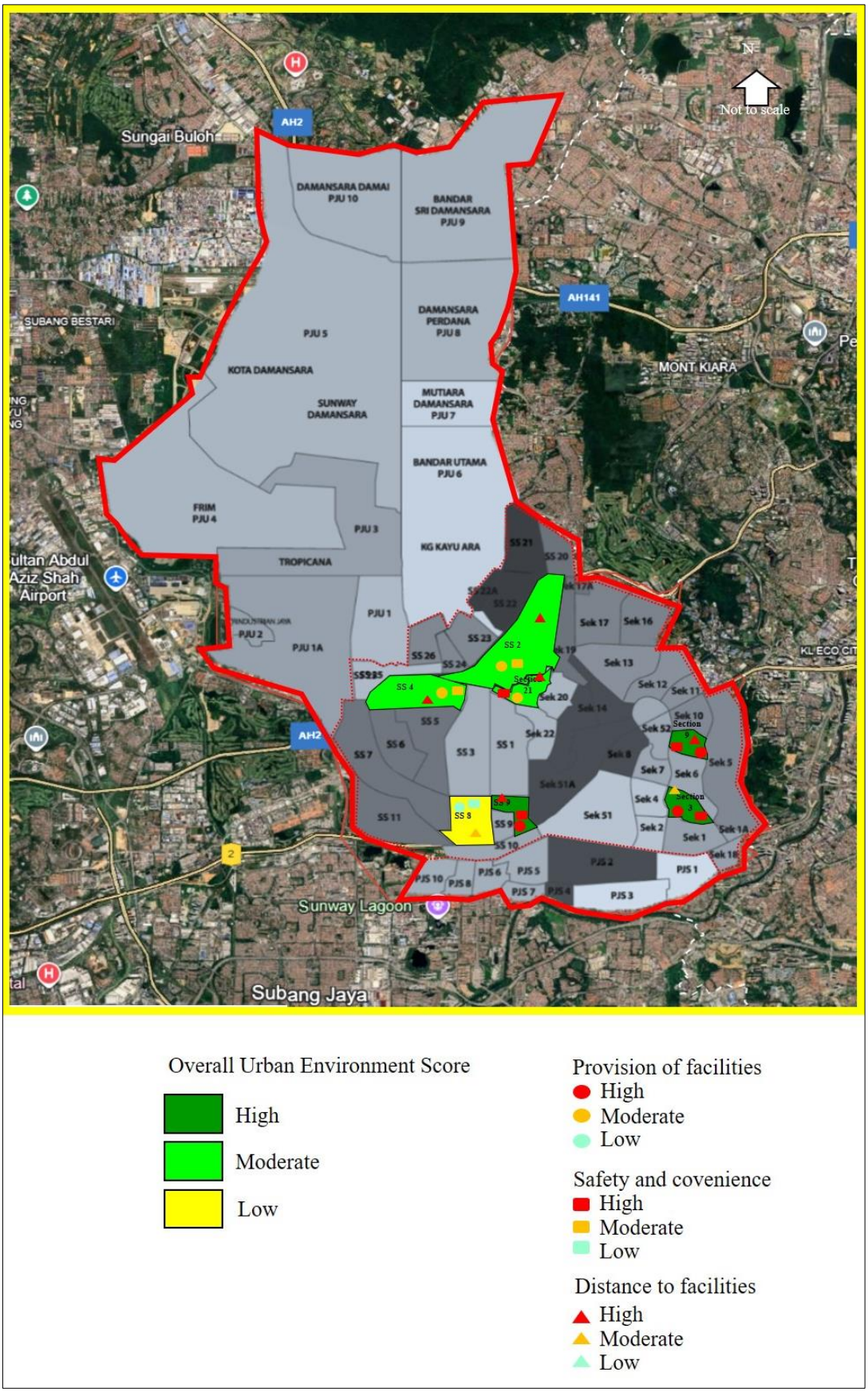


Figure 4.1 Interactive Spatial Distribution of Urban Environment Perception Scores Across Study Sections

4.4 Observation of Urban Environment Features in The Neighbourhood

This subsection presents the findings from the on-site observation conducted to objectively document the physical characteristics of urban environment features within the study area. The observation focused on proximity to green areas, proximity to commercial areas, facilities convenience, safety features, and surrounding land use context, as outlined in the structured observation checklist (Appendix 2). The findings are reported descriptively and organised according to these thematic dimensions.

For the mapping approach, two platforms were utilised: Google Maps and IPlanMalaysia. IPlanMalaysia was employed to examine land use patterns in each section, with attention to green areas (specifically recreational and sports spaces) as well as commercial areas. Using this platform, walking distance radii were also measured from green spaces and commercial areas to the surrounding neighbourhoods in each section. This method provided an assessment of the proximity of facilities to residential areas. Meanwhile, Google Maps (specifically Google Street View) was used to assess the connectivity between facilities and neighbourhoods, identifying the level of convenience for residents in accessing these facilities. Particular attention was given to the presence of pedestrian walkways and public transport infrastructure, such as transit stops.

The site survey was conducted to observe the actual condition of green areas and the surrounding neighbourhood environment. The findings are subsequently discussed in a section-by-section analysis. Figure 4.0 is the legend for the map used in the observation in order to examine the urban land use for each section.

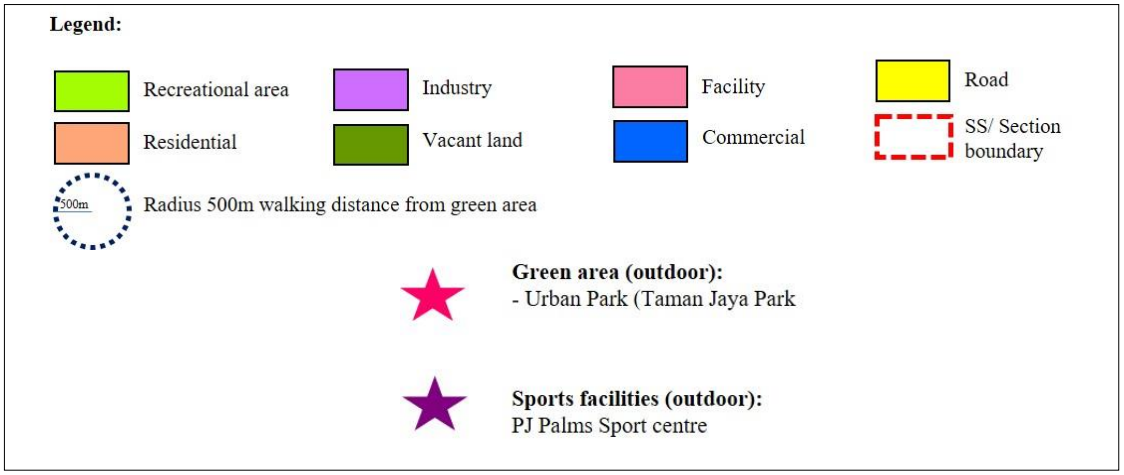


Figure 4.2 Land Use Color Code

4.4.1 Section 9

4.4.1.1 Provision and Proximity of Facilities (Green Area and Sports Facilities) To the Neighbourhood

Section 9 is predominantly characterised by residential land use, as shown in Figure 4.3. Based on on-site observation and map review, no designated public green spaces were identified within the boundary of this section. To the west of Section 9 is Dataran Petaling Jaya, which is located adjacent to the residential area but separated by a dual carriageway. The presence of this major road creates a physical barrier between the residential area and the green space. Pedestrian access to Taman Jaya Park is available via internal residential roads connecting Section 9 to surrounding areas. These internal roads are observed to carry relatively low traffic volumes and provide continuous pedestrian routes. However, access to green spaces located across major roads requires crossing high-traffic corridors, which may affect direct pedestrian connectivity.

The residential environment in Section 9 consists primarily of low-density, single-family housing units. Observations indicate that many residential plots include private outdoor spaces within their lot boundaries. These private spaces are part of the residential layout and form a component of the neighbourhood's physical environment. In addition, a sports centre is located to the west of Section 9. Bukit Gasing is also situated in proximity to this section; however, it is located beyond a 500-metre walking distance radius. Based on route estimation, Bukit Gasing is approximately 13 minutes by car or 39 minutes on foot from Section 9.



Figure 4.3 Land Use in Section 9 And the Distribution of Green Area
Source: PLANMalaysia (IplanMalaysia), Year 2020

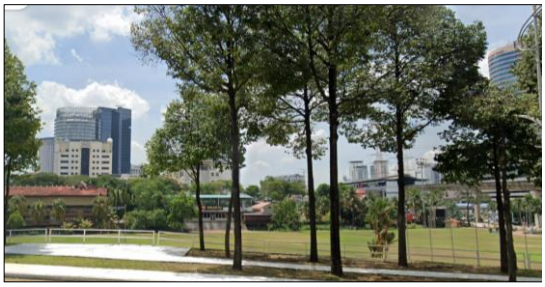


Plate 4.1 Dataran Petaling Jaya
Source: Google Street View (Google Maps), 2020



Plate 4.2 Taman Jaya Park
Source: Google Street View (Google Maps), 2020



Plate 4.3 Residence Need to Across Two Carriage Ways to Go to Dataran Petaling Jaya
Source: Google Street View (Google Maps), 2020



Plate 4.4 The Environment in This Section Is Quite Convenience
Source: Google Street View (Google Maps), 2020



Plate 4.5 The Environment in This Section Is Quite Convenient
Source: Google Street View (Google Maps), 2020

4.4.1.2 Provision and Proximity of Facilities (Shops/ Stores) To the Neighbourhood

Based on available spatial information, Figure 4.4, and on-site observation, the immediate environment of Section 9 is predominantly, with limited commercial activity within the section itself. Wisma TNB is the only identified commercial building within the immediate vicinity, and no retail shops, neighbourhood markets, or small-scale commercial outlets were observed within the internal street network of Section 9.

Beyond the section boundary, several commercial destinations are located within relatively short travel distances. The nearest cluster of commercial activities is situated approximately 500 metres to the southwest. Although this distance falls within a walkable range, pedestrian access requires crossing a main road with a roundabout, which represents a physical interruption to pedestrian movement between the residential area and nearby commercial uses.

In addition, Amcorp Mall is located to the northwest of Section 9 and is separated from the residential area by a dual carriageway. This major road functions as a physical barrier, affecting the directness of pedestrian connectivity between the neighbourhood and the commercial facility. Other commercial areas, including Jaya 1 Shopping Centre, Section 52 commercial amenities, and larger regional malls such as Mid Valley Megamall and The Gardens Mall, are located outside the immediate vicinity of Section 9 and are primarily accessed via main roads or arterial corridors. These commercial nodes are not directly integrated within the residential fabric of Section 9 and require travel beyond the section boundary.



Figure 4.4 Land Use in Section 9 And the Distribution of Commercial Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.6 Amcorp Mall
Source: Google Street View (Google Maps), 2020



Plate 4.7 Nearest Shops Located at The East of This Section.
Source: Google Street View (Google Maps), 2020

4.4.1.3 Facilities Convenience and Safety in Neighbourhood

Based on the observation, pedestrian walkways are present around key activity areas in Section 9, including schools, recreational spaces, and internal neighbourhood streets. These walkways provide basic pedestrian infrastructure within the residential environment. However, connectivity between pedestrian walkways and certain key facilities is discontinuous in several locations, particularly where movement between the neighbourhood and external facilities requires crossing major roads.

Formal pedestrian crossings are limited along some routes linking the residential area to nearby facilities, resulting in direct pedestrian movement being interrupted by road infrastructure. A designated bicycle lane is observed near Amcorp Mall; however, this facility is not directly connected to the internal street network of Section 9. As a result, cycling infrastructure within the section remains spatially separated from this external bicycle route.

A pedestrian bridge is observed near the school area, providing grade-separated crossing and improved pedestrian connectivity at that specific location. In terms of physical condition, observed pedestrian facilities, including walkways and supporting infrastructure, appear to be generally maintained. Shaded areas are present along selected pedestrian routes, contributing to thermal comfort along these walkways.

In addition, Section 9 is located within an approximate 500-metre walking radius to the west of Taman Jaya LRT Station, indicating the presence of a nearby public transport node. Access to this station from the neighbourhood involves movement along local and arterial roads, highlighting the role of pedestrian infrastructure in facilitating connectivity between residential areas and public transport facilities.



Plate 4.8 Pedestrian Walkway Around School.
Source: Google Street View (Google Maps), 2020



Plate 4.9 Pedestrian Walkway Along Dataran Petaling Jaya And Along Neighbourhood Area.
Source: Google Street View (Google Maps), 2020

4.4.2 SS9

4.4.2.1 Provision and Proximity of Facilities (Green Area and Sports Facilities) To the Neighbourhood

Based on Figure 4.5, the eastern, western, and southern boundaries of SS9 are predominantly surrounded by industrial land uses, while the northern boundary is adjacent to residential areas. This spatial configuration indicates that SS9 is located between residential and industrial land use zones.

Within SS9, only one linear green area was observed, located at the southern part of the section (refer to Figure 4.5 and Photo 4.10). An additional green area is located outside the section boundary, approximately within a 500-metre walking radius to the north of SS9 (refer to Figure 4.5). Based on on-site observation, this external green area shows limited maintenance and active use (refer to Photo 4.11).

In addition to green spaces, indoor sports facilities are located adjacent to SS9, specifically within SS8 (refer to Figure 4.5). These facilities are situated at an estimated distance of approximately 2.2 km, corresponding to an estimated 30-minute walking distance from SS9.



Figure 4.5 Land Use in SS 9 And the Distribution of Green Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.11 Green Area Outside of This Section (Located at The North of This Section)
Source: Google Street View (Google Maps), 2020



Plate 4.10 Linear Green Area in SS9
Source: Google Street View (Google Maps), 2020

4.4.2.2 Provision and Proximity of Facilities (Shops/ Stores) To the Neighbourhood

Figure 4.6 shows that a commercial area is located to the southeast of this section. However, based on the distance between the commercial area and the residential area, the 500-metre walking radius does not cover the entire section. In addition, Figure 4.6 indicates the presence of another commercial area located outside the section boundary to the northwest; similarly, the 500-metre walking radius from this commercial area does not cover the whole section. Furthermore, on-site observation identified business activities within the residential area, consisting of retail stores and food stalls.

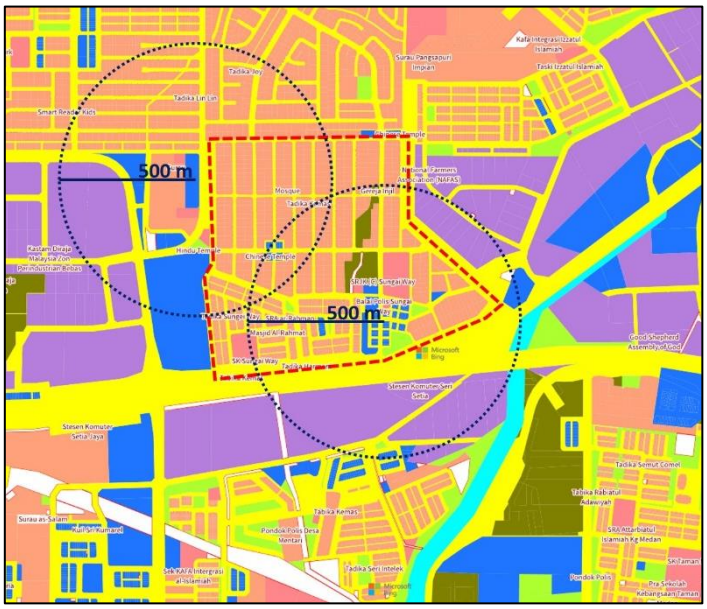


Figure 4.6 Land Use in SS 9 And the Distribution of Commercial Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.12 Commercial Area in This Section
Source: Google Street View (Google Maps), 2020



Plate 4.13 Business Activities in Residential Area.
Source: Google Street View (Google Maps), 2020

4.4.2.3 Facilities Convenience and Safety in The Neighbourhood

Based on the observation, the built environment within this section is characterised by high building density and narrow internal roads. Vehicular traffic was observed along these roads during the observation period. Shaded areas are limited, and continuous pedestrian walkways were not observed along several road segments. Access to the commercial area located outside the section boundary (refer to Figure 4.5) requires crossing a four-lane single carriageway. No marked pedestrian crossings, such as zebra crossings, were observed along this route (Refer to Photo 4.16). Vehicular traffic volume was observed on this road during the site visit. The combination of road width, traffic presence, and limited pedestrian infrastructure results in direct pedestrian movement being constrained along this corridor.



Plate 4.14 Inconvenience Narrow Road for The Residents to Walk Along the Road
Source: Google Street View (Google Maps), 2020

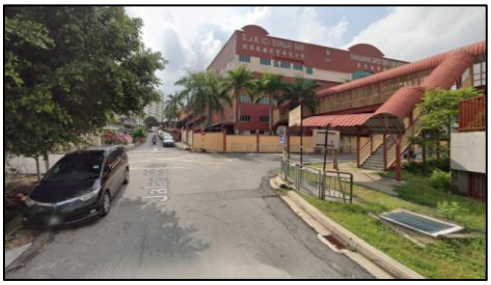


Plate 4.15 Existing Pedestrian Bridge Near School
Source: Google Street View (Google Maps), 2020



Plate 4.16 Single Carriageway with Four Lanes, Without Zebra Crossing
Source: Google Street View (Google Maps), 2020

4.4.3 Section 3

4.4.3.1 Provision and Proximity of Facilities (Green Area and Sports Facilities) To the Neighbourhood

Based on the observation, Section 3 Petaling Jaya is a predominantly residential neighbourhood within the Old Town area, with limited but identifiable green and recreational facilities (Refer Figure 4.7). While no small neighbourhood park or playground was observed within most residential streets, the area is served by a major green and sports facility, Kompleks Sukan Arena PJ, located at the northern part of the section. This facility constitutes a substantial green open space, covering a significant portion of the section and functioning as the primary recreational and sports area for residents. In addition, other green spaces are located immediately outside the southern boundary of the section.

Collectively, these green areas fall within an approximate 500 m walking distance radius from the neighbourhood, indicating reasonable spatial accessibility. However, the distribution of greenery is concentrated rather than evenly integrated throughout residential streets, with everyday green exposure largely limited to street trees, private gardens, and incidental landscaping. This spatial pattern suggests that while opportunities for recreational physical activity are available within walking distance, daily park-based walking and spontaneous outdoor activities may be influenced by the location and accessibility of these facilities, particularly for residents living further from the main green area.

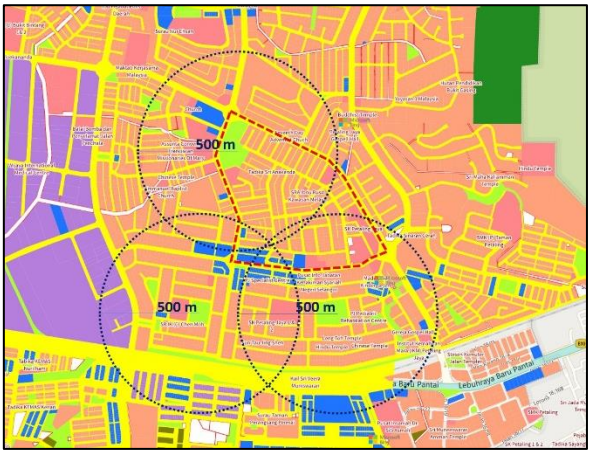


Figure 4.7 Land Use in Section 3 And the Distribution of Green Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020

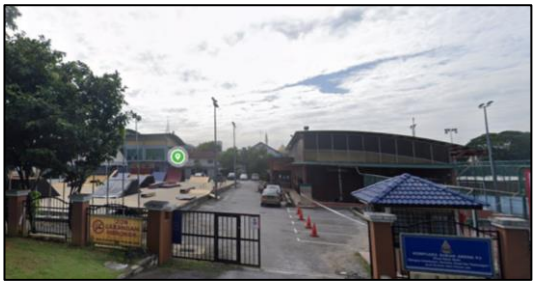


Plate 4.17 Kompleks Sukan Arena PJ
Source: Google Street View (Google Maps), 2020



Plate 4.18 Open Space Located Outside of This Section
Source: Google Street View (Google Maps), 2020

4.4.3.2 Provision and Proximity of Facilities (Shops/ Stores) To the Neighbourhood

Observation findings indicate that Section 3 Petaling Jaya benefits from good proximity to neighbourhood-level commercial facilities, largely due to its location adjacent to PJ Old Town. As illustrated in Figure 4.8, the main commercial area is concentrated along the southern part of the section, particularly along Jalan Othman, which functions as a local commercial corridor. This area accommodates a variety of daily services, including small shops, food outlets, clinics, mosques, schools, as well as key community destinations such as Pasar Besar Jalan Othman (wet market) and Taman Selera Jalan Othman.

While some commercial premises are located within Section 3 itself, others are situated immediately outside the section boundary; however, the 500 m walking distance radius covers most residential areas within the section, indicating a high level of walkable access to daily necessities. In contrast, larger commercial centres and

shopping malls are located beyond comfortable walking distance and generally require vehicular travel. Overall, the observed land-use pattern reflects a functional mixed-use environment that supports routine walking for daily needs and reduces reliance on private vehicles for short-distance trips.

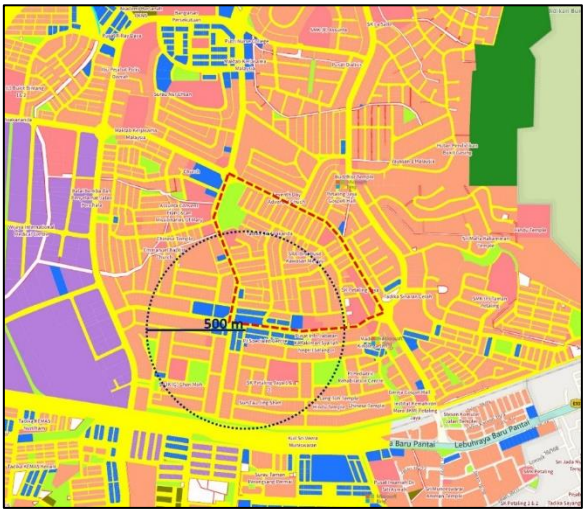


Figure 4.8 Land Use in Section 3 And the Distribution of Commercial Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.19 Pasar Besar Jalan Othman
Source: Google Street View (Google Maps), 2020



Plate 4.20 Taman Selera Jalan Othman
Source: Google Street View (Google Maps), 2020

4.4.3.3 Facilities Convenience and Safety in The Neighbourhood

From an observational perspective, Section 3 Petaling Jaya demonstrates a generally convenient and moderately safe environment for everyday walking activities. The neighbourhood is characterised by low-rise landed residential development, which encourages passive surveillance and contributes to a calm street environment with relatively low traffic volume, making it suitable for walking and light jogging (Refer Photo 4.21). Pedestrian walkways are provided along several residential streets and main routes, facilitating short walking trips to nearby shops, religious facilities, schools,

and recreational areas. Access to Kompleks Sukan Arena PJ is supported by continuous pedestrian walkways, shaded paths in good condition, and the provision of pedestrian bridges that enable residents to safely cross wider roads.

Similarly, connectivity between residential areas and nearby commercial zones is enhanced through pedestrian walkways, zebra crossings, and pedestrian bridges (Refer Photo 4.25), improving walkability and perceived safety. However, variations in pedestrian infrastructure quality were observed in certain locations, including narrow sidewalks and shared road space with vehicles, which may affect walking comfort, particularly for older adults and children. Overall, while the neighbourhood offers a supportive setting for short-distance walking and daily activities, further improvements to pedestrian infrastructure continuity and design would enhance safety and encourage more frequent and longer walking behaviour.



Plate 4.21 Convenience Environment in Residential Area.
Source: Google Street View (Google Maps), 2020



Plate 4.22 Pedestrian Walkway Provided
Source: Google Street View (Google Maps), 2020



Plate 4.23 Traffic Calming/ Zebra Crossing
Source: Google Street View (Google Maps), 2020



Plate 4.24 Pedestrian Bridge Near Kompleks Sukan Arena PJ
Source: Google Street View (Google Maps), 2020



Plate 4.25 Pedestrian Bridge In Old Town PJ Area.
Source: Google Street View (Google Maps), 2020

4.4.4 Section 21

4.4.4.1 Provision and Proximity of Facilities (Green Area and Sports Facilities) To the Neighbourhood

Based on on-site observation, Section 21 Petaling Jaya is a mature residential neighbourhood with no formal green areas, public parks, or indoor sports facilities located within its immediate residential fabric. Green elements within the section are limited to street trees, small landscaped pockets, and incidental greenery associated with residential plots and apartment compounds, which contribute to visual comfort but provide minimal space for recreational or sports-related physical activity. As illustrated in Figure 4.9, nearby green areas located outside Section 21 particularly in the SS2 area to the north fall within a 500 m walking distance radius but only partially cover the neighbourhood, indicating uneven accessibility to green spaces.

The nearest green area is separated from Section 21 by residential roads, while pedestrian access is possible, site observation indicates that road width and narrow walking space in certain locations reduce walking comfort (refer Photo 4.26). Consequently, access to larger green areas and sports facilities generally requires movement beyond the neighbourhood boundary, often involving longer walking distances or vehicular travel. This spatial arrangement suggests that opportunities for park-based and recreational physical activity are not directly embedded within the neighbourhood, which may limit spontaneous or frequent use of green and sports facilities among residents.

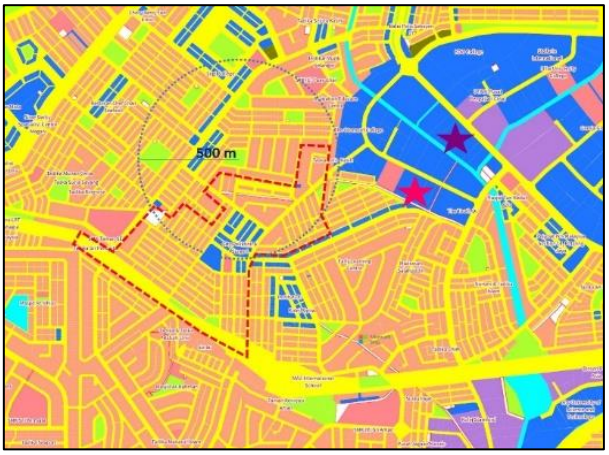


Figure 4.9 Land Use in Section 21 And the Distribution of Green Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.26 Nearest Green Area Is In SS2 Adjacent To This Section (Section 21)
Source: Google Street View (Google Maps), 2020



Plate 4.27 The Road Is Quite Narrow And Less Convenient For The Residence
Source: Google Street View (Google Maps), 2020



Plate 4.28 Nearest Green Area Is In SS2 Adjacent To This Section (Section 21)
Source: Google Street View (Google Maps), 2020

4.4.4.2 Provision and Proximity of Facilities (Shops/ Stores) To the Neighbourhood

Observation findings indicate that Section 21 Petaling Jaya has good proximity to neighbourhood-level commercial facilities, reflecting a functional mixed-use environment. As shown in Figure 4.10, the main commercial area is centrally located

within Section 21 and its 500 m walking distance radius covers most residential areas, providing convenient access to daily services. Rows of shophouses accommodating eateries, convenience stores, clinics, wet markets, and small retail outlets form a well-established commercial node commonly associated with the Sea Park area.

Most residential units are located close to this commercial core, enabling residents to access daily necessities on foot. However, site observation indicates that in certain locations, residents are required to cross main and busier roads to reach the commercial area, which may affect walking comfort and perceived safety. Larger shopping centres and regional malls are situated beyond comfortable walking distance and generally require motorised travel. Overall, the spatial distribution of commercial facilities supports routine utilitarian walking for daily errands within the neighbourhood.



Figure 4.10 Land Use in Section 21 And the Distribution of Commercial Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.29 Commercial Area Adjacent to The Residential
Source: Google Street View (Google Maps), 2020



Plate 4.30 Shops in Section 21
Source: Google Street View (Google Maps), 2020



Plate 4.31 Commercial Area Adjacent to Main Road
Source: Google Street View (Google Maps), 2020

4.4.4.3 Facilities Convenience and Safety in The Neighbourhood

From an observational perspective, Section 21 Petaling Jaya demonstrates a moderate level of convenience and safety for everyday walking activities, influenced by both its built form and pedestrian infrastructure quality. The neighbourhood is characterised by low-rise landed housing and some medium-density apartments, which contribute to passive surveillance and observable pedestrian activity, particularly near commercial areas. Pedestrian movement was noted along residential streets and shop rows, indicating regular short-distance walking. However, pedestrian walkways are not provided comprehensively nor well connected throughout the section. Sidewalks are more evident near commercial areas, while several residential streets rely on shared road space with vehicles.

In addition, formal pedestrian crossings such as zebra crossings were not observed in certain locations, requiring residents to cross busy roads informally, especially near commercial zones. Most roads within Section 21 are relatively narrow; while traffic movement is generally slow, roads adjacent to commercial areas experience higher traffic volumes, reducing walking comfort. Public transport facilities include approximately eight bus stops distributed near residential and commercial areas, supporting accessibility; however, several bus stops were observed to be in poor physical condition. The Taman Paramount LRT station, located just outside the southern boundary of Section 21, is accessible from the neighbourhood but requires movement beyond the section. Overall, while the neighbourhood supports short-distance walking and access to public transport, inconsistent pedestrian infrastructure and traffic conditions may constrain walking safety and comfort, particularly for vulnerable users.



Plate 4.32 Bus Stop Provided Near Residential Area
Source: Google Street View (Google Maps), 2020



Plate 4.33 The Bus Stop Is in Poor Condition as The Roof Is Broken. The Material of The Roof Is Transparent and Do Not Provide Shade to The User
Source: Google Street View (Google Maps), 2020

4.4.5 SS4

4.4.5.1 Provision and Proximity of Facilities (Green Area and Sports Facilities) To the Neighbourhood

SS4 is predominantly a low- to medium-density residential neighbourhood, consisting mainly of terrace houses and semi-detached units. This residential land use forms a compact neighbourhood fabric, characteristic of early planned suburban developments in Petaling Jaya. Within the section, residential land use is complemented by small-scale open and green spaces, such as neighbourhood parks and landscaped open areas, which are generally located within walking distance of residential clusters. (Refer Figure 4.11). The presence of local neighbourhood parks provides residents with accessible spaces for leisure, light physical activity, and social interaction, although these green spaces are limited in size and function primarily as passive recreational areas rather than large urban parks. Larger recreational and green facilities are available in nearby areas of Kelana Jaya, requiring short travel distances by foot, bicycle, or vehicle. Overall, the land use pattern in SS4 reflects a residential-dominated neighbourhood with supporting green spaces, contributing to environmental liveability and offering basic opportunities for outdoor physical activity, albeit at a modest scale.



Figure 4.11 Land Use in SS4 And the Distribution of Green Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.34 Green Area in The Neighbourhood



Plate 4.35 Green Area in The Neighbourhood

4.4.5.2 Provision and Proximity of Facilities (Shops/ Stores) To the Neighbourhood

While SS4 itself is primarily residential (Refer Figure 4.10), it benefits from high proximity to commercial land uses located within adjacent sections such as SS3, SS2, and Kelana Jaya. These nearby commercial areas include local shoplots, eateries, convenience stores, clinics, and neighbourhood services, which are easily accessible from SS4 and support residents' daily needs. In addition, major commercial centres, most notably Paradigm Mall, are located within a short distance of the neighbourhood. These larger commercial developments provide access to supermarkets, retail outlets, food courts, restaurants, and entertainment facilities.

The close proximity of such malls enhances convenience for residents and supports non-work-related trips, some of which can be undertaken by walking or public transport. The spatial arrangement of commercial land use around SS4 demonstrates a

functional semi-mixed land use structure, where residential areas are buffered from intensive commercial activity while still maintaining easy access to essential goods, services, and food outlets, which may influence dietary choices and travel behaviour.



Figure 4.12 Land Use in SS4 And the Distribution of Commercial Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.36 Shop Lot in The Neighbourhood



Plate 4.37 Shop Lot in The Neighbourhood

4.4.5.3 Facilities Convenience and Safety in The Neighbourhood

SS4 is well-served by a range of urban facilities and infrastructure, contributing to overall neighbourhood convenience. The area has good road connectivity, with direct access to major arterial roads and the Damansara–Puchong Expressway (LDP), facilitating movement to other parts of Petaling Jaya and the Klang Valley. Public transport accessibility is enhanced by the proximity of Kelana Jaya LRT and Taman Bahagia LRT stations, enabling residents to access employment, education, and commercial centres without complete reliance on private vehicles. In terms of

pedestrian infrastructure, sidewalks and pedestrian pathways are available along residential streets and near major activity nodes, although their continuity and quality vary.

Pedestrian bridges and controlled crossings near major roads improve safety, particularly around LRT stations, but heavy traffic along main roads may reduce walking comfort in certain areas. From a safety perspective, SS4 is generally regarded as a stable and established residential neighbourhood, with relatively low crime levels and the presence of community-based safety measures such as neighbourhood watch initiatives. Adequate street lighting, residential surveillance, and active street use contribute to residents' perceived sense of safety. Collectively, the availability of facilities, transport accessibility, and perceived neighbourhood safety enhances daily convenience and liveability, supporting routine activities such as walking to transit, accessing shops, and using nearby recreational spaces.



Plate 4.38 Pedestrian Walkway Provided in The Neighbourhood



Plate 4.39 Mosque Provided in The Neighbourhood

4.4.6 SS2

4.4.6.1 Provision and Proximity of Facilities (Green Area and Sports Facilities) To the Neighbourhood

Observation findings indicate that SS2 is predominantly a residential area, with green and open spaces integrated within the neighbourhood structure. As shown in Figure 4.13, the land use in this section is largely residential, while green areas are distributed across the neighbourhood rather than concentrated in a single location. The main urban park within SS2 is Taman Bandar SS2, Petaling Jaya, which functions as the principal recreational space, complemented by several smaller neighbourhood parks and pocket open spaces located along residential streets.

Based on a 500 m walking radius, these green areas collectively cover most parts of the section, indicating that open spaces are generally within walking distance and physically accessible to surrounding residential areas. Field observation shows that these green spaces typically provide basic recreational facilities, such as walking paths, seating, children's play equipment and open areas, which support light physical activity and informal use. Although the green spaces are modest in scale and do not function as large regional parks, their distribution within residential areas and proximity to housing enhances accessibility and supports regular outdoor activities within the neighbourhood.



Figure 4.13 Land Use in SS2 And the Distribution of Green Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.40 Taman Bandar Ss2 Petaling Jaya
Source: Google Street View (Google Maps), 2020



Plate 4.41 Taman Bandar Ss2 Petaling Jaya
Source: Google Street View (Google Maps), 2020

4.4.6.2 Provision and Proximity of Facilities (Shops/ Stores) To the Neighbourhood

SS2 demonstrates a high level of accessibility to commercial facilities, reflecting its function as a mixed residential–commercial neighbourhood. Observation shows that shops, eateries, convenience stores, clinics and small supermarkets are concentrated within well-established commercial zones, particularly around the central SS2 commercial precinct (Refer Figure 4.14). These facilities are closely integrated with surrounding residential areas, allowing most daily needs to be met within walking distance. The presence of active shop rows and regular street activity indicates a strong relationship between residential land use and commercial services. In addition, larger shopping centres such as One Utama, Tropicana City Mall and The Curve are located within a short driving distance, further enhancing access to a wider range of goods and services. Overall, the spatial proximity of shops and stores in SS2 supports frequent non-motorised trips and reduces reliance on private vehicles for daily errands.



Figure 4.14 Land Use in SS2 And the Distribution of Commercial Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.42 Commercial Area Around Taman SS2 Petaling Jaya
Source: Google Street View (Google Maps), 2020



Plate 4.43 Commercial Area in SS2
Source: Google Street View (Google Maps), 2020

4.4.6.3 Facilities Convenience and Safety in The Neighbourhood

In terms of overall facilities convenience and safety, SS2 demonstrates characteristics of a functional and active urban neighbourhood. The area is well connected by major roads and supported by public transport, including proximity to the Taman Bahagia LRT station, which enhances accessibility to surrounding areas. Observation shows that pedestrian infrastructure, such as sidewalks and zebra crossings, is provided along many streets, particularly near commercial zones, although the continuity and quality of walkways vary, especially along roads with higher traffic volumes. Within residential streets, traffic levels are generally lower, creating a more suitable environment for walking and jogging activities. Green and open spaces are distributed across the section and located within walking distance, allowing residents to access these spaces without motorised travel.

Field observation indicates that several open spaces are equipped with recreational facilities such as jogging tracks, badminton courts and basketball courts, supporting various forms of physical activity. Access to commercial areas is also convenient, as shop rows and service facilities are located within walking distance of surrounding residential areas, with pedestrian walkways provided in certain locations. In addition, the presence of active commercial uses, schools, clinics, a police station and a fire station contribute to street activity and natural surveillance. While traffic congestion is observed in some commercial areas, particularly during peak periods, the overall physical environment supports daily movement and access to facilities in a relatively safe and convenient manner.



Plate 4.44 Green Area That Have Jogging Track and Other Facilities



Plate 4.45 Green Area That Have Jogging Track and Other Facilities

4.4.7 SS8

4.4.7.1 Provision and Proximity of Facilities (Green Area and Sports Facilities) To the Neighbourhood

Observation findings indicate that SS8 is characterised by a predominantly industrial land use, which distinguishes it from the other study sections. As shown in Figure 4.15, the area is structured around major road infrastructure, with the Lebuhraya Damansara–Puchong (LDP) and the Federal Highway forming the primary access routes. Residential presence within SS8 is limited and includes one apartment, one serviced apartment and Pangsapuri SS8, while surrounding residential areas are located outside the section boundary. Field observation and spatial analysis show that no dedicated public green areas or neighbourhood parks are provided within SS8, and green elements within the section are limited to landscaped spaces associated with mixed-use or commercial developments, which function mainly as visual or circulation spaces rather than recreational areas.

Purpose-built outdoor sports facilities, such as jogging tracks, courts or large open fields, were not observed within the section; however, indoor sports facilities are present. The nearest major green space, Taman Bandar Kelana Jaya, is located outside the SS8 boundary and beyond the 500 m walking radius, indicating limited walkable access to public green and recreational facilities from within the section.

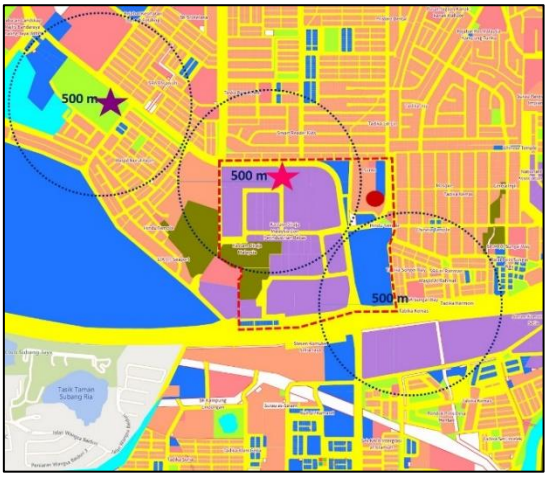


Figure 4.15 Land Use in SS8 And the Distribution of Green Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.46 Taman Bandaran
Source: Google Street View (Google Maps), 2020

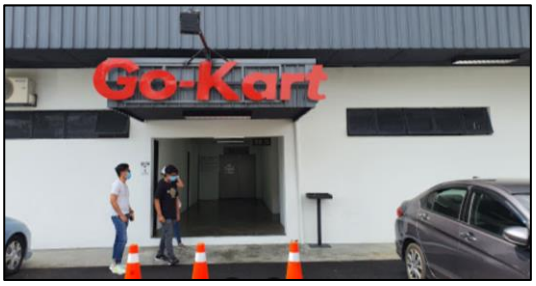


Plate 4.47 Indoor Sports
Source: Google Street View (Google Maps), 2020



Plate 4.48 Indoor Sports
Source: Google Street View (Google Maps), 2020

4.4.7.2 Provision and Proximity of Facilities (Shop/ Stores) To the Neighbourhood

Observation findings indicate that SS8 exhibits a moderate provision of commercial facilities, with shoplots, food outlets, and service-oriented businesses primarily concentrated within specific mixed-use developments and along major roads. As shown in Figure 4.16, the land use in SS8 consists mainly of industrial and commercial areas, with the largest commercial development being a service apartment,

which also serves as a residential facility. Additional commercial clusters are observed near the apartment at the north-east of the section, providing daily services for residents in proximity. Based on a 500 m walking radius, both the service apartment and Pangsapuri SS8 are located within accessible distance to these commercial clusters. Other parts of the section, particularly those closer to industrial land, are less directly connected to commercial facilities, and larger shopping centres and a wider range of retail options are located outside the section, typically requiring short vehicular trips. Overall, commercial facilities in SS8 are localised and concentrated, rather than evenly distributed throughout the section.

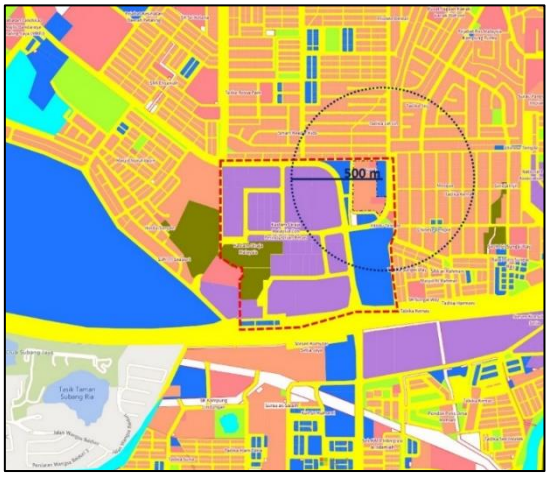


Figure 4.16 Land Use in SS8 And the Distribution of Commercial Area
Source: PLANMalaysia (iPlanMalaysia), Year 2020



Plate 4.49 Shops in Service Apartment

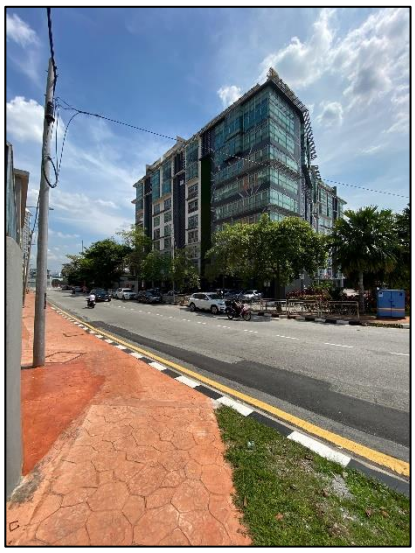


Plate 4.50 Service Apartment

4.4.7.3 Facilities Convenience and Safety in The Neighbourhood

Regarding overall facilities convenience and safety, SS8 is characterised by strong vehicular accessibility but variable pedestrian conditions. The section is well connected to major road networks, including highways such as the LDP and Federal Highway, which support efficient regional movement. However, observation indicates that pedestrian infrastructure, including sidewalks and crossings, is not consistently provided across the section, particularly near industrial areas and major road corridors. Walkable environments are more evident within individual developments rather than at the neighbourhood scale. Traffic volume along major roads may affect pedestrian comfort, while quieter internal streets and development-specific pathways offer more favourable walking conditions. Overall, facilities convenience and safety in SS8 appear to be context-dependent, with higher accessibility for motorised travel and more limited continuity for pedestrian movement within the section.

4.4.8 Overall Observation of Urban Environment Features in The Neighbourhood

Based on Table 4.25, the observation findings indicate clear variation in urban environment characteristics across the study sections, reflecting differences in land use composition, spatial structure, and the distribution of facilities. Sections characterised by mixed residential and commercial land uses, such as Section 3 and SS2, demonstrate a higher concentration of neighbourhood-scale commercial facilities and green or recreational spaces within walkable distances, supported by more continuous pedestrian infrastructure. These sections exhibit a more integrated internal layout, with daily facilities located closer to residential areas.

In contrast, sections dominated by single land use types, particularly residential or industrial uses, such as Section 9, SS9, and SS8, show limited provision of internal green spaces, sports facilities, and neighbourhood-scale commercial outlets. In these sections, key facilities are generally located outside the section boundaries, requiring movement across major roads or arterial corridors. Observation further indicates that pedestrian connectivity in these areas is fragmented, with discontinuous walkways and limited formal crossing facilities at certain locations.

Across all sections, the presence and quality of pedestrian infrastructure vary considerably, with more complete and connected networks observed near commercial centres, schools, and transport nodes. Physical barriers such as wide roads, dual carriageways, and high traffic corridors are commonly observed factors influencing the directness of pedestrian movement between residential areas and surrounding facilities.

Overall, the observation findings highlight that the spatial distribution of land uses, green spaces, and commercial facilities, together with the configuration of pedestrian infrastructure, differs substantially between sections. These physical characteristics form an important contextual basis for interpreting residents' perceptions and healthy lifestyle behaviours in subsequent analyses.

Table 4.25
Overall Observation on Urban Environment Features

Section	Dominant Land Use	Green Areas & Sports Facilities (Proximity)	Commercial Facilities (Proximity)	Facilities Convenience & Safety (Observation)
Section 9	Predominantly low-density residential	No designated green space within section; Dataran Petaling Jaya located adjacent but separated by dual carriageway; Taman Jaya Park accessible via internal roads; sports centre located west of section; Bukit Gasing beyond 500 m walking radius	No retail outlets within section; Wisma TNB is the only commercial building; nearest commercial cluster ~500 m southwest, requiring road crossing; Amcorp Mall northwest, separated by dual carriageway	Pedestrian walkways present around schools and selected routes; discontinuous connectivity to external facilities; limited formal crossings across major roads; pedestrian bridge near school; shaded walkways observed in selected areas; LRT station within ~500 m
SS9	Residential–industrial interface	One linear green area within section (south); additional green area north of section within 500 m but showing limited maintenance; indoor sports facilities in adjacent SS8 (~2.2 km / ~30 min walk)	Commercial areas located southeast and northwest of section; 500 m walking radius does not cover entire section; small-scale retail and food stalls observed within residential area	High building density and narrow roads; vehicular traffic observed; limited shaded areas; discontinuous pedestrian walkways; access to external commercial areas requires crossing four-lane carriageway without marked crossings
Section 3	Predominantly residential with mixed-use edges	Major green and sports facility (Kompleks Sukan Arena PJ) located within section; additional green areas just outside southern boundary; most areas within 500 m walking distance	Strong neighbourhood commercial presence along Jalan Othman; wet market, food outlets, shops, clinics within walking distance; larger malls beyond walkable range	Continuous pedestrian walkways in many areas; shaded paths and pedestrian bridges near sports complex; zebra crossings present near commercial areas; low-rise housing and moderate traffic support walking

Section 21	Predominantly residential	No formal parks within section; green spaces limited to street trees and small landscaped pockets; larger green areas in SS2 within partial 500 m walking coverage	Central commercial core within section (Sea Park); 500 m walking radius covers most residences; larger malls beyond walkable distance	Pedestrian walkways provided mainly near commercial areas; shared road space in residential streets; limited zebra crossings in some locations; bus stops available but some in poor condition; LRT station just outside boundary
SS4	Low- to medium-density residential	Small neighbourhood parks and landscaped open spaces within walking distance; larger green and recreational facilities in Kelana Jaya nearby	Commercial facilities located in adjacent sections (SS2, SS3, Kelana Jaya); Paradigm Mall within short travel distance	Good road and public transport connectivity; sidewalks and pedestrian bridges near major roads and LRT stations; pedestrian infrastructure varies in continuity; heavy traffic on main roads observed
SS2	Mixed residential–commercial	Multiple green spaces including Taman Bandar SS2; smaller parks and pocket spaces distributed across section; most within 500 m walking radius	High concentration of shops, eateries, clinics and small supermarkets within walking distance; major malls nearby by vehicle	Pedestrian walkways and zebra crossings provided in many areas; lower traffic on residential streets; recreational facilities observed in parks; traffic congestion observed near commercial zones during peak periods
SS8	Predominantly industrial with limited residential	No public green areas within section; green elements limited to landscaped spaces in developments; indoor sports facilities present; nearest major park beyond 500 m walking radius	Commercial activities concentrated in mixed-use developments and along major roads; accessible mainly to nearby apartments; larger malls outside section	Strong vehicular accessibility via highways; inconsistent pedestrian infrastructure; walkability higher within individual developments than across section; traffic volume affects pedestrian comfort

4.5 Analysis of Healthy Lifestyle of the Respondents

This subsection presents the healthy lifestyle profile of the respondents, focusing on their physical activity patterns and dietary behaviour. Physical activity is examined through both moderate and vigorous activities, with the level of participation measured using indicators of frequency and duration for each activity type. Dietary behaviour is analysed based on food consumption patterns, including the most and second most frequently consumed foods, balanced diet intake, and levels of sugar, salt, fat, and calorie intake. The analysis is descriptive in nature and is presented using frequencies and percentages to provide an overall understanding of respondents' lifestyle practices prior to examining their relationships with urban environment features.

4.5.1 Physical Activity

4.5.1.1 Frequency of Physical Activity

Tables 4.26 and 4.27 present the frequency of engagement in two types of physical activity, namely vigorous and moderate activities, among respondents in the study area. Based on Table 4.26, 78.87% of respondents reported being actively engaged in vigorous physical activity at least one day per week. Among the study sections, SS4 recorded the highest proportion of respondents engaging in vigorous activity, with 95.12% participating at least two days per week. This was followed by SS2 (93.75%), SS8 (91.18%), and Section 9 (88.89%). In contrast, respondents from Section 3, SS9, and Section 21 demonstrated lower engagement in vigorous activity, with only 64.71%, 61.29%, and 59.37% respectively reporting participation at least one day per week.

When examining higher frequencies of vigorous activity (more than two days per week), SS8 and SS9 showed relatively higher levels of engagement. However, only SS9 (29.03%) and SS8 (14.71%) recorded notable proportions of respondents engaging in vigorous activity more than two days per week. Based on Table 4.27, overall engagement in moderate physical activity was considerably lower, with only 27.70% of respondents participating across the study area. Section 3 recorded the highest proportion of respondents engaging in moderate activity (55.88%), followed by Section 21 (40.62%) and SS9 (38.71%). In contrast, respondents from SS2, SS4, Section 9, and

SS8 demonstrated lower levels of moderate activity participation, with percentages of 21.87%, 14.63%, 11.11%, and 2.94% respectively.

A comparison of Tables 4.26 and 4.27 indicates an inverse pattern between vigorous and moderate physical activity across the study areas. Sections with higher participation in vigorous activity (SS4, SS2, SS8, and Section 9) generally exhibited lower engagement in moderate activity. Conversely, areas with lower levels of vigorous activity (Section 3, Section 21, and SS9) showed higher participation in moderate physical activity.

Table 4.26
Frequency of Vigorous Activity of the Respondents

Section/ SS	**Vigorous activity (frequency)**										**Total**
	None		1-2 days		3-4 days		5-6 days		7 days		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS4	2	4.88	36	87.80	2	4.88	0	0.00	1	2.44	41
SS2	2	6.25	26	81.25	3	9.38	0	0.00	1	3.13	32
SS8	3	8.82	26	76.47	5	14.71	0	0.00	0	0.00	34
Section 9	1	11.11	7	77.78	1	11.11	0	0.00	0	0.00	9
Section 3	12	35.29	19	55.88	2	5.88	1	2.94	0	0.00	34
SS9	12	38.71	10	32.26	9	29.03	0	0.00	0	0.00	31
Section 21	13	40.63	17	53.13	2	6.25	0	0.00	0	0.00	32
Total	45	21.13	141	66.20	24	11.27	1	0.47	2	0.94	213

Table 4.27
Frequency of Moderate Activity of the Respondents

Section/ SS	**Moderate activity (frequency)**										**Total**
	None		1-2 days		3-4 days		5-6 days		7 days		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
Section 3	15	44.12	18	52.94	1	2.94	0	0.00	0	0.00	34
Section 21	19	59.38	13	40.63	0	0.00	0	0.00	0	0.00	32
SS9	19	61.29	5	16.13	5	16.13	1	3.23	1	3.23	31
SS2	25	78.13	4	12.50	3	9.38	0	0.00	0	0.00	32
SS4	35	85.37	4	9.76	1	2.44	1	2.44	0	0.00	41
Section 9	8	88.89	1	11.11	0	0.00	0	0.00	0	0.00	9
SS8	33	97.06	1	2.94	0	0.00	0	0.00	0	0.00	34
Total	154	72.30	46	21.60	10	4.69	2	0.94	1	0.47	213

4.5.1.2 Duration of Physical Activity

According to the Malaysia Dietary Guidelines, individuals are recommended to engage in at least 150 minutes of moderate-intensity physical activity or 75 minutes of vigorous-intensity physical activity per week. For moderate-intensity activity, it is suggested that physical activity be performed on at least five days per week, with a minimum duration of 30 minutes per session, to achieve the recommended level of physical activity (Ministry of Health Malaysia, 2020). Tables 4.28 and 4.29 present the duration of respondents' engagement in vigorous and moderate physical activities, respectively. Based on Table 4.28, four sections recorded a higher proportion of respondents engaging in vigorous-intensity physical activity for more than 10 minutes per session. SS4 reported the highest percentage (95.13%), followed by SS2 (95.13%), Section 9 (77.78%), and SS8 (70.59%). In contrast, Section 3, SS9, and Section 21 recorded lower proportions of respondents engaging in vigorous activity for more than 10 minutes, at 64.71%, 64.52%, and 59.37%, respectively.

In terms of longer duration of vigorous activity, respondents from SS2 and SS4 were more likely to engage in vigorous activity for extended periods (more than 40 minutes), with proportions of 87.50% and 85.37%, respectively. Additionally, 50.01% of respondents from Section 21 engaged in vigorous activity for more than 30 minutes, followed by SS9 (45.16%), Section 9 (44.44%), and SS8 (44.12%). Based on Table 4.29, three sections recorded higher proportions of respondents engaging in moderate-intensity physical activity for more than 10 minutes per session. Section 3 reported the highest percentage (50.00%), followed by Section 21 (40.62%) and SS9 (32.25%). In contrast, the remaining four sections recorded lower participation in moderate activity of more than 10 minutes. SS8 showed the lowest percentage (2.94%), followed by Section 9 (11.11%), SS4 (14.63%), and SS2 (15.62%).

Table 4.28
Duration of Vigorous Activity of the Respondents

Section/ SS	**Vigorous activity (duration)**										**Total**
	None		<10 mins		10-20 mins		30-40 mins		>40 mins		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS4	2	4.88	0	0.00	0	0.00	4	9.76	35	85.37	41
SS2	2	6.25	1	3.13	0	0.00	1	3.13	28	87.50	32
Section 21	13	40.63	0	0.00	3	9.38	5	15.63	11	34.38	32

SS9	11	35.48	0	0.00	6	19.35	7	22.58	7	22.58	31
Section 9	1	11.11	1	11.11	3	33.33	2	22.22	2	22.22	9
SS8	3	8.82	7	20.59	9	26.47	15	44.12	0	0.00	34
Section 3	12	35.29	0	0.00	16	47.06	2	5.88	4	11.76	34
Total	44	20.66	9	4.23	37	17.37	36	16.90	87	40.85	213

Table 4.29
Duration of Moderate Activity of the Respondents

Section/ SS	**Moderate activity (duration)**										**Total**
	None		<10 mins		10-20 mins		30-40 mins		>40 mins		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
Section 3	15	44.12	2	5.88	15	44.12	2	5.88	0	0.00	34
Section 21	19	59.38	0	0.00	7	21.88	5	15.63	1	3.13	32
SS9	20	64.52	1	3.23	6	19.35	2	6.45	2	6.45	31
SS2	27	84.38	0	0.00	1	3.13	3	9.38	1	3.13	32
SS4	35	85.37	0	0.00	2	4.88	4	9.76	0	0.00	41
Section 9	8	88.89	0	0.00	1	11.11	0	0.00	0	0.00	9
SS8	33	97.06	0	0.00	1	2.94	0	0.00	0	0.00	34
Total	157	73.71	3	1.41	33	15.49	16	7.51	4	1.88	213

Based on the frequency and duration of physical activity (Tables 4.26, 4.27, 4.28, and 4.29), variations in physical activity participation were observed across the study sections. Most respondents from SS4 and SS2 were more likely to engage in vigorous-intensity physical activity and can be considered the most active groups. In terms of frequency, 95.12% of respondents from SS4 and 93.75% from SS2 reported engaging in vigorous activity at least two days per week (Table 4.26). In addition, respondents from both sections demonstrated longer durations of vigorous activity, with 85.37% (SS4) and 87.50% (SS2) engaging in sessions lasting more than 40 minutes (Table 4.28). These findings indicate that respondents from SS4 and SS2 achieved the recommended weekly duration of 75 minutes of vigorous-intensity physical activity.

Meanwhile, respondents from Section 21 also demonstrated relatively active participation in vigorous physical activity. Although Section 21 recorded the lowest proportion of respondents engaging in vigorous activity at least two days per week (59.37%) (Table 4.26), approximately half of the respondents engaged in vigorous activity for longer durations exceeding 30 minutes per session (Table 4.28). As a result, about half of the respondents in Section 21 achieved the recommended weekly duration of 75 minutes of vigorous-intensity physical activity.

Respondents from SS9, SS8, and Section 9 were considered moderately active. Although the frequency of engaging in vigorous physical activity was relatively high in SS8 (91.18%), Section 9 (88.89%), and SS9 (61.29%) (Table 4.26), only 45.16% of respondents from SS9, 44.44% from Section 9, and 44.12% from SS8 engaged in vigorous activity for durations exceeding 30 minutes per session (Table 4.28). This suggests that fewer than half of respondents in these sections achieved the recommended weekly duration of 75 minutes of vigorous-intensity physical activity.

In contrast, respondents from Section 3 were considered less active compared to other sections. Section 3 recorded a lower frequency of vigorous physical activity participation (64.71%) (Table 4.26) and the lowest proportion of respondents engaging in longer durations of vigorous activity (17.64%) (Table 4.28). Consequently, respondents from Section 3 did not achieve the recommended weekly duration for either moderate-intensity physical activity (150 minutes) or vigorous-intensity physical activity (75 minutes).

Overall, Tables 4.26 to 4.29 indicate that respondents across all sections were more likely to engage in vigorous-intensity physical activity than moderate-intensity activity. Respondents who were considered active generally engaged in physical activity for longer durations but less frequently within a week, while respondents who were less active tended to perform physical activity both less frequently and for shorter durations, resulting in non-compliance with the recommended weekly physical activity guidelines.

4.5.2 Dietary Behavior

4.5.2.1 Food Consumption

Tables 4.30 and 4.31 present the most frequent and second most frequent types of food consumption among respondents. Overall, the highest proportion of respondents reported home-cooked food as their most frequently consumed food type (84.51%), followed by non-fast food from restaurants (10.33%) (Table 4.30). For second most frequent food consumption, non-fast food recorded the highest percentage (62.44%), followed by home-cooked food (29.58%) (Table 4.31). In contrast, organic food and fast food recorded the lowest percentages for both most and second most frequent food consumption across the study area.

Section-level analysis shows that respondents from SS4 and SS2 recorded the highest proportions of home-cooked food as their most frequent food consumption, **at** 100% and 90.63%**,** respectively (Table 4.30). These two sections also recorded the highest proportions of non-fast food as the second most frequent food consumption, with 95.12% for SS4 and 84.38% for SS2 (Table 4.31). This indicates a strong preference for home-prepared meals and non-fast food dining among respondents in SS4 and SS2.

Respondents from Section 3 and SS9 also demonstrated relatively high reliance on home-cooked food as their most frequent food consumption, at 85.29% and 67.74%, respectively (Table 4.30). Additionally, both sections recorded notable proportions of respondents reporting home-cooked food as their second most frequent food consumption, at 58.82% for Section 3 and 54.84% for SS9 (Table 4.31). This suggests that home-cooked meals form a dominant component of dietary practices in these sections.

Overall, the findings indicate that home-cooked food and non-fast food restaurants constitute the dominant food consumption patterns among respondents. However, SS8 recorded a relatively higher proportion of respondents consuming fast food, with 11.76% reporting fast food as their most frequent food consumption and 20.59% as their second most frequent food consumption (Tables 4.30 and 4.31). A smaller proportion of respondents from SS2 (12.50%) also reported fast food as their second most frequent food consumption.

Table 4.30
Most Frequent Food Consumption

	Most frequent food consumption								
Section/ SS	Home cook		Organic food		Non- fast food		Fast food		**Total**
	f	%	*f*	%	*f*	%	*f*	%	
SS2	29	90.63	2	6.25	1	3.13	0	0.00	32
SS4	41	100.00	0	0.00	0	0.00	0	0.00	41
SS8	25	73.53	0	0.00	5	14.71	4	11.76	34
SS9	21	67.74	2	6.45	6	19.35	2	6.45	31
Section 3	29	85.29	0	0.00	5	14.71	0	0.00	34
Section 9	8	88.89	1	11.11	0	0.00	0	0.00	9
Section 21	27	84.38	0	0.00	5	15.63	0	0.00	32
Total	180	84.51	5	2.35	22	10.33	6	2.82	213

Table 4.31
Second Most Frequent Food Consumption

Section/ SS	Second most frequent food consumption								Total
	Home cook		Organic food		Non- fast food		Fast food		
	f	%	*f*	%	*f*	%	*f*	%	
SS2	1	3.13	0	0.00	27	84.38	4	12.50	32
SS4	2	4.88	0	0.00	39	95.12	0	0.00	41
SS8	7	20.59	0	0.00	20	58.82	7	20.59	34
SS9	17	54.84	1	3.23	11	35.48	2	6.45	31
Section 3	20	58.82	0	0.00	13	38.24	1	2.94	34
Section 9	2	22.22	1	11.11	6	66.67	0	0.00	9
Section 21	14	43.75	0	0.00	17	53.13	1	3.13	32
Total	63	29.58	2	0.94	133	62.44	15	7.04	213

4.5.2.2 Level Intake of Food

Table 4.32 presents respondents' self-reported levels of overall food intake. At the study-area level, most respondents rated their food intake as moderate (62.91%), followed by balanced diet (25.82%). A smaller proportion of respondents (11.27%) rated their food intake as imbalanced. Across sections, SS8 recorded the highest proportion of respondents reporting moderate food intake (85.29%), followed by Section 21 (62.50%). Respondents from SS2 (59.37%), Section 3 (58.82%), and SS4 (58.54%) also recorded similar proportions of moderate food intake. In contrast, Section 9 and SS9 showed relatively lower proportions of respondents reporting moderate food intake. In terms of balanced dietary intake, SS4 recorded the highest proportion of respondents (36.59%), followed by SS2 (31.25%). Approximately 30% of respondents from Section 3 and SS9 also reported having a balanced diet. Meanwhile, SS8, Section 9, and Section 21 recorded lower proportions of respondents reporting balanced dietary intake.

Table 4.32
Level Intake of Food

Section/ SS	Balance diet		Moderate		Imbalance diet		Total
	f	%	*f*	%	*f*	%	
SS2	10	31.25	19	59.37	3	9.37	32
SS4	15	36.59	24	58.54	2	4.88	41
SS8	3	8.82	29	85.29	2	5.88	34
SS9	9	29.03	17	54.84	5	16.13	31
Section 3	10	29.41	20	58.82	4	11.76	34
Section 9	1	11.11	5	55.56	3	33.33	9
Section 21	7	21.88	20	62.50	5	15.63	32
Total	55	25.82	134	62.91	24	11.27	213

4.5.2.3 Level Intake of Sugar, Salt, Fat and Calorie

Tables 4.33 to 4.36 present respondents' intake levels of sugar, salt, fat, and calories. Across all sections, more than half of the respondents reported medium intake levels for sugar, salt, fat, and calories, indicating a generally moderate dietary pattern at the study-area level. Section-specific analysis shows that SS8 recorded the highest proportions of respondents with high intake levels for sugar (20.59%), salt (29.41%), and calories (29.41%) (Tables 5.8, 5.9, and 5.11). Section 21 also demonstrated relatively high intake levels across all four dietary components, with 15.63% reporting high sugar intake, 12.50% high salt intake, 18.75% high fat intake, and 18.75% high calorie intake.

In addition, Section 3 recorded higher proportions of respondents with high intake levels of fat (20.59%) and calories (20.59%), while respondents from SS9 also demonstrated notable levels of high fat intake (12.90%) and high calorie intake (22.58%). Overall, the prevalence of medium intake levels across all dietary components aligns with earlier findings on food consumption patterns, where most respondents reported frequent consumption of home-cooked food and non-fast food options. Sections with relatively higher proportions of fast-food consumption, particularly SS8, also exhibited higher intake levels of sugar, salt, and calories.

Table 4.33
Level Intake Sugar

Level Intake of Sugar									
Section/ SS	Very low		Low		Medium		High		Total
	f	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	14	43.75	18	56.25	0	0.00	32
SS4	1	2.44	24	58.54	15	36.59	1	2.44	41
SS8	0	0.00	9	26.47	18	52.94	7	20.59	34
SS9	6	19.35	4	12.90	21	67.74	0	0.00	31
Section 3	5	14.71	8	23.53	19	55.88	2	5.88	34
Section 9	1	11.11	0	0.00	7	77.78	1	11.11	9
Section 21	4	12.50	7	21.88	16	50.00	5	15.63	32
Total	17	7.98	66	30.99	114	53.52	16	7.51	213

Table 4.34
Level Intake Salt

Level Intake of Salt									
Section/ SS	Very low		Low		Medium		High		Total
	f	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	15	46.88	15	46.88	2	6.25	32
SS4	1	2.44	15	36.59	23	56.10	2	4.88	41
SS8	0	0.00	5	14.71	19	55.88	10	29.41	34
SS9	4	12.90	9	29.03	18	58.06	0	0.00	31
Section 3	5	14.71	5	14.71	22	64.71	2	5.88	34
Section 9	1	11.11	0	0.00	8	88.89	0	0.00	9
Section 21	3	9.38	9	28.13	16	50.00	4	12.50	32
Total	14	6.57	58	27.23	121	56.81	20	9.39	213

Table 4.35
Level Intake Fat

Level Intake of Fat											
Section/ SS	Very low		Low		Medium		High		Very high		Total
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	9	28.13	20	62.50	3	9.38	0	0.00	32
SS4	1	2.44	10	24.39	29	70.73	1	2.44	0	0.00	41
SS8	0	0.00	7	20.59	21	61.76	6	17.65	0	0.00	34
SS9	5	16.13	6	19.35	16	51.61	4	12.90	0	0.00	31
Section 3	4	11.76	5	14.71	17	50.00	7	20.59	1	2.94	34
Section 9	1	11.11	0	0.00	6	66.67	1	11.11	1	11.11	9
Section 21	3	9.38	9	28.13	14	43.75	6	18.75	0	0.00	32
Total	14	6.57	46	21.60	123	57.75	28	13.15	2	0.94	213

Table 4.36
Level Intake Calorie

Section/ SS	Level Intake of Calorie										Total
	Very low		Low		Medium		High		Very high		
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	
SS2	0	0.00	8	25.00	21	65.63	2	6.25	1	3.13	32
SS4	0	0.00	9	21.95	30	73.17	2	4.88	0	0.00	41
SS8	0	0.00	1	2.94	23	67.65	10	29.41	0	0.00	34
SS9	4	12.90	7	22.58	13	41.94	7	22.58	0	0.00	31
Section 3	3	8.82	4	11.76	19	55.88	7	20.59	1	2.94	34
Section 9	1	11.11	0	0.00	6	66.67	0	0.00	2	22.22	9
Section 21	3	9.38	8	25.00	15	46.88	6	18.75	0	0.00	32
Total	11	5.16	37	17.37	127	59.62	34	15.96	4	1.88	213

4.6 Correlation Analysis

4.6.1 Correlation between Physical Activity with the Urban Environment Feature

Table 4.37 presents the correlation between urban environment quality and the frequency and duration of vigorous-intensity physical activity, using the same three analytical dimensions. Regarding the provision of facilities, the results reveal several statistically significant negative correlations with both the frequency and duration of vigorous physical activity. Significant negative relationships were observed between the frequency of vigorous activity and the availability of green areas and sports centres ($r = -0.134$, $p < 0.05$) as well as the variety of shops, stores, and markets ($r = -0.137$, $p < 0.05$). Stronger negative correlations were found for the duration of vigorous physical activity, particularly with green areas and sports centres ($r = -0.251$, $p < 0.01$), variety of shops and markets ($r = -0.339$, $p < 0.01$), public transport ($r = -0.214$, $p < 0.01$), and pedestrian walkways ($r = -0.197$, $p < 0.01$). These findings indicate that higher levels of vigorous physical activity are associated with lower reliance on neighbourhood-level facility provision.

In terms of facilities convenience and safety in the neighbourhood, statistically significant negative correlations were identified between several safety-related variables and vigorous physical activity. For frequency, significant negative relationships were observed with facilities being well maintained, safety during day and evening walks, and the provision of pedestrian signals. Similarly, the duration of vigorous physical activity was negatively correlated with facilities being well

maintained, safety during daytime walking, pedestrian signals, and walkway connectivity. These results suggest that neighbourhood convenience and safety characteristics are not positively associated with vigorous physical activity participation and may be less relevant for higher-intensity activities.

With respect to the distance of facilities to the neighbourhood, distance to transit stops showed statistically significant negative correlations with both the frequency ($r = -0.175$, $p < 0.05$) and duration ($r = -0.289$, $p < 0.01$) of vigorous physical activity. In contrast, distances to green areas and shops or markets showed weaker and non-significant relationships. This indicates that closer proximity to transit facilities is associated with lower engagement in vigorous-intensity physical activity.

In conclusion, the correlation analysis indicates that vigorous physical activity demonstrates a distinct pattern compared to moderate physical activity, with several urban environment variables showing negative associations. This suggests that vigorous-intensity physical activity is less influenced by neighbourhood-level urban environment characteristics and may be shaped by factors beyond the immediate residential environment.

Table 4.37
Correlation Between Frequency and Duration of Vigorous Activity with The Urban Environment Quality

Urban environment quality	**Frequency**		**Duration**	
	Coefficient (r) value	Significant (p) value	Coefficient (r) value	Significant (p) value
Provision of facilities				
Green area and sport center	-0.134	0.050*	-0.251	0.000**
Variety shops/ stores/ market	-0.137	0.045*	-0.339	0.000**
Public transport	-0.073	0.292	-0.214	0.002**
Pedestrian walkway	-0.115	0.094	-0.197	0.004**
Dedicated bicycle lane	-0.114	0.098	0.001	0.986
Combined (pedestrian walkway and bicycle lane)	0.005	0.939	0.115	0.094
Facilities convenience and safety in the neighbourhood				
Facilities well maintained	-0.154	0.025*	-0.226	0.001**
Safe during a day walk	-0.203	0.003**	-0.160	0.020*
Safe during evening walk	-0.146	0.034*	-0.030	0.661
Pedestrian signals provided	-0.149	0.030*	-0.180	0.008**
Walkways are well connected	-0.116	0.093	-0.140	0.041*

Distance of facilities to the neighbourhood				
Green area	-0.024	0.732	-0.230	0.001**
Shops/ stores/ market	-0.046	0.503	0.177	0.009**
Transit stop	-0.175	0.010*	-0.289	0.000**

Table 4.38 presents the correlation between urban environment quality and the frequency and duration of moderate-intensity physical activity, organised according to three dimensions: provision of facilities, facilities convenience and safety, and distance of facilities to the neighbourhood. In terms of provision of facilities, the correlation results indicate generally weak and statistically non-significant relationships between most facility-related variables and the frequency of moderate physical activity. Variables such as the availability of green areas and sports centres, variety of shops and markets, public transport, pedestrian walkways, bicycle lanes, and combined pedestrian–bicycle infrastructure recorded low correlation coefficients with p-values greater than 0.05. However, a statistically significant positive correlation was observed between the provision of pedestrian walkways and the duration of moderate physical activity ($r = 0.138$, $p < 0.05$), suggesting that the presence of pedestrian infrastructure is associated with longer durations of moderate-intensity activity. Overall, the provision of facilities appears to have a limited association with how often moderate physical activity is performed, but certain elements, particularly pedestrian walkways, are associated with activity duration.

Regarding facilities convenience and safety in the neighbourhood, most variables did not demonstrate significant correlations with the frequency of moderate physical activity. Nevertheless, a significant positive relationship was identified between facilities being well maintained and the duration of moderate physical activity ($r = 0.153$, $p < 0.05$). This indicates that respondents tend to engage in moderate physical activity for longer periods in neighbourhoods where facilities are perceived to be well maintained. Other safety-related variables, including perceived safety during day and evening walks, the provision of pedestrian signals, and walkway connectivity, showed weak and non-significant relationships. In summary, convenience and safety factors appear to influence the duration rather than the frequency of moderate physical activity.

For the distance of facilities to the neighbourhood, the results show the strongest associations with moderate physical activity. Distance to transit stops demonstrated a

statistically significant positive correlation with both the frequency ($r = 0.250$, $p < 0.01$) and duration ($r = 0.253$, $p < 0.01$) of moderate physical activity. In contrast, distances to green areas and shops or markets did not show significant relationships. These findings indicate that accessibility to transit facilities is an important factor associated with moderate physical activity behaviour. Overall, distance-related variables play a more prominent role in shaping moderate-intensity physical activity than facility provision or neighbourhood safety characteristics.

In conclusion, the correlation analysis suggests that moderate physical activity is more closely associated with accessibility and quality-related aspects of the urban environment, particularly pedestrian infrastructure, facility maintenance, and proximity to transit stops, while the general provision of facilities shows limited influence.

Table 4.38
Correlation Between Frequency and Duration of Moderate Activity with The Urban Environment Quality

Urban environment quality	**Frequency**		**Duration**	
	Coefficient (r) value	Significant (p) value	Coefficient (r) value	Significant (p) value
Provision of facilities				
Green area and sport center	-0.134	0.050*	-0.251	0.000**
Variety shops/ stores/ market	-0.137	0.045*	-0.339	0.000**
Public transport	-0.073	0.292	-0.214	0.002**
Pedestrian walkway	-0.115	0.094	-0.197	0.004**
Dedicated bicycle lane	-0.114	0.098	0.001	0.986
Combined (pedestrian walkway and bicycle lane)	0.005	0.939	0.115	0.094
Facilities convenience and safety in the neighbourhood				
Facilities well maintained	-0.154	0.025*	-0.226	0.001**
Safe during a day walk	-0.203	0.003**	-0.160	0.020*
Safe during evening walk	-0.146	0.034*	-0.030	0.661
Pedestrian signals provided	-0.149	0.030*	-0.180	0.008**
Walkways are well connected	-0.116	0.093	-0.140	0.041*
Distance of facilities to the neighbourhood				
Green area	-0.024	0.732	-0.230	0.001**
Shops/ stores/ market	-0.046	0.503	0.177	0.009**
Transit stop	-0.175	0.010*	-0.289	0.000**

4.6.2 Correlation between Food consumption with the Urban Environment Feature

Based on Table 4.39, the presence of variety shops, stores, and markets shows a negative correlation with the most frequent food consumption pattern ($r = -0.276$, $p < 0.01$) and the second most frequent food consumption pattern ($r = -0.236$, $p < 0.01$). This implies that in areas where these facilities are abundant, residents may have access to diverse food options but may also have exposure to less healthy food choices, influencing their dietary habits. Conversely, public transport availability shows a negative correlation with the most frequent food consumption ($r = -0.236$, $p < 0.01$) but a positive correlation with the second most frequent food consumption ($r = 0.351$, $p < 0.01$). This could indicate that areas with better public transport networks enable residents to access food sources that are not necessarily within walking distance, potentially improving dietary variety but also increasing exposure to unhealthy food options.

The pedestrian walkway provision does not exhibit a significant correlation with the most frequent food consumption ($r = 0.043$, $p = 0.531$), but it does show a positive relationship with the second most frequent food consumption ($r = 0.011$, $p = 0.873$), though not statistically significant. This suggests that while walkability may not be a primary determinant of food consumption habits, it could play a role in influencing secondary food choices. Interestingly, dedicated bicycle lanes and combined pedestrian and bicycle lanes show weak and insignificant correlations, highlighting that active mobility infrastructure alone may not strongly impact food consumption patterns.

Facilities Convenience, Safety, and Food Consumption

Neighborhood safety indicators, such as perceived safety during daytime and evening walks, show a negative correlation with food consumption habits. Safety during a daytime walk has a negative correlation with the most frequent food consumption ($r = -0.196$, $p < 0.01$) and second most frequent food consumption ($r = -0.218$, $p < 0.01$). Similarly, safety during an evening walk also negatively correlates with the most frequent ($r = -0.204$, $p < 0.01$) and second most frequent ($r = -0.181$, $p < 0.01$) food consumption patterns. These results suggest that in areas perceived as safer, residents may have healthier food consumption habits, possibly due to greater accessibility to diverse and fresh food sources. Pedestrian signals provided and well-connected walkways also show a negative correlation with food consumption, indicating that

better urban infrastructure may be associated with healthier food choices. However, the correlation is stronger for the second most frequent food consumption, implying that these features could influence occasional food purchases more than daily eating habits.

Distance to Facilities and Food Consumption. The distance to shops, stores, and markets is significantly negatively correlated with the most frequent food consumption ($r = -0.196$, $p < 0.01$), suggesting that greater proximity to these amenities leads to increased food purchases. However, transit stop proximity is not significantly correlated with most frequent food consumption but shows a strong negative correlation with the second most frequent food consumption ($r = -0.281$, $p < 0.01$). This suggests that areas with closer transit stops may encourage residents to explore food options further away, affecting their food variety and dietary habits.

This highlight that urban environment quality plays a role in shaping residents' food consumption behaviors. Accessibility to food sources, pedestrian-friendly infrastructure, and neighborhood safety influence how and where residents obtain their food. Areas with well-maintained public transport and commercial establishments may promote diverse food choices, but they also present risks of exposure to unhealthy food options. Meanwhile, walkability and safety perceptions appear to support healthier food consumption habits, reinforcing the need for balanced urban planning that prioritizes both accessibility and health-conscious food environments.

Table 4.39
Correlation Between Food Consumption with The Urban Environment Quality

Urban environment quality	**Most frequent food consumption**		**Second most frequent food consumption**	
	Coefficient (r) value	Significant (p) value	Coefficient (r) value	Significant (p) value
Provision of facilities				
Variety shops/ stores/ market	0.095	0.169	-0.276	0.000**
Public transport	0.050	0.465	-0.236	0.001**
Pedestrian walkway	0.043	0.531	0.351	0.000**
Dedicated bicycle lane	-0.108	0.116	0.011	0.873
Combined (pedestrian walkway and bicycle lane)	-0.126	0.066	0.058	0.399

Facilities convenience and safety in the neighbourhood				
Safe during a day walk	-0.196	0.004**	-0.218	0.001**
Safe during evening walk	-0.204	0.003**	-0.181	0.008**
Pedestrian signals provided	-0.118	0.085	-0.232	0.001**
Walkways are well connected	-0.142	0.038	-0.232	0.001**
Distance of facilities to the neighbourhood				
Shops/ stores/ market	-0.196	0.004**	0.052	0.451
Transit stop	0.033	0.628	-0.281	0.000**

4.6.3 Correlation Between Most and Second Most Frequent Food Consumption and Level Intake of Food

Based on Table 4.40, the correlation analysis between food consumption patterns and dietary intake variables, including sugar, salt, fat, and calorie intake, provides valuable insights into how eating habits impact nutritional intake. The most frequently consumed food shows a negative correlation with the second most frequently consumed food ($r = -0.311$, $p < 0.01$), indicating that individuals tend to prioritize one type of food over another. It is positively correlated with overall food intake ($r = 0.214$, $p = 0.002$), suggesting that those who frequently consume a particular food tend to have a higher total food intake. Additionally, it is significantly correlated with sugar intake ($r = 0.259$, $p < 0.01$), implying that the most frequently consumed foods often contain high sugar content. There is also a weaker correlation with salt intake ($r = 0.132$, $p = 0.055$) and fat intake ($r = 0.142$, $p = 0.038$), indicating a moderate influence on these nutrients. Furthermore, a correlation with calorie intake ($r = 0.175$, $p = 0.011$) suggests that frequently consumed foods contribute to overall caloric intake.

In contrast, the second most frequently consumed food also shows a negative correlation with the primary food choice, reinforcing the idea that individuals do not consume both options frequently. However, its correlation with nutrient intake variables, such as sugar ($r = 0.118$, $p = 0.086$), salt ($r = 0.120$, $p = 0.081$), fat ($r = 0.085$, $p = 0.217$), and calorie intake ($r = 0.182$, $p = 0.008$), is weaker compared to the most frequently consumed food. This suggests that secondary food choices have a lesser

impact on nutrient intake compared to primary dietary habits. The total food intake is strongly correlated with sugar ($r = 0.587$, $p < 0.01$), salt ($r = 0.624$, $p < 0.01$), fat ($r = 0.609$, $p < 0.01$), and calorie intake ($r = 0.606$, $p < 0.01$), indicating that higher food consumption leads to increased intake of these nutrients. These strong correlations highlight the importance of monitoring portion sizes and food choices, as excessive intake is linked to unhealthy dietary patterns.

Overall, the findings suggest that frequent food consumption significantly influences dietary intake, particularly in terms of sugar and calorie intake. High sugar consumption is notably associated with frequent food consumption, indicating that commonly consumed foods often have high sugar content. Meanwhile, calorie intake is linked to both primary and secondary food choices, but the influence is more pronounced for the most frequently consumed food. Salt and fat intake also show moderate correlations with frequent food consumption, though they are more strongly associated with overall food intake. The second most frequently consumed food has a weaker correlation with nutrient intake, highlighting that primary dietary habits play a more significant role in determining nutritional outcomes.

In conclusion, these results emphasize the need for urban environments to promote healthier food choices and access to balanced meals. Encouraging better dietary habits through urban planning, food accessibility improvements, and public health interventions can help reduce excessive intake of unhealthy nutrients. By improving access to healthier food options and educating individuals on proper nutrition, it is possible to support healthier lifestyles and mitigate the risks associated with high sugar, salt, fat, and calorie consumption.

Table 4.40
Correlation Between Most and Second Most Frequent Food Consumption and Level Intake of Food

		Most frequent food consumption	Second most frequent food consumption	Level intake of food	Level intake of sugar	Level intake of salt	Level intake of fat	Level intake of calorie
Most frequent food consumption	Coefficient (r) value	1	-0.311	0.214	0.259	0.132	0.142	0.175
	Significant (p) value		0.000**	0.002	0.000	0.055	0.038	0.011
Second most frequent food consumption	Coefficient (r) value	-0.311	1	0.109	0.118	0.182	0.120	0.085
	Significant (p) value	0.000**		0.114	0.086	0.008	0.081	0.217
Level intake of food	Coefficient (r) value	0.214	0.109	1	0.587	0.624	0.609	0.606
	Significant (p) value	0.002**	0.114		0.000	0.000	0.000	0.000

4.7 Regression Analysis

Multiple linear regression analysis was conducted to examine the influence of urban environment characteristics on physical activity and dietary behaviour. Six separate regression models were estimated, covering moderate and vigorous physical activity (frequency and duration) as well as food consumption patterns. All models included fourteen built environment variables related to land use diversity, pedestrian and cycling infrastructure, safety, connectivity, and accessibility. Prior to analysis, regression assumptions were assessed. Diagnostic checks indicated no serious violations of linearity, homoscedasticity, multicollinearity, or normality of residuals. Variance Inflation Factor (VIF) values were within acceptable limits, suggesting the absence of multicollinearity among predictor variables.

4.7.1 Frequency of Moderate Physical Activity

The regression model for moderate physical activity frequency was statistically significant ($F(16,196) = 1.98$, $p = 0.016$) (Refer Table 4.42). The model explained 13.9% of the variance in moderate physical activity frequency ($R^2 = 0.139$, Adjusted $R^2 = 0.069$) (Refer Table 4.41). Among the predictor variables, perceived safety during evening walk ($\beta = -0.283$, $p = 0.010$) and distance to transit stop ($\beta = 0.383$, $p = 0.001$) (Refer Table 4.43). The remaining urban environment variables did not show significant associations with the frequency of moderate physical activity. The regression results indicate that moderate physical activity frequency is weakly but significantly influenced by selected urban environment characteristics, with the overall explanatory power remaining modest. Only distance to transit stop and perceived safety during evening walk were significant predictors, while most land use and infrastructure variables were not statistically significant.

Table 4.41
Model Summary of Multiple Linear Regression Analysis for Frequency of Moderate Physical Activity

R	R Square	Adjusted R	Std. Error of the Estimate
.373[a]	.139	.069	.63871

Table 4.42
ANOVA Results for Regression Model Predicting Frequency of Moderate Physical Activity

	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.924	16	.808	1.980	.016[b]
Residual	79.959	196	.408		
Total	92.883	212			

Table 4.43
Regression Coefficients for Factors Influencing Frequency of Moderate Activity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	2.368	.575		4.120	.000
Recreational facilities well maintained	.097	.107	.096	.909	.364
Safety during a day walk	-.034	.127	-.035	-.265	.791
Safety during evening walk	-.299	.116	-.283	-2.589	.010
Pedestrian signals provided	.036	.111	.043	.330	.742
Walkways are well connected	.094	.117	.097	.800	.425
Variety of shop	-.050	.116	-.043	-.435	.664
Recreational area	.014	.080	.016	.171	.864
Public transport	-.050	.128	-.035	-.395	.693
Pedestrian walkways	.015	.091	.017	.168	.866
Dedicated bicycle lanes	-.127	.100	-.142	-1.267	.207
Combined bicycle lane and pedestrian walkways	-.009	.098	-.010	-.088	.930
Distance to shops	.039	.116	.042	.337	.737
Distance to recreational area	-.123	.079	-.143	-1.554	.122
Distance to transit stop	.434	.127	.383	3.407	.001

4.7.2 Frequency of Vigorous Physical Activity

The regression model predicting vigorous physical activity frequency was not statistically significant ($F(16,196) = 1.32$, $p = 0.187$) (Refer Table 4.45). The model accounted for 9.7% of the variance in vigorous physical activity frequency ($R^2 = 0.097$, Adjusted $R^2 = 0.024$) (Refer Table 4.44). None of the built environment variables emerged as significant predictors in this model (Refer table 4.46). The regression model

for vigorous physical activity frequency was not statistically significant, indicating that urban environment characteristics did not meaningfully explain how often residents engage in vigorous activities.

Table 4.44
Model Summary of Multiple Linear Regression Analysis for Frequency of Moderate Physical Activity

R	R Square	Adjusted R	Std. Error of the Estimate
.312[a]	.097	.024	.64454

Table 4.45
ANOVA Results for Regression Model Predicting Frequency of Moderate Physical Activity

	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.783	16	.549	1.321	.187[b]
Residual	81.424	196	.415		
Total	90.207	212			

Table 4.46
Regression Coefficients for Factors Influencing Frequency of Moderate Activity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	2.888	.580		4.978	.000
Recreational facilities well maintained	-.069	.108	-.069	-.638	.524
Safety during a day walk	-.169	.128	-.180	-1.317	.189
Safety during evening walk	-.076	.117	-.072	-.649	.517
Pedestrian signals provided	.057	.112	.068	.513	.609
Walkways are well connected	.161	.118	.169	1.365	.174
Variety of shop	-.102	.117	-.088	-.872	.384
Recreational area	-.072	.081	-.084	-.893	.373
Public transport	.089	.129	.062	.687	.493
Pedestrian walkways	.011	.092	.012	.115	.909
Dedicated bicycle lanes	-.196	.101	-.221	-1.931	.055
Combined bicycle lane and pedestrian walkways	.161	.099	.187	1.627	.105

Distance to shops	-.034	.117	-.037	-.292	.770
Distance to recreational area	-.018	.080	-.021	-.226	.821
Distance to transit stop	-.141	.129	-.127	-1.100	.273

4.7.3 Duration of Moderate Physical Activity

The regression model for moderate physical activity duration was statistically significant (F (16,196) = 2.09, p = 0.010) (Refer Table 4.48), explaining 14.6% of the variance in activity duration ($R^2 = 0.146$, Adjusted $R^2 = 0.076$) (Refer Table 4.47). Three variables were found to be statistically significant predictors: recreational facilities that are well maintained ($\beta = 0.217$, $p = 0.041$), perceived safety during evening walk ($\beta = -0.218$, $p = 0.046$), and distance to transit stop ($\beta = 0.248$, $p = 0.028$) (Refer Table 4.49). Other variables did not demonstrate significant effects on moderate physical activity duration. Urban environment characteristics showed a significant but modest influence on the duration of moderate physical activity. Variables related to facility maintenance, safety during evening walking, and accessibility to transit stops were significant predictors.

Table 4.47
Model Summary of Multiple Linear Regression Analysis for Duration of Moderate Physical Activity

R	R Square	Adjusted R	Std. Error of the Estimate
.382[a]	.146	.076	1.06432

Table 4.48
ANOVA Results for Regression Model Predicting Frequency of Moderate Physical Activity

	Sum of Squares	df	Mean Square	F	Sig.
Regression	37.930	16	2.371	2.093	.010[b]
Residual	222.023	196	1.133		
Total	259.953	212			

Table 4.49
Regression Coefficients for Factors Influencing Frequency of Moderate Activity

	Unstandardized Coefficients		**Standardized Coefficients**		
	B	Std. Error	Beta	t	Sig.
Constant	2.468	.958		2.577	.011
Recreational facilities well maintained	.367	.178	.217	2.059	.041
Safety during a day walk	.194	.212	.121	.916	.361
Safety during evening walk	-.386	.193	-.218	-2.004	.046
Pedestrian signals provided	-.194	.184	-.136	-1.055	.293
Walkways are well connected	.039	.195	.024	.198	.844
Variety of shop	.099	.193	.050	.512	.609
Recreational area	-.115	.133	-.079	-.862	.390
Public transport	-.397	.213	-.164	-1.863	.064
Pedestrian walkways	.251	.151	.172	1.659	.099
Dedicated bicycle lanes	-.171	.167	-.114	-1.019	.309
Combined bicycle lane and pedestrian walkways	.008	.163	.006	.052	.959
Distance to shops	.102	.193	.065	.529	.597
Distance to recreational area	-.050	.131	-.035	-.378	.705
Distance to transit stop	.469	.212	.248	2.211	.028

4.7.4 Duration of Vigorous Physical Activity

The regression model for vigorous physical activity duration was statistically significant ($F(16,196) = 6.07$, $p < 0.001$) (Refer Table 4.51). This model explained 33.1% of the variance in vigorous physical activity duration ($R^2 = 0.331$, Adjusted $R^2 = 0.277$) (Refer Table 4.50), representing the highest explanatory power among the physical activity models. Significant predictors included pedestrian signals provided ($\beta = -0.245$, $p = 0.033$), variety of shops ($\beta = -0.175$, $p = 0.047$), availability of recreational areas ($\beta = -0.204$, $p = 0.013$) and distance to transit stop ($\beta = -0.386$, $p < 0.001$) (Refer Table 4.52). This model demonstrated the strongest explanatory power among all physical activity models, indicating that urban environment characteristics play a more substantial role in shaping the duration of vigorous physical activity.

Several accessibilities and land-use-related variables, particularly distance to transit stops, emerged as significant predictors.

Table 4.50
Model Summary of Multiple Linear Regression Analysis for Duration of Moderate Physical Activity

R	R Square	Adjusted R	Std. Error of the Estimate
.576[a]	.331	.277	1.31790

Table 4.51
ANOVA Results for Regression Model Predicting Frequency of Moderate Physical Activity

	Sum of Squares	df	Mean Square	F	Sig.
Regression	168.625	16	10.539	6.068	.000[b]
Residual	340.427	196	1.737		
Total	509.052	212			

Table 4.52
Regression Coefficients for Factors Influencing Frequency of Moderate Activity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	6.375	1.186		5.374	.000
Recreational facilities well maintained	.072	.221	.030	.326	.745
Safety during a day walk	.138	.263	.062	.527	.599
Safety during evening walk	.428	.238	.172	1.793	.075
Pedestrian signals provided	-.489	.228	-.245	-2.143	.033
Walkways are well connected	.121	.242	.053	.498	.619
Variety of shop	-.478	.239	-.175	-2.002	.047
Recreational area	-.414	.165	-.204	-2.507	.013
Public transport	-.083	.264	-.025	-.315	.753
Pedestrian walkways	-.029	.187	-.014	-.152	.879
Dedicated bicycle lanes	-.173	.207	-.082	-.836	.404
Combined bicycle lane and pedestrian walkways	.395	.202	.193	1.954	.052
Distance to shops	.047	.239	.021	.195	.846
Distance to recreational area	-.246	.163	-.122	-1.515	.131

Distance to transit stop	-1.024	.263	-.386	-3.895	.000

4.7.5 Most Frequent Food Consumption

The regression model examining the most frequent food consumption was statistically significant (F (16,196) = 2.59, p = 0.001) (Refer Table 4.54). The model explained 17.5% of the variance in food consumption patterns (R^2 = 0.175, Adjusted R^2 = 0.107) (Refer Table 4.53). Perceived safety during daytime walking was the only variable that showed a statistically significant association with most frequent food consumption (β = −0.362, p = 0.006) (Refer Table 4.55). All other predictors were not statistically significant. The regression model for most frequent food consumption showed limited but significant influence from urban environment characteristics, with perceived safety during daytime walking emerging as the only significant predictor.

Table 4.53
Model Summary of Multiple Linear Regression Analysis for Duration of Moderate Physical Activity

R	R Square	Adjusted R	Std. Error of the Estimate
.418[a]	.175	.107	.72816

Table 4.54
ANOVA Results for Regression Model Predicting Frequency of Moderate Physical Activity

	Sum of Squares	df	Mean Square	F	Sig.
Regression	22.004	16	1.375	2.594	.001[b]
Residual	103.921	196	.530		
Total	125.925	212			

Table 4.55
Regression Coefficients for Factors Influencing Frequency of Moderate Activity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	2.035	.655		3.105	.002

Recreational facilities well maintained	-.056	.122	-.048	-.461	.645
Safety during a day walk	-.403	.145	-.362	-2.774	.006
Safety during evening walk	-.164	.132	-.133	-1.248	.214
Pedestrian signals provided	.179	.126	.181	1.423	.156
Walkways are well connected	-.109	.134	-.097	-.816	.416
Variety of shop	.108	.132	.079	.821	.413
Recreational area	.130	.091	.128	1.421	.157
Public transport	.091	.146	.054	.621	.535
Pedestrian walkways	.161	.104	.158	1.551	.123
Dedicated bicycle lanes	.019	.115	.019	.169	.866
Combined bicycle lane and pedestrian walkways	-.158	.112	-.156	-1.418	.158
Distance to shops	-.042	.132	-.038	-.316	.752
Distance to recreational area	.027	.090	.026	.295	.768
Distance to transit stop	.245	.145	.186	1.685	.094

4.7.6 Second Most Frequent Food Consumption

The regression model for second most frequent food consumption was statistically significant ($F(16,196) = 4.17$, $p < 0.001$) (Refer Table 4.57), accounting for 25.4% of the variance in the outcome variable ($R^2 = 0.254$, Adjusted $R^2 = 0.193$) (Refer Table 4.56). Two variables were identified as significant predictors: pedestrian walkways ($\beta = -0.277$, $p = 0.005$) and distance to transit stop ($\beta = -0.269$, $p = 0.011$) (Refer Table 4.58). The remaining built environment variables did not demonstrate statistically significant relationships with second most frequent food consumption. The second most frequent food consumption model demonstrated moderate explanatory power, with pedestrian walkways and distance to transit stops identified as significant predictors.

Table 4.56
Model Summary of Multiple Linear Regression Analysis for Duration of Moderate Physical Activity

R	R Square	Adjusted R	Std. Error of the Estimate
.504[a]	.254	.193	.89202

Table 4.57
ANOVA Results for Regression Model Predicting Frequency of Moderate Physical Activity

	Sum of Squares	df	Mean Square	F	Sig.
Regression	53.096	16	3.319	4.171	.000[b]
Residual	155.955	196	.796		
Total	209.052	212			

Table 4.58
Regression Coefficients for Factors Influencing Frequency of Moderate Activity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	4.533	.803		5.645	.000
Recreational facilities well maintained	.108	.149	.071	.722	.471
Safety during a day walk	.248	.178	.173	1.393	.165
Safety during evening walk	.034	.161	.021	.210	.834
Pedestrian signals provided	-.234	.154	-.183	-1.513	.132
Walkways are well connected	-.043	.164	-.030	-.265	.791
Variety of shop	-.185	.162	-.105	-1.145	.253
Recreational area	-.136	.112	-.104	-1.216	.226
Public transport	-.092	.178	-.043	-.516	.606
Pedestrian walkways	-.363	.127	-.277	-2.858	.005
Dedicated bicycle lanes	.098	.140	.073	.700	.485
Combined bicycle lane and pedestrian walkways	.196	.137	.150	1.433	.153
Distance to shops	.029	.162	.021	.182	.856
Distance to recreational area	-.044	.110	-.034	-.401	.689
Distance to transit stop	-.458	.178	-.269	-2.573	.011

4.7.7 Relationship between Respondent's background with healthy lifestyle

Multiple linear regression analysis was conducted to examine the relationship between respondents' background characteristics (gender, ethnicity, marital status, BMI, age, and monthly income) and healthy lifestyle indicators, namely physical activity (frequency and duration of moderate and vigorous activity) and dietary behaviour (most frequent and second most frequent food consumption).

4.7.7.1 Frequency of Moderate Physical Activity

A multiple linear regression analysis was conducted to examine the relationship between respondents' background characteristics and the frequency of moderate physical activity. The independent variables included gender, ethnicity, marital status, body mass index (BMI), age, and monthly income. The results indicated that the overall regression model was not statistically significant ($F = 1.442$, $p = .200$) (Refer Table 4.60). The model explained only 4.0% of the variance in the frequency of moderate physical activity ($R^2 = .040$) (Refer Table 4.59), suggesting a weak explanatory power

Despite the non-significant overall model, age emerged as a statistically significant predictor ($\beta = .212$, $p = .013$) (Refer Table 4.61), indicating that older respondents tended to engage more frequently in moderate physical activity. Other background variables, including gender, ethnicity, marital status, BMI, and monthly income, did not show significant relationships with moderate physical activity frequency ($p > .05$) (Refer Table 4.61). These findings suggest that respondents' background characteristics generally have limited influence on the frequency of moderate physical activity, with age being the only notable factor.

Table 4.59
Model Summary of Multiple Linear Regression Analysis for Frequency of Moderate Physical Activity with Respondent's Background

	R	R Square	Adjusted R	Std. Error of the Estimate
	.201[a]	.040	.012	.65781

Table 4.60
ANOVA Results for Regression Model Predicting Frequency of Moderate Physical Activity with Respondent's Background

	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.743	6	.624	1.442	.200[b]
Residual	89.140	206	.433		
Total	92.883	212			

Table 4.61
Regression Coefficients for Factors Influencing Frequency of Moderate Activity

	Unstandardized Coefficients		**Standardized Coefficients**		
	B	Std. Error	Beta	t	Sig.
Constant	1.501	.275		5.454	.000
Gender	.045	.094	.034	.481	.631
Ethnic	.015	.060	.018	.253	.800
Marital status	-.071	.072	-.081	-.978	.329
BMI	-.086	.061	-.099	-1.408	.161
Age	.107	.043	.212	2.504	.013
Monthly income	-.020	.018	-.084	-1.128	.261

4.7.7.2 Frequency of Vigorous Physical Activity

Multiple linear regression analysis was also performed to assess the association between respondents' background characteristics and the frequency of vigorous physical activity. The results showed that the regression model was statistically significant ($F = 5.642$, $p < .001$) (Refer Table 4.63), explaining 14.1% of the variance in vigorous physical activity frequency ($R^2 = .141$) (Refer Table 4.62).

Among the independent variables, gender and age were found to be significant predictors. Gender demonstrated a significant negative relationship with vigorous physical activity frequency ($\beta = -.140$, $p = .037$) (Refer Table 4.64), indicating differences in participation levels between male and female respondents. Age was also negatively associated with vigorous physical activity frequency ($\beta = -.316$, $p < .001$) (Refer Table 4.64), suggesting that younger respondents were more likely to engage in vigorous physical activities. Ethnicity, marital status, BMI, and monthly income were not statistically significant predictors. Overall, these results indicate that demographic factors, particularly age and gender, play an important role in influencing vigorous physical activity behaviour.

Table 4.62
Model Summary of Multiple Linear Regression Analysis for Frequency of Vigorous Physical Activity with Respondent's Background

R	R Square	Adjusted R	Std. Error of the Estimate
.376[a]	.141	.116	.61326

Table 4.63
ANOVA Results for Regression Model Predicting Frequency of Vigorous Physical Activity with Respondent's Background

	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.732	6	2.122	5.642	.000[b]
Residual	77.475	206	.376		
Total	90.207	212			

Table 4.64
Regression Coefficients for Factors Influencing Frequency of Vigorous Activity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	2.542	.257		9.906	.000
Gender	-.184	.088	-.140	-2.095	.037
Ethnic	-.008	.056	-.009	-.139	.890
Marital status	-.078	.067	-.090	-1.149	.252
BMI	.015	.057	.018	.268	.789
Age	-.158	.040	-.316	-3.953	.000
Monthly income	.023	.016	.099	1.406	.161

4.7.7.3 Duration of Moderate Physical Activity

To further examine physical activity behaviour, a multiple linear regression analysis was conducted to determine the influence of respondents' background characteristics on the duration of moderate physical activity. The regression model was statistically significant ($F = 2.254$, $p = .040$) (Refer Table 4.66), although the proportion of variance explained by the model was relatively small ($R^2 = .062$) (Refer Table 4.65). The findings revealed that gender ($\beta = .187$, $p = .008$) and age ($\beta = .189$, $p = .025$) (Refer Table 4.67) were significant predictors of the duration of moderate physical activity.

This suggests that both gender differences and increasing age are associated with longer durations of moderate physical activity. In contrast, ethnicity, marital status, BMI, and monthly income did not show significant relationships with activity duration. These results indicate that while background characteristics contribute modestly to explaining moderate physical activity duration, gender and age remain important influencing factors.

Table 4.65
Model Summary of Multiple Linear Regression Analysis for Duration of Moderate Physical Activity with Respondent's Background

R	R Square	Adjusted R	Std. Error of the Estimate
.248[a]	.062	.034	1.08819

Table 4.66
ANOVA Results for Regression Model Predicting Duration of Moderate Physical Activity with Respondent's Background

	Sum of Squares	df	Mean Square	F	Sig.
Regression	16.017	6	2.669	2.254	.040[b]
Residual	243.936	206	1.184		
Total	259.953	212			

Table 4.67
Regression Coefficients for Factors Influencing Duration of Moderate Activity

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	1.103	.455		2.423	.016
Gender	.417	.156	.187	2.680	.008
Ethnic	.077	.100	.053	.773	.441
Marital status	-.135	.120	-.092	-1.125	.262
BMI	-.038	.102	-.026	-.371	.711
Age	.160	.071	.189	2.264	.025
Monthly income	-.042	.029	-.107	-1.452	.148

4.7.7.4 Duration of Vigorous Physical Activity

A multiple linear regression analysis was carried out to assess the relationship between respondents' background characteristics and the duration of vigorous physical activity. The results demonstrated a statistically significant regression model ($F = 19.294$, $p < .001$) (Refer Table 4.69), with the model explaining a substantial 36.0% of the variance in vigorous physical activity duration ($R^2 = .360$) (Refer Table 4.68). Several background variables were identified as significant predictors. Gender was negatively associated with vigorous activity duration ($\beta = -.239$, $p < .001$), while marital status also showed a significant negative relationship ($\beta = -.165$, $p = .016$). BMI was positively related to the duration of vigorous physical activity ($\beta = .158$, $p = .006$) (Refer Table 4.70), indicating that respondents with higher BMI tended to engage in longer durations of vigorous activity. Age emerged as the strongest predictor, showing a significant negative association ($\beta = -.454$, $p < .001$) (Refer Table 4.70), suggesting that younger respondents participated in vigorous physical activity for longer periods. These findings highlight the strong influence of socio-demographic characteristics on vigorous physical activity behaviour.

Table 4.68
Model Summary of Multiple Linear Regression Analysis for Duration of Vigorous Physical Activity with Respondent's Background

R	R Square	Adjusted R	Std. Error of the Estimate
.600[a]	.360	.341	1.25781

Table 4.69
ANOVA Results for Regression Model Predicting Duration of Vigorous Physical Activity with Respondent's Background

	Sum of Squares	df	Mean Square	F	Sig.
Regression	183.143	6	30.524	19.294	.000[b]
Residual	325.908	206	1.582		
Total	509.052	212			

Table 4.70
Regression Coefficients for Factors Influencing Duration of Vigorous Physical Activity

	Unstandardized Coefficients		**Standardized Coefficients**		
	B	Std. Error	Beta	t	Sig.
Constant	5.680	.526		10.791	.000
Gender	-.746	.180	-.239	-4.147	.000
Ethnic	-.092	.115	-.045	-.802	.424
Marital status	-.337	.138	-.165	-2.438	.016
BMI	.323	.117	.158	2.751	.006
Age	-.538	.082	-.454	-6.569	.000
Monthly income	-.010	.034	-.017	-.285	.776

4.7.7.5 Most frequent food consumption

Multiple linear regression analysis was conducted to examine the relationship between respondents' background characteristics and their most frequent food consumption. The regression model was statistically significant ($F = 2.447$, $p = .026$) (Refer Table 4.72) and accounted for 6.7% of the variance in dietary behaviour ($R^2 = .067$) (Refer Table 4.71). The analysis revealed that marital status ($\beta = .183$, $p = .027$) and BMI ($\beta = -.154$, $p = .027$) (Refer Table 4.73) were significant predictors of most frequent food consumption. This suggests that dietary choices vary according to marital status, and that respondents with higher BMI tended to report different patterns of food consumption. Other background variables, including gender, ethnicity, age, and monthly income, were not statistically significant. Overall, the findings indicate that background characteristics have a limited but meaningful influence on primary dietary patterns.

Table 4.71
Model Summary of Multiple Linear Regression Analysis for Most Frequent Food Consumption with Respondent's Background

R	**R Square**	**Adjusted R**	**Std. Error of the Estimate**
.258[a]	.067	.039	.75539

Table 4.72
ANOVA results for regression model predicting Most frequent food consumption with Respondent's Background

	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.379	6	1.396	2.447	.026[b]
Residual	117.546	206	.571		
Total	125.925	212			

Table 4.73
Regression coefficients for factors influencing Most frequent food consumption

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	1.702	.316		5.383	.000
Gender	-.086	.108	-.055	-.793	.429
Ethnic	.050	.069	.050	.726	.468
Marital status	.185	.083	.183	2.230	.027
BMI	-.157	.071	-.154	-2.224	.027
Age	-.038	.049	-.065	-.776	.439
Monthly income	-.031	.020	-.114	-1.556	.121

4.7.7.6 Second most frequent food consumption

Finally, a multiple linear regression analysis was performed to assess the influence of respondents' background characteristics on second most frequent food consumption. The results indicated that the regression model was statistically significant ($F = 5.561$, $p < .001$) (Refer Table 4.75), explaining 13.9% of the variance in dietary behaviour ($R^2 = .139$) (Refer Table 4.74). BMI ($\beta = .156$, $p = .020$) and age ($\beta = -.282$, $p = .001$) (Refer Table 4.76) emerged as significant predictors. The negative relationship with age suggests that younger respondents reported greater diversity or variation in their secondary food choices, while BMI was positively associated with second most frequent food consumption. Gender, ethnicity, marital status, and monthly income were not statistically significant predictors. These results suggest that age and BMI are important determinants of dietary behaviour beyond primary food choices.

Table 4.74
Model Summary of Multiple Linear Regression Analysis for Second Most Frequent Food Consumption with Respondent's Background

R	R Square	Adjusted R	Std. Error of the Estimate
.373[a]	.139	.114	.93453

Table 4.75
ANOVA Results for Regression Model Predicting Second Most Frequent Food Consumption with Respondent's Background

	Sum of Squares	df	Mean Square	F	Sig.
Regression	29.142	6	4.857	5.561	.000[b]
Residual	179.909	206	.873		
Total	209.052	212			

Table 4.76
Regression Coefficients for Factors Influencing Second Most Frequent Food Consumption

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	2.797	.391		7.151	.000
Gender	-.246	.134	-.123	-1.841	.067
Ethnic	.119	.086	.091	1.385	.167
Marital status	-.126	.103	-.096	-1.227	.221
BMI	.204	.087	.156	2.337	.020
Age	-.215	.061	-.282	-3.527	.001
Monthly income	-.011	.025	-.030	-.426	.671

4.8 Expert Interview Findings

4.8.1 Theme 1: Influence of Urban Land Use Planning on Accessibility and Daily Living

This theme examines how land use planning decisions shape residents' mobility patterns, access to facilities, and everyday practices.

4.8.1.1 Accessibility and connectivity Constraints

Experts highlighted that unplanned land use patterns and contemporary urban layouts such as gated communities, fragmented road networks, roundabouts, and U-turn systems reduce functional accessibility. Although facilities may be geographically close, poor connectivity discourages walking and limits residents' ability to access neighbourhood amenities, thereby constraining opportunities for physical activity.

4.8.1.2 Loss of Informal and Traditional Uses of Space

Historically, residents in areas such as Petaling Jaya flats utilised surrounding open spaces for small-scale food cultivation (e.g., curry leaves and lemongrass). However, current planning practices characterised by gated developments and privatised land restrict such activities. This shift reflects the loss of community-based practices that previously supported food security, social interaction, and healthier lifestyles.

4.8.1.3 Role of Planning Authorities and Governance

Local authorities and town planners play a critical role in shaping land use outcomes. Experts emphasised that effective land use planning is fundamental to ensuring safety, family well-being, and public health. Nevertheless, planning decisions are often influenced by economic considerations, as development projects generate revenue for local and state governments, which may affect land allocation and planning priorities.

4.8.2 Theme 2: Urban Lifestyle, Health Behaviour and Non- Communicable Diseases

This theme explores the interaction between urban living conditions, lifestyle behaviours, and health outcomes.

4.8.2.1 Time Constraints, Sedentary Behaviour and Dietary Practices

Urban residents experience significant time poverty, largely driven by long working hours and extended commuting times. Consequently, participation in physical activity and healthy meal preparation is limited. Experts noted a strong reliance on ready-made or fast food, often driven by convenience and prevailing neighbourhood norms, with home-cooked meals increasingly confined to evenings or weekends.

4.8.2.2 Health Outcomes and Disease Patterns

The combined effects of sedentary lifestyles and unhealthy dietary practices contribute to a higher prevalence of non-communicable diseases (NCDs), including hypertension, cardiovascular disease, stress-related conditions, and diabetes. Regular medical check-ups are common among urban residents, particularly in Petaling Jaya, reflecting heightened exposure to and awareness of these health risks.

4.8.2.3 Housing Type and Dietary Behaviour

Experts observed that residents of high-rise housing, such as low-cost flats, apartments, and service apartments, are more likely to purchase food from outside sources compared to those living in landed or terraced housing. This housing-related behavioural pattern influences dietary quality and reinforces unhealthy eating practices in dense urban environments.

4.8.3 Theme 3: Environmental Conditions and Public Health Risks

This theme addresses how environmental quality shaped by land use planning influences public health.

4.8.3.1 Urban Form, Air Quality and Microclimate

High vehicle density and intensive high-rise development contribute to the urban heat island effect, reduced air circulation, and increased humidity. Experts associated these conditions with adverse environmental health outcomes and heightened physical stress among urban residents.

4.8.3.2 Waste Management, Pest Infestation and Disease Risk

In areas with extensive food preparation activities and inadequate waste management particularly in low-cost flats experts reported increased pest infestations, including flies, cockroaches, rats, and ants. Such conditions elevate the risk of vector-borne diseases and may transform neighbourhoods into outbreak-prone areas.

4.8.4 Theme 4: Safety, Security and Constraints on Physical Activity

This theme highlights safety and security as critical determinants of residents' mobility and physical activity.

4.8.4.1 Perceived Safety and Mobility

Residents expressed concerns related to road safety, crime, theft, and overall neighbourhood security. These safety concerns discourage outdoor activities such as walking and cycling, even when facilities are available within the neighbourhood.

4.8.4.2 Children's Independent Mobility

Safety concerns significantly restrict children's freedom to play outdoors or access recreational spaces independently. Parents often feel compelled to accompany their children, which further limits opportunities for physical activity due to adults' competing time commitments.

4.8.5 Theme 5: Socio- Economic Influences on Healthy Lifestyle Choices

This theme examines how socio-economic factors intersect with land use planning to shape lifestyle behaviours.

4.8.5.1 Cost of Living and Food Choices

The high cost of living encourages residents to prioritise affordability in food consumption, often leading to the selection of cheaper and less nutritious outside food options. Economic pressure thus reinforces unhealthy dietary behaviours, particularly among urban households.

4.8.5.2 Income- Based Lifestyle Differences

Experts noted variations in lifestyle practices across income groups (B40, M40, and higher-income households). Lower-income groups tend to rely more on available or reused resources, whereas higher-income groups possess greater capacity to engage in health-promoting activities and access healthier food options.

4.8.6 Theme 6: Integrated and Health- Oriented Urban Planning

This theme synthesises expert recommendations for future planning practice.

4.8.6.1 Inter- Agency Collaboration

Experts strongly emphasised the need for collaboration between town planners, architects, and environmental health authorities to ensure that health considerations are systematically embedded in land use planning decisions.

4.8.6.2 Designing Urban Environments for Health

Urban planning should proactively address both communicable and non-communicable diseases. This includes designing buildings and neighbourhoods that

prevent water stagnation (thereby reducing dengue risk), promote adequate ventilation, and support active lifestyles.

4.8.6.3 Creating Healthy and Safe Living Environments

Ultimately, effective land use planning should aim to create urban environments that are safe, accessible, and supportive of healthy lifestyles, thereby enhancing residents' overall well-being and quality of life.

4.9 Chapter Summary

This chapter presented the results and analysis of the data collected to examine the relationships between urban environment features, physical activity, and healthy dietary behaviour within the study area. The findings were organised in accordance with the research objectives and the analytical framework outlined in Chapter 3. The chapter began with a descriptive analysis of respondents' socio-demographic characteristics, providing an overview of the study sample. This was followed by descriptive analyses of respondents' perceptions of urban environment features, physical activity patterns, and dietary behaviours. A weighted scoring index was then applied to assess and compare urban environment conditions across different neighbourhood sections. Observational findings were presented to complement the survey results and to provide objective insights into the actual physical characteristics of the study areas. Inferential statistical analyses, including correlation and multiple regression, were subsequently conducted to examine the strength, direction, and predictive relationships between urban environment features and healthy lifestyle behaviours. These analyses identified key environmental factors associated with variations in physical activity levels and dietary behaviour among residents. Overall, the results provide empirical evidence supporting the role of urban land use planning in shaping healthy lifestyle behaviours. The findings form the basis for in-depth interpretation and discussion in the subsequent chapter, where the results are contextualised within existing literature and used to refine the proposed framework of urban land use planning for a healthy lifestyle.

CHAPTER 5
DISCUSSION

5.1 Introduction

This chapter discusses and interprets the key findings of the study presented in Chapter 4, with reference to the research objectives, research questions, and the conceptual framework underpinning the study. Rather than restating the results, this chapter aims to explain the meaning and implications of the findings by situating them within the context of existing theories, empirical literature, and urban land use planning practice. Particular emphasis is placed on understanding how urban built environment characteristics influence healthy lifestyle behaviours, specifically physical activity and dietary practices, within urban residential settings.

The discussion is structured around the main analytical components of the study. First, findings related to residents' perceptions of the urban built environment are interpreted alongside observational evidence to identify areas of convergence and divergence between perceived and objectively measured neighbourhood characteristics. This triangulation approach strengthens the validity of the findings and provides a more comprehensive understanding of the urban environment–health relationship. The discussion then considers how these built environment attributes are associated with physical activity and dietary behaviours, drawing comparisons with previous studies conducted in both international and Malaysian contexts.

Subsequently, the results of the correlation and regression analyses are discussed to explain the nature and strength of relationships between urban built environment variables and healthy lifestyle outcomes. Significant predictors identified in the regression models are examined in detail to highlight the role of specific land use planning and urban design factors in shaping residents' health-related behaviours. Where findings are inconsistent with existing literature, possible contextual, cultural, and methodological explanations are explored.

Finally, this chapter synthesises the overall findings to demonstrate how the study addresses the identified research gaps and contributes to theoretical and practical understanding of urban land use planning for healthy lifestyles. The implications of the

findings for urban planning policy, neighbourhood design, and public health interventions are also discussed. This chapter provides the foundation for Chapter 6, which presents the study's conclusions, recommendations, and directions for future research.

5.2 Integrated Perspectives on the Urban Environment: Evidence from Observation, Respondent's Perception and Expert Interview

The triangulation of respondents' perceptions, field observations, and expert interview insights reveals a nuanced understanding of how urban environment features and land use configurations are experienced, interpreted, and shaped through planning decisions. Three distinct patterns emerge: convergent, divergent, and complementary relationships between the data sources.

5.2.1 Convergent Triangulation: Clear Physical Legibility

In areas such as SS2 and Section 8, strong convergence is observed across all three data sources. In SS2, residents' positive perceptions of accessibility and convenience correspond closely with observational evidence of dense mixed-use development and continuous pedestrian infrastructure. Expert interview findings further reinforce this alignment, emphasising that well-integrated mixed-use planning enhances functional accessibility when supported by coherent connectivity.

Conversely, Section 8 demonstrates negative convergence. Residents' low perception scores align with observed industrial dominance, limited pedestrian facilities, and poor walkability. Experts explicitly linked such environments to economic-driven land use decisions that deprioritise liveability and pedestrian needs. These convergent findings suggest that when urban form is either strongly supportive or strongly constrained, residents' perceptions tend to accurately reflect physical conditions, and expert assessments confirm the structural nature of these environments.

5.2.2 Largely Convergent Triangulation

Section 21 demonstrates a largely convergent pattern between respondents' perceptions, field observations, and expert interview insights, although with minor limitations related to green space provision. Respondents in this section reported moderate levels of facility provision alongside high scores for convenience, safety, and accessibility. These perceptions are largely supported by observational findings, which identified a clearly defined commercial core within the section, with pedestrian walkways concentrated around retail and service areas.

Expert interview findings help to contextualise this convergence by highlighting that commercial clustering within neighbourhood centres often enhances perceived accessibility and daily convenience, even when other urban amenities such as internal green spaces are limited. Experts noted that residents tend to prioritise ease of access to essential services (e.g., shops, food outlets, and services) in their evaluation of neighbourhood convenience, which aligns with the perception patterns observed in Section 21.

However, observations also revealed that pedestrian infrastructure is unevenly distributed and that green spaces are relatively limited within residential areas. These shortcomings prevent full convergence across all environmental dimensions. As a result, Section 21 is classified as largely convergent rather than fully convergent, as residents' positive perceptions align with the functional commercial integration of the area, while certain spatial and environmental limitations remain underrepresented in perception.

5.2.3 Divergent Triangulation: Perceived Convenience Versus Physical Barriers

A notable divergence emerges in Section 9 and SS9, where residents report very high levels of convenience, safety, and accessibility despite observational evidence of fragmented pedestrian networks, limited internal facilities, and significant road-crossing barriers. Expert interview findings provide critical explanatory depth for this mismatch.

Experts consistently highlighted that contemporary urban layouts characterised by car-oriented road hierarchies, gated developments, and fragmented connectivity create environments that function adequately for vehicle users while remaining hostile

to pedestrian movement. As a result, residents may perceive their environment as convenient due to habitual car use and familiarity, even though physical conditions constrain non-motorised mobility. This triangulation reveals that positive perception does not necessarily indicate supportive urban form but may instead reflect behavioural adaptation to structural limitations.

5.2.4 Complementary Triangulation: Spatial Distribution and Functional Accessibility

In Section 3 and SS4, the triangulation reveals complementary relationships rather than direct agreement or contradiction. In Section 3, residents acknowledge high facility provision but report lower accessibility, which corresponds with observations showing green spaces clustered around specific nodes. Expert insights clarify that uneven spatial distribution and gated layouts reduce functional accessibility, even when facilities are present.

Similarly, in SS4, residents' perception of accessibility is supported by proximity to public transport and adjacent commercial areas. However, observations highlight traffic dominance and limited internal land use integration. Experts explain that transport infrastructure often compensates for weak local urban design, shaping perception without resolving underlying spatial constraints. These complementary findings illustrate how perception and observation capture different dimensions of accessibility, with expert insights bridging these perspectives.

Taken together, the triangulation demonstrates that residents' perceptions are shaped by a combination of physical environment characteristics, habitual movement patterns, and broader planning structures. Expert interview findings play a critical role in interpreting inconsistencies and partial alignments, revealing how land use decisions, governance priorities, and urban design principles influence both observed conditions and perceived experience. This integrated understanding provides a robust foundation for subsequent analyses that examine statistical relationships between urban environment features and behavioural outcomes.

Table 5.1
Triangulation of Respondent's Perceptions, Observational Findings and Expert Insights on Urban Environment and Land Use Characteristics

Section	Respondents' Perception	Observation Findings	Expert Interview Insights (Urban Features / Land Use)	Triangulation Outcome
Section 3	Highest facility provision; high convenience and safety; lower accessibility due to limited proximity to green spaces	Strong commercial presence; continuous pedestrian infrastructure; green spaces concentrated around sports facilities	Experts noted that facilities may exist, but poor spatial distribution and gated layouts reduce functional accessibility, particularly for walking	**Complementary: P**erception and observation align on provision; expert insights explain accessibility limitations as a planning and connectivity issue
Section 9	Very high scores for provision, convenience, safety, and accessibility	Limited internal facilities; fragmented pedestrian network; major road crossings required	Experts highlighted that modern road hierarchies, car-oriented layouts, and fragmented connectivity reduce walkability despite perceived convenience	**Divergent: E**xpert insights explain why positive perceptions coexist with physically constrained environments
SS9	High provision, convenience, safety, and accessibility	Industrial–residential interface; limited green spaces; discontinuous walkways	Experts emphasised that mixed industrial residential zoning without pedestrian integration creates environments that appear convenient but are functionally restrictive	**Divergent: E**xpert views reveal structural land use conflicts not fully perceived by residents
SS2	Moderate provision; high accessibility; moderate convenience and safety	Dense mixed-use development; shops, eateries, and parks within walking distance	Experts consistently supported mixed-use planning as enhancing accessibility and daily convenience when connectivity is continuous	**Convergent:** Perception, observation, and expert opinion align

Section 21	Moderate provision; high convenience, safety, and accessibility	Central commercial core; pedestrian infrastructure mainly near shops; limited green spaces	Experts noted that commercial clustering improves perceived convenience, even when open space provision is limited	**Largely convergent: E**xpert insights reinforce perception shaped by commercial proximity
SS4	Moderate provision and convenience; high safety; strong accessibility	Residential area with nearby commercial centres; LRT access; heavy traffic	Experts highlighted reliance on transport infrastructure to compensate for weak local land use integration	**Complementary: E**xpert insights clarify transport-led accessibility rather than walkable design
SS8	Lowest scores across provision, safety, and accessibility	Industrial-dominated land use; poor pedestrian infrastructure; low walkability	Experts strongly associated industrial zoning and economic-driven planning priorities with reduced liveability and accessibility	**Convergent: A**ll three data sources indicate structurally weak urban form

5.3 Urban Environment Features and Physical Activity

5.3.1 Differential Influence of Urban Environment on Moderate and Vigorous Physical Activity

The triangulated analysis of correlation results, regression models, and expert interview findings reveals a clear distinction between moderate- and vigorous-intensity physical activity in relation to urban environment features. While moderate physical activity demonstrates modest but consistent associations with selected environmental characteristics, vigorous physical activity appears to be weakly or inconsistently related to neighbourhood-level urban form.

Correlation results show that moderate physical activity is positively associated with aspects of accessibility and quality, particularly proximity to transit stops, pedestrian infrastructure, and facility maintenance. These relationships are reinforced in the regression models, where distance to transit stops emerges as a significant predictor of both the frequency and duration of moderate physical activity. Expert interview findings provide strong contextual support, highlighting that residents often integrate moderate activities such as walking into daily routines linked to commuting and errands, especially when transit access is within reasonable distance.

In contrast, vigorous physical activity exhibits predominantly negative or non-significant correlations with most urban environment variables. Regression analysis confirms this pattern, with the frequency model failing to achieve statistical significance and the duration model showing negative associations with facility provision and accessibility variables, particularly distance to transit stops. Experts consistently attributed vigorous physical activity to time availability, occupational demands, and lifestyle constraints, rather than neighbourhood design. This convergence across data sources suggests that vigorous physical activity is less dependent on local urban form and more influenced by individual schedules and external facilities such as gyms or organised sports venues.

5.3.2 Role of Accessibility and Transit- Oriented Environments

Distance to transit stops emerges as one of the most consistent and influential variables across analyses. The positive relationship with moderate physical activity

suggests that residents engage in more walking when transit access requires short-distance travel. However, the negative association with vigorous physical activity duration indicates that transit-oriented environments may prioritise functional mobility over high-intensity exercise.

Expert interviews contextualise this duality by highlighting long commuting times and time poverty in urban settings such as Petaling Jaya. Residents who rely heavily on transit may accumulate moderate physical activity through daily movement but lack sufficient discretionary time or energy for vigorous exercise. This triangulation underscores the structuring role of transport infrastructure in shaping activity intensity rather than overall participation.

5.3.3 Safety, Perception and Activity Duration

Safety particularly during evening hours shows a complex relationship with physical activity. Although correlations are generally weak, regression results indicate that perceived safety during evening walks is a significant negative predictor of both the frequency and duration of moderate physical activity. Expert findings strongly reinforce this result, identifying road safety, crime concerns, and parental restrictions as key deterrents to outdoor activity.

This triangulation suggests that even when facilities and infrastructure are present, perceived safety constrains actual use, especially during non-daytime hours. The findings indicate that safety operates as a threshold factor: its absence discourages participation, but its presence alone does not guarantee increased activity.

5.3.4 Facility Provision Versus Functional Usability

Across both correlation and regression analyses, the general provision of facilities such as green spaces, recreational areas, and shops shows limited or negative associations with physical activity, particularly at higher intensities. Expert interviews provide a critical explanation, emphasising that facilities are often poorly connected, gated, or embedded within car-oriented layouts, reducing their functional usability.

The convergence of quantitative and qualitative findings reinforces the argument that facility availability without integration and accessibility does not

translate into active behaviour. This distinction between nominal provision and practical usability is a key contribution of the triangulated analysis.

Overall, the triangulated findings indicate that moderate physical activity is modestly influenced by selected urban environment characteristics, particularly accessibility, proximity to transit facilities, and the quality and maintenance of neighbourhood infrastructure. In contrast, vigorous physical activity shows a weak association with neighbourhood-level urban environment features and appears to be more strongly shaped by individual lifestyle factors and time constraints. The findings further suggest that safety and connectivity function primarily as enabling or constraining conditions rather than as direct motivators of physical activity participation. Importantly, insights from the expert interviews play a critical role in contextualising the quantitative results, helping to explain why statistically significant relationships between urban environment features and physical activity outcomes are generally modest in strength. Collectively, these integrated findings provide a robust foundation for interpreting the role of urban land use planning in shaping physical activity patterns and justify the limited explanatory power observed in the regression models.

Table 5.2
Triangulation of Correlation, Regression and Expert Insights on Urban Environment Factors Influencing Physical Activity

Key Urban Environment Factor	Correlation Findings	Regression Findings	Expert Interview Interpretation	Triangulation Outcome
Distance to Transit Stops	Moderate PA: positive correlation with frequency and duration; Vigorous PA: negative correlation with duration	Significant predictor for frequency and duration of moderate PA (+); strongest negative predictor for duration of vigorous PA (–)	Experts noted long commuting time, time poverty, and reliance on motorised transport shaping activity patterns	**Strong convergence:** accessibility to transit structures activity type and intensity
Pedestrian Infrastructure (walkways, signals)	Moderate PA: weak positive association with duration; Vigorous PA: negative associations	Not significant for frequency; pedestrian signals negatively predict vigorous PA duration	Experts highlighted fragmented walkways, safety concerns, and car-oriented road design	**Complementary:** infrastructure quality affects duration and intensity differently
Safety (especially evening safety)	Moderate PA: weak or non-significant correlations; Vigorous PA: negative correlations	Significant negative predictor for frequency and duration of moderate PA	Experts emphasised safety concerns as a major constraint on outdoor activity	**Convergent (interpretive):** perceived safety constrains participation despite availability
Facility Provision (green areas, shops, recreation)	Mostly weak or negative correlations, especially for vigorous PA	Generally non-significant predictors; some negative predictors for vigorous PA duration	Experts noted facilities exist but are poorly connected or time-inaccessible	**Convergent:** availability alone does not promote activity
Facility Maintenance	Positive correlation with duration of moderate PA	Significant positive predictor for duration of moderate PA	Experts linked maintenance to usability and perceived comfort	**Strong convergence**
Vigorous Physical Activity Overall	Mostly negative or weak associations with neighbourhood features	Frequency model not significant; duration model strongest but with negative predictors	Experts stressed time constraints and lifestyle factors dominate vigorous activity	**Convergent:** vigorous PA occurs outside neighbourhood context

5.4 Urban Environment Features and Food Consumption Behaviour

The triangulation of correlation analysis, regression modelling, and expert interview findings demonstrates that urban environment features influence food consumption patterns indirectly and unevenly, mediated by accessibility, safety, and individual socio-demographic characteristics. Unlike physical activity, food consumption behaviour appears to be shaped by both environmental exposure and lifestyle constraints, rather than by infrastructure provision alone.

Correlation results indicate that the availability of shops, stores, and markets is negatively associated with both the most frequent and second most frequent food consumption patterns. While this may initially appear counterintuitive, expert interview findings help to interpret this relationship by highlighting that dense commercial environments often increase exposure to convenience food, fast food, and eating outside the home. As a result, greater availability does not necessarily translate into healthier or more balanced dietary habits.

5.4.1 Accessibility, mobility and Food Choice Geography

Public transport accessibility demonstrates a mixed relationship with food consumption. The negative correlation with most frequent food consumption and positive correlation with second most frequent food consumption suggest that transport infrastructure expands residents' food choice geography, enabling access to food sources beyond the immediate neighbourhood. Experts confirmed that improved mobility allows residents to obtain food from distant locations, particularly due to time constraints and commuting patterns. This complementary triangulation suggests that transport access influences where food is obtained, rather than how often residents eat.

Distance-related variables further reinforce this interpretation. Proximity to shops is associated with higher frequent food consumption, while proximity to transit stops affects secondary food choices. Expert insights indicate that these patterns reflect time poverty, where residents prioritise convenience and affordability over nutritional considerations.

5.4.2 Safety as a Consistent Environmental Influence

Safety-related variables emerge as some of the most consistent environmental correlates of food consumption. Negative correlations between perceived safety (during both day and evening walks) and food consumption patterns suggest that safer neighbourhoods are associated with more controlled or healthier eating habits. Expert interviews strongly support this finding, noting that concerns over crime and road safety discourage residents from accessing neighbourhood food outlets, particularly during evening hours.

This triangulation indicates that safety functions as a gatekeeping condition for food access. Even where food outlets are available, perceived insecurity limits residents' willingness to engage with their surrounding food environment.

5.4.3 Walkability and Active Mobility Infrastructure

Pedestrian walkways, bicycle lanes, and combined infrastructure show weak and statistically non-significant correlations with food consumption patterns. Expert interview findings clarify that while walkability supports access, it does not directly shape food choice decisions. Instead, food consumption is more strongly influenced by convenience, affordability, and cultural norms. This convergence suggests that active mobility infrastructure alone is insufficient to alter dietary behaviour without complementary food environment planning.

5.4.4 Nutritional Intake and Food Consumption Patterns

Correlation analysis between food consumption patterns and nutrient intake reveals that most frequent food consumption is strongly associated with higher sugar and calorie intake, while total food intake is strongly correlated with sugar, salt, fat, and calorie consumption. Expert interviews contextualise these findings by highlighting reliance on ready-made food, fast food, and eating outside the home, particularly among urban residents living in high-rise housing.

The weaker association between secondary food consumption and nutrient intake suggests that primary dietary habits play a dominant role in shaping nutritional

outcomes, reinforcing the importance of targeting everyday food environments rather than occasional consumption.

5.4.5 Role of Socio- Demographic Factors

Regression results indicate that BMI, age, and marital status are significant predictors of food consumption patterns, while income and ethnicity are not. Expert interview findings align with this result, emphasising that lifestyle stage, household structure, and housing type influence food preparation practices and eating behaviour. This convergence underscores that urban environment effects on diet are mediated by individual characteristics, explaining the modest explanatory power of the regression models.

Overall, the triangulated findings indicate that urban environment features influence food consumption primarily through exposure, accessibility, and safety, rather than through infrastructure provision alone. While dense commercial environments and transport accessibility expand food choices, they also increase exposure to unhealthy food options. Safety consistently shapes residents' engagement with neighbourhood food environments, while socio-demographic factors mediate how environmental opportunities are translated into actual dietary behaviour.

These integrated findings justify the modest statistical associations observed in the regression models and highlight the importance of integrated urban planning approaches that align food environments, safety, accessibility, and socio-economic realities to support healthier dietary patterns.

Table 5.3
Triangulation of Correlation, Regression and Expert Insights on Urban Environment Factors Influencing Dietary Behaviour

Urban Environment Dimension	Correlation Findings (Food Consumption)	Regression Findings (Background Factors)	Expert Interview Insights	Triangulation Outcome
Availability of Shops, Stores, and Markets	Negative correlation with most and second most frequent food consumption	Not directly significant; BMI and marital status significant	Experts noted high exposure to outside and convenience food in dense urban areas	**Convergent:** availability increases exposure but not necessarily healthy intake
Public Transport Accessibility	Mixed correlations: negative with most frequent, positive with second most frequent food consumption	Not a direct predictor	Experts highlighted mobility enabling access to wider food environments	**Complementary:** transport expands food choice geography
Pedestrian Infrastructure	Weak or non-significant correlations	Not significant	Experts stressed walkability affects access but not food choice alone	**Convergent (weak):** infrastructure is enabling but not decisive
Safety (Day & Evening)	Consistent negative correlations with both food consumption patterns	Not a regression predictor	Experts linked safety to willingness to access neighbourhood food options	**Strong convergence:** safety shapes food access behaviour
Distance to Shops and Transit	Proximity to shops increases frequent consumption; transit proximity affects secondary food choices	Not significant	Experts explained distance interacts with time poverty and convenience	**Complementary:** spatial reach matters more than proximity alone
Socio-demographic Factors (BMI, Age, Marital Status)	Linked indirectly via intake patterns	Significant predictors of food consumption	Experts highlighted lifestyle constraints and housing type	**Convergent:** individual factors mediate environmental influence

5.5 Demographic Mediators of Healthy Living

The discussion of respondents' background characteristics is positioned in this chapter to complement, rather than replace, the analysis of urban environment features and behavioural outcomes. While earlier sections focused on how urban environment characteristics are perceived, observed, and statistically associated with physical activity and dietary behaviour, this subsection provides an individual-level context that helps explain variability within those patterns.

The findings indicate that background characteristics such as age, gender, BMI, and marital status influence the intensity, duration, and regularity of physical activity and food consumption, but do not independently determine overall participation. In particular, moderate physical activity appears to be embedded within daily routines and is therefore less sensitive to socio-demographic differences, whereas vigorous physical activity and dietary diversity are more strongly shaped by life stage, household structure, and body composition.

Importantly, the generally modest explanatory power of the regression models is consistent with this layered interpretation. Individual characteristics account for some variation in behaviour, particularly for higher-intensity activities, but operate alongside environmental exposure, accessibility, safety, and planning context discussed in previous sections. The non-significant effects of income and ethnicity further suggest that, within the urban context of the study area, lifestyle behaviours are shaped more by routine, time availability, and spatial context than by socio-economic differentiation alone.

Taken together, this subsection strengthens the overall Chapter 5 narrative by demonstrating that healthy lifestyle behaviours emerge from the interaction between individual characteristics and urban environment conditions, rather than from either dimension in isolation. This integrated understanding provides a coherent bridge between the descriptive analysis of environmental characteristics and the subsequent interpretation of how urban land use planning frameworks can support healthier urban living.

Table 5.4
Triangulation of Background Factors Influencing Physical Activity and Dietary Behaviour

Background Factor	Physical Activity (Frequency & Duration)	Dietary Behaviour	Interpretation	Triangulation Outcome
Age	Positive for moderate PA (frequency & duration); strong negative for vigorous PA (frequency & duration)	Negative for second most frequent food consumption	Life-stage effect: ageing shifts activity intensity and diet patterns	**Strong convergence**
Gender	Significant for vigorous PA (frequency & duration) and duration of moderate PA	Not significant	Gender differences more pronounced for activity intensity	**Convergent (PA-specific)**
BMI	Significant positive predictor for duration of vigorous PA	Significant for both most and second most frequent food consumption	BMI interacts with both energy intake and activity behaviour	**Strong convergence**
Marital Status	Significant only for duration of vigorous PA	Significant for most frequent food consumption	Household structure shapes lifestyle routines	**Complementary**
Income	Not significant across PA models	Not significant	Economic homogeneity / urban context	**Convergent (non-effect)**
Ethnicity	Not significant	Not significant	Lifestyle similarities override ethnic differences	**Convergent (non-effect)**

5.6 Triangulation of Findings on Green Spaces and Healthy Lifestyle

The triangulated findings indicate that green spaces play an important but currently under-optimised role in supporting a healthy lifestyle within the study area. Survey results show that residents generally perceive access to green spaces as moderate, suggesting that such facilities are present within neighbourhoods. This aligns with previous studies which highlight that the mere presence of green spaces does not necessarily guarantee frequent use or sufficient support for physical activity (Giles-Corti et al., 2005; Kaczynski & Henderson, 2007). However, on-site observations revealed that green spaces are unevenly distributed, vary in size, connectivity, and maintenance, and are not equally accessible to all residential sections. Such spatial inequality has been widely recognised as a key barrier to equitable physical activity participation in urban settings (Sugiyama et al., 2010; World Health Organization [WHO], 2016). This physical inequality helps explain why moderate physical activity levels remain relatively low despite the existence of green spaces.

Statistical analyses further strengthen this interpretation. Correlation results demonstrate a positive relationship between perceived access to green spaces and physical activity, indicating that residents who perceive better access are more likely to engage in physical activity. This finding is consistent with socio-ecological and environmental behaviour models, which emphasise the importance of perceived environmental support in shaping health-related behaviours (Sallis et al., 2015). More importantly, multiple regression analysis confirms that proximity to green spaces significantly predicts physical activity even after controlling for socio-demographic factors, supporting evidence that accessible green spaces exert an independent influence on physical activity behaviour (Giles-Corti et al., 2005; Kaczynski et al., 2014). Expert interviews further contextualise these findings by highlighting land-use competition, limited allocation of neighbourhood-level green spaces, and maintenance constraints as major barriers, issues that have also been documented in planning and urban health literature (WHO, 2016; UN-Habitat, 2020). Together, these findings suggest that while green spaces contribute positively to physical activity, their effectiveness depends heavily on spatial distribution, quality, and integration within residential areas.

Table 5.5
Triangulation of Evidence on Green Space Provision and Physical Activity

Data Source / Method	Key Findings	Triangulated Interpretation
Residents' perception survey	Respondents perceived moderate access to neighbourhood green spaces	Green spaces are recognised by residents but may not be sufficiently convenient or attractive
On-site observation	Green spaces were present but unevenly distributed, with differences in size, facilities, and maintenance	Spatial inequality and quality issues limit equal use across neighbourhoods
Physical activity analysis	Moderate physical activity levels were relatively low	Existing green spaces are not fully supporting regular physical activity
Correlation analysis	Perceived access to green spaces showed a positive correlation with physical activity	Better perceived access is associated with higher activity engagement
Multiple regression analysis	Proximity to green spaces significantly predicted physical activity after controlling for socio-demographic variables	Green spaces independently influence physical activity behaviour
Expert interviews	Experts cited land-use competition, maintenance constraints, and limited connectivity	Planning and management factors reduce the effectiveness of green spaces

5.7 Commercial Areas and Dietary Habit

Findings from the triangulated analysis reveal that the neighbourhood commercial environment significantly influences residents' dietary behaviour. Respondents generally perceived good access to shops and food outlets, indicating that daily food needs can be met conveniently. Previous studies have similarly shown that high commercial accessibility improves food convenience but does not necessarily promote healthy dietary choices (Larson, Story, & Nelson, 2009; Walker, Keane, & Burke, 2010). However, observational findings showed that commercial areas are dominated by convenience stores and fast-food outlets, with limited availability of fresh food retailers. This imbalance in the food environment has been widely associated with unhealthy eating patterns, particularly increased consumption of energy-dense and nutrient-poor foods (Swinburn et al., 2011; Fraser et al., 2010).

Lifestyle analysis supports this observation, as respondents exhibited higher intake levels of sugar, salt, and fat. Similar dietary outcomes have been linked to neighbourhoods characterised by a high concentration of fast-food outlets and limited access to fresh food sources (Moore et al., 2009; Laska, Hearst, Forsyth, Pasch, & Lytle, 2010). Correlation analysis indicates a significant association between access to nearby shops and dietary choices, suggesting that the type and proximity of food outlets shape food consumption behaviour. This finding is consistent with food environment theories which emphasise that spatial access and exposure strongly influence dietary behaviour (Glanz et al., 2005; Story et al., 2008).

Regression results further confirm that distance to shops significantly predicts dietary behaviour after controlling for income and age, demonstrating that built environment factors influence diet independently of socio-economic characteristics. This supports existing evidence that neighbourhood food environments exert an independent effect on dietary intake beyond individual-level determinants (Morland, Wing, & Roux, 2002; Boone-Heinonen et al., 2011). Expert interview findings reinforce this interpretation by pointing to market-driven development patterns and the absence of strong planning controls for healthy food environments, issues frequently highlighted in urban planning and public health literature (Swinburn et al., 2011; World Health Organization [WHO], 2017). Collectively, the triangulated evidence suggests that while commercial accessibility is high, the dominance of unhealthy food outlets undermines healthy dietary practices.

Table 5.6
Triangulation of Evidence on Commercial Area Provision and Dietary Behaviour

Data Source / Method	**Key Findings**	**Triangulated Interpretation**
Residents' perception survey	Respondents perceived good access to shops and food outlets	Commercial facilities are generally available within neighbourhoods
On-site observation	Commercial areas were dominated by convenience stores and fast-food outlets, with fewer fresh food vendors	Food environment favours less healthy dietary options
Dietary behaviour analysis	Higher intake of sugar, salt, and fat was observed among respondents	The local food environment may influence unhealthy dietary patterns

Correlation analysis	Access to nearby shops showed a significant relationship with dietary choices	Type and proximity of food outlets affect food consumption behaviour
Multiple regression analysis	Distance to shops significantly predicted dietary behaviour, controlling for income and age	Built environment characteristics influence diet beyond socio-economic factors
Expert interviews	Experts highlighted market-driven development and lack of healthy food zoning policies	Planning regulations insufficiently guide healthier food environments

5.8 Safety, facilities and physical activity

The triangulated findings highlight safety and facility conditions as critical determinants of physical activity, particularly moderate-intensity activities such as walking. Survey results indicate that residents perceive safety levels as moderate to low, especially during evening hours. This finding is consistent with previous studies which show that perceived safety, including fear of crime and traffic hazards, strongly influences individuals' willingness to engage in outdoor physical activity (Foster & Giles-Corti, 2008; Loukaitou-Sideris, 2006). Observational data corroborate these perceptions, revealing inconsistent street lighting, poorly connected pedestrian walkways, and limited supporting facilities such as benches and signage. Such environmental shortcomings have been widely identified as barriers to walkability and everyday physical activity in urban neighbourhoods (Saelens & Handy, 2008; Ewing & Cervero, 2010). Consequently, these conditions reduce neighbourhood walkability and discourage routine outdoor activity.

Physical activity analysis shows that participation in moderate physical activity is lower compared to vigorous activity, suggesting that environmental barriers disproportionately affect everyday movement. This pattern aligns with evidence that moderate activities such as walking are more sensitive to environmental conditions than structured or vigorous exercise (Sallis et al., 2012). Correlation analysis demonstrates a positive relationship between perceived safety and physical activity levels, while regression analysis confirms that safety-related variables significantly predict physical activity after controlling for individual factors. These findings support ecological models of health behaviour, which emphasise the role of supportive and safe environments in enabling regular physical activity (Sallis et al., 2015). Expert

interviews further explain that inadequate maintenance, fragmented pedestrian networks, and weak enforcement contribute to unsafe walking environments, issues commonly highlighted in urban design and transport planning literature (Loukaitou-Sideris & Eck, 2007; World Health Organization [WHO], 2018). When integrated, these findings indicate that improving safety and facility quality is essential for promoting daily physical activity within urban neighbourhoods.

Table 5.7
Triangulation of Safety-Related Urban Environment Factors Influencing Physical Activity

Data Source / Method	Key Findings	Triangulated Interpretation
Residents' perception survey	Respondents reported moderate to low perceived safety, especially during evening hours	Safety concerns may discourage outdoor physical activity
On-site observation	Inconsistent street lighting, poor walkway connectivity, and limited facilities were observed	Physical environment conditions reduce walkability and perceived safety
Physical activity analysis	Participation in moderate physical activity was lower compared to vigorous activity	Environmental barriers particularly affect routine, daily activity
Correlation analysis	Perceived safety showed a positive correlation with physical activity levels	Feeling safe encourages greater engagement in outdoor activity
Multiple regression analysis	Safety-related variables significantly predicted physical activity after adjustments	Safety is a key determinant of active lifestyle behaviour
Expert interviews	Experts emphasised maintenance issues, fragmented pedestrian networks, and enforcement gaps	Institutional and design weaknesses undermine active living support

5.9 The Synthesis A Framework for Urban Land Use Planning in Petaling Jaya

This section synthesises the study's findings by directly linking the empirical results to the proposed conceptual framework for urban land use planning and healthy lifestyles in Petaling Jaya (PJ). The framework consolidates the relationships identified in the analysis and illustrates how land use planning influences healthy lifestyle outcomes through specific urban environment features and behavioural pathways.

As shown in the framework Figure 5.1, urban environment features including the provision of green areas and sports centres, pedestrian walkways, transit stops, and a variety of shops, stores, and markets represent the physical outcomes of urban land use planning decisions. The findings indicate that the provision, accessibility, convenience, and safety of facilities, as well as the distance to facilities, are critical factors shaping residents' daily behaviours. Well-maintained environments and perceived safety during both daytime and evening walking were found to encourage greater engagement with neighbourhood spaces.

These urban environment features influence healthy lifestyles through two key behavioural mediators: physical activity and dietary behaviour. The results demonstrate that supportive environments are associated with increased frequency and duration of moderate and vigorous physical activity, while improved access to diverse food outlets and markets is linked to healthier dietary behaviours, including food consumption patterns and intake levels. This confirms that land use planning affects health indirectly by shaping environments that enable or constrain everyday behavioural choices.

The framework also incorporates demographic background variables, including age, gender, marital status, and body mass index (BMI), recognising their role in moderating the relationship between the urban environment and healthy lifestyle behaviours. This acknowledges that individuals interact with and respond to urban environments differently, even within the same spatial context.

Overall, the conceptual framework provides a coherent representation of how urban land use planning in PJ contributes to healthy lifestyle outcomes. By explicitly linking planning-related urban features to behavioural mechanisms and individual characteristics, the framework offers both a theoretical contribution and a practical reference for planners and policymakers. It reinforces the role of urban land use

planning as an upstream strategy for promoting healthier, more liveable urban environments in Petaling Jaya.

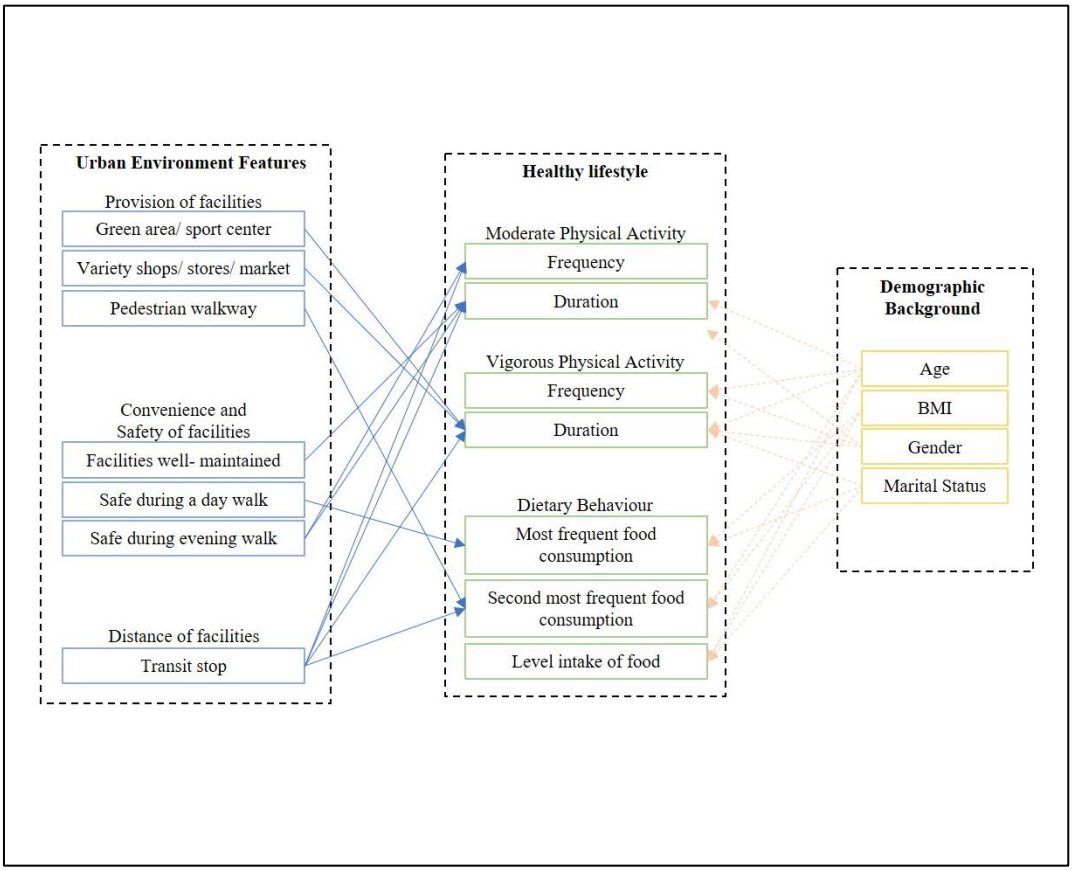


Figure 5.1 The Synthesis A Framework for Urban Land Use Planning in Petaling Jaya

5.10 Chapter Summary

Chapter 5 presents an in-depth discussion of the findings from this study, integrating evidence from multiple sources, including direct observation, respondents' perceptions, and expert interviews, to understand the influence of urban land use planning on healthy lifestyles in Petaling Jaya. The chapter systematically analyses the interplay between urban environment features, physical activity, and food consumption behaviour, highlighting convergent, divergent, and complementary patterns of findings through triangulation. The study identifies areas of clear agreement (convergent triangulation), such as physical legibility and connectivity, which consistently facilitate mobility and encourage active lifestyles. Largely convergent findings reveal that some urban design elements, while generally supportive, show variability in their influence depending on location or user characteristics. Divergent triangulation highlights

discrepancies between perceived convenience and physical barriers, emphasizing the role of subjective experience in shaping physical activity and accessibility. Complementary triangulation underscores how the spatial distribution of amenities and functional accessibility work together to support healthy behaviours. The discussion further explores the differential effects of urban environment features on physical activity, distinguishing between moderate and vigorous activity levels. Accessibility and transit-oriented planning are shown to encourage active mobility, while safety perceptions and the duration of exposure influence overall engagement in physical activity. Facility provision alone is insufficient unless accompanied by functional usability that meets user needs. Similarly, the chapter examines the relationship between urban form and food consumption behaviour. Accessibility, mobility, and the spatial distribution of food outlets shape dietary choices, while safety and walkability consistently influence active travel to food destinations. Nutritional intake patterns are moderated by the availability of food options and socio-demographic factors, indicating that both the physical environment and population characteristics contribute to healthy dietary habits. Demographic factors are highlighted as key mediators of healthy living, with age, gender, and socio-economic status influencing the interaction between urban environment features, physical activity, and dietary behaviour. The chapter also synthesizes findings regarding green spaces, commercial areas, and safety, illustrating how these elements collectively affect lifestyle outcomes. Finally, the chapter concludes with the development of "A Framework for Urban Land Use Planning in Petaling Jaya", which integrates the study's findings into a cohesive model that demonstrates the pathways through which urban planning can promote physical activity, healthy dietary behaviour, and overall wellbeing. This framework provides actionable insights for planners, policymakers, and urban designers seeking to create healthier urban environments.

CHAPTER 6
CONCLUSION AND RECOMMENDATION

6.1 Introduction

This chapter concludes the study by synthesising the empirical findings and reflecting on their broader implications for urban land use planning and healthy lifestyle promotion. The primary purpose of this chapter is consolidation rather than reanalysis, drawing together insights generated through the mixed-methods approach adopted in this research. Through the triangulation of household survey data, neighbourhood observations, statistical analyses, and expert interviews, the study has examined the relationships between urban environment features, physical activity, and dietary behaviour within the context of Petaling Jaya, Malaysia. This concluding chapter revisits the research objectives and research questions to demonstrate how they have been addressed. By integrating quantitative and qualitative evidence, the findings are interpreted and situated within the broader literature on urban planning and public health. No new empirical data are introduced; rather, the focus is on synthesis and the articulation of the study's knowledge contribution. The chapter is structured as follows. Section 6.2 summarises the key findings organised around the core thematic components of the study. Section 6.3 outlines the theoretical, methodological, and practical contributions of the research. Section 6.4 discusses the implications of the findings for urban planning and policy. Section 6.5 presents recommendations, culminating in the proposal of an Integrated Implementation Framework for Healthy Urban Living in Petaling Jaya, which constitutes the primary research output. Section 6.6 acknowledges the study's limitations, and Section 6.7 concludes with final reflections.

6.2 Summary of Key Findings

This section synthesises the key findings of the study in relation to the research objectives and research questions. The findings are organised thematically to reflect the conceptual framework underpinning the study and are derived from the triangulation of multiple data sources. This integrative approach enhances the robustness of the

conclusions by capturing residents' perceptions and behaviours, objectively observed neighbourhood conditions, statistical relationships, and expert insights.

6.2.1 Urban Environment Features

In addressing the first research objective, which sought to examine the characteristics of urban environment features within the study area, the findings demonstrate that neighbourhood design and land use patterns play a fundamental role in shaping opportunities for healthy living. Key urban environment features examined in this study included land use mix, availability and accessibility of green and recreational spaces, pedestrian infrastructure, neighbourhood safety, and the local food environment. Survey findings indicated that residents generally perceived their neighbourhood environments as moderately supportive of daily activities. However, notable concerns were raised regarding pedestrian safety, continuity of walkways, and the adequacy of supporting facilities such as street lighting, seating, and signage. These perceptions were not isolated opinions but were substantiated through systematic observational assessments, which revealed inconsistencies in pedestrian infrastructure provision, fragmented walkways, and uneven maintenance across neighbourhoods.

Expert interviews provided further depth to these findings by highlighting structural and institutional factors influencing urban environment quality. Planning practitioners and professionals noted that while planning standards exist, their implementation often prioritises vehicular circulation and development efficiency over pedestrian comfort and safety. Health considerations were described as implicit rather than explicit within local planning processes, resulting in neighbourhood environments that meet minimum technical requirements but fall short of supporting healthy daily behaviours. Taken together, the triangulated findings indicate that urban environment features in the study area exhibit both enabling and constraining characteristics. While basic infrastructure and services are present, deficiencies in quality, integration, and spatial distribution limit their potential to fully support healthy lifestyles. This finding directly addresses the first research objective by demonstrating that urban environment features are not merely background conditions but active determinants of health-related behaviours.

6.2.2 Physical Activity (Vigorous and Moderate)

The second research objective focused on examining the relationship between urban environment features and residents' physical activity levels, with particular attention given to differences between vigorous and moderate-intensity activities. The findings reveal a clear distinction in how neighbourhood environments influence these two forms of physical activity. Moderate-intensity physical activity, particularly walking, emerged as the most environmentally sensitive behaviour. Regression analysis demonstrated that variables such as walkability, perceived safety, and accessibility of neighbourhood facilities were significant predictors of participation in moderate physical activity. Survey results further indicated that residents were more likely to engage in walking for both utilitarian and recreational purposes when pedestrian routes were continuous, well-lit, and perceived as safe.

Observational data reinforced these findings by identifying physical barriers to walking, including discontinuous sidewalks, poor crossings, and limited shading in certain areas. These environmental constraints were frequently cited by residents as reasons for reduced walking, particularly among older adults and women. Expert interviews supported this interpretation, emphasising that everyday physical activity is closely tied to neighbourhood-scale design decisions rather than large-scale recreational facilities alone. In contrast, vigorous physical activity showed a weaker association with neighbourhood environmental characteristics. Such activities were often undertaken in specialised facilities, such as gyms or sports complexes, or outside the immediate residential area.

This suggests that while urban environment features may facilitate access to moderate physical activity as part of daily routines, vigorous activity is influenced by a broader range of factors, including individual motivation, time availability, and access to dedicated facilities. These findings address the second research objective by demonstrating that urban land use planning interventions at the neighbourhood level are particularly critical for promoting moderate physical activity. This has important implications for planning practice, as moderate activities such as walking contribute substantially to overall physical activity levels and are more accessible to a wider segment of the population.

6.2.3 Dietary Behaviour

The third research objective sought to examine the relationship between urban environment features and dietary behaviour. The findings indicate that dietary behaviour is closely linked to the neighbourhood food environment, although this relationship is often less explicitly recognised in urban planning practice. Survey data revealed that residents' food choices were influenced by the type, proximity, and accessibility of food outlets within their neighbourhoods. A higher concentration of convenience stores and fast-food outlets was associated with less healthy dietary patterns, while access to fresh food outlets, such as wet markets or grocery stores offering fresh produce, was comparatively limited. These patterns suggest that the spatial configuration of food environments shapes everyday dietary decisions.

Observational assessments corroborated these findings by identifying a dominance of energy-dense food outlets in certain areas and limited integration of healthy food options within residential neighbourhoods. Expert interviews further highlighted that food environment planning is often treated as a commercial or economic issue rather than a public health concern. Planners noted that existing land use policies provide limited guidance on promoting healthy food environments, resulting in missed opportunities to support healthier dietary behaviour through planning interventions. Collectively, these findings demonstrate that dietary behaviour is an integral yet under-addressed component of healthy urban living. By empirically linking food environments to dietary behaviour, the study addresses the third research objective and contributes to a more comprehensive understanding of how urban land use planning influences multiple dimensions of health.

6.2.4 Triangulated Findings

The fourth research objective focused on integrating findings across multiple methods to develop a comprehensive understanding of the relationship between urban environment features and healthy lifestyle behaviours. Strong convergence was observed across survey data, observational assessments, statistical analyses, and expert interviews. Key themes, including neighbourhood safety, walkability, and food accessibility, consistently emerged as critical determinants of physical activity and dietary behaviour. Where minor discrepancies existed between perceived and observed

conditions, expert insights provided contextual explanations, such as differences in user expectations or institutional constraints. This triangulation not only enhanced the credibility of the findings but also provided a nuanced interpretation that would not have been possible through a single-method approach. Overall, the triangulated findings provide a robust empirical foundation for the conceptual framework developed in Chapter 5 and support the argument that health-oriented urban land use planning requires an integrated understanding of physical, social, and institutional factors.

6.3 Contributions of the Study

6.3.1 Theoretical Contributions

This study makes a significant theoretical contribution to the literature on urban planning and healthy lifestyles by extending and refining existing conceptual frameworks. While widely used models such as the Social Ecological Model acknowledge the influence of environmental factors on health behaviour, they often conceptualise the built environment in broad terms without explicitly operationalising urban land use elements relevant to planning practice. By identifying and empirically examining specific urban environment features such as walkability, neighbourhood safety, green space availability, and food environments this study advances theoretical understanding of how planning-related variables influence both physical activity and dietary behaviour. Importantly, the study integrates these two behavioural outcomes within a single framework, addressing a key gap in the literature where physical activity and diet are frequently examined in isolation. Furthermore, the study contributes to theory by contextualising health–environment relationships within a Malaysian urban setting, thereby extending the geographical scope of existing frameworks that are predominantly based on evidence from Western contexts. This contextual contribution enhances the relevance and applicability of urban health theories to rapidly urbanising cities in Southeast Asia.

6.3.2 Methodological Contributions

From a methodological perspective, this study demonstrates the value of a triangulated mixed-methods approach in urban planning and health research. The integration of household surveys, systematic neighbourhood observations, regression

analysis, and expert interviews enabled a comprehensive examination of urban environment–health relationships from multiple perspectives. By combining subjective perceptions with objective environmental assessments and expert insights, the study addressed common methodological limitations associated with reliance on single data sources. This approach enhanced both the internal validity and interpretive depth of the findings. The methodological design therefore offers a useful reference for future studies seeking to examine complex, multi-dimensional relationships between urban form and health outcomes.

6.3.3 Practical and Planning Contributions

In practical terms, this study provides locally grounded evidence to inform urban land use planning in Malaysia. By focusing on Petaling Jaya as a case study, the research offers insights that are directly relevant to local authorities and planning practitioners in Selangor and comparable urban contexts. The findings translate abstract health concepts into concrete planning considerations, such as pedestrian infrastructure quality, neighbourhood safety, and food outlet distribution. In doing so, the study bridges the gap between academic research and planning practice and supports the development of more health-responsive urban environments.

6.4 Planning and Policy Implications

The findings of this study have important implications for urban land use planning and policy, particularly in relation to the integration of health considerations into planning decision-making. Drawing on the conceptual framework developed in Chapter 5, which links urban environment features to physical activity and dietary behaviour, this section interprets the findings in terms of their relevance for planning policies, neighbourhood design standards, and governance practices. First, the study highlights the need for urban land use planning policies to move beyond conventional functional zoning approaches towards more health-oriented and people-centred planning principles. The evidence demonstrates that land use mix, pedestrian connectivity, and neighbourhood-scale facilities play a crucial role in enabling daily physical activity, particularly moderate-intensity activities such as walking. This

suggests that planning policies should explicitly recognise physical activity promotion as a core objective, rather than as a secondary or incidental outcome.

Second, the findings underscore the importance of neighbourhood design standards in shaping health-related behaviours. Walkability and safety consistently emerged as key determinants of physical activity participation. This implies that design standards should prioritise continuous and well-maintained pedestrian networks, adequate street lighting, traffic calming measures, and safe crossings. Such features should be treated as essential components of neighbourhood infrastructure, rather than optional design enhancements.

Third, the study reveals that food environments are an integral yet underdeveloped aspect of urban land use planning. The spatial concentration of convenience and fast-food outlets, combined with limited access to healthy food options, indicates a gap in existing planning policies. Integrating food environment considerations into land use planning such as through zoning controls, location guidelines, or incentives for healthier food outlets would support more balanced dietary behaviour at the neighbourhood level.

Importantly, the framework developed in Chapter 5 illustrates that urban environment features influence physical activity and dietary behaviour through both perceived and objectively measured pathways. This finding has policy implications, as it suggests that planning interventions must address not only physical infrastructure but also residents' perceptions of safety, accessibility, and comfort. Policies that improve the visibility, maintenance, and usability of neighbourhood environments are therefore likely to have a greater impact on healthy lifestyle outcomes.

Overall, the planning and policy implications of this study point towards a more integrated approach to urban development, where health considerations are embedded within land use planning, urban design, and development control processes. Such an approach aligns with broader sustainable development goals and reinforces the role of planning as a determinant of population health.

6.5 Recommendations: An Integrated Implementation Framework for Healthy Urban Living in Petaling Jaya

Empirical evidence from Petaling Jaya (PJ) highlights a significant functional usability gap. Although urban infrastructure is generally present, a range of physical,

psychological, and planning-related barriers often limit residents' ability to engage in healthy lifestyle behaviours. The analysis that follows examines how varying urban forms across PJ either facilitate or constrain health-supportive living.

6.5.1 The Nominal vs. Functional Gap

This framework demonstrates that positive neighbourhood perceptions do not necessarily reflect a supportive urban form. In several areas, perceived convenience is largely derived from car dependency rather than from genuine pedestrian accessibility or walkable urban design.

Table 6.1
Triangulated Assessment of Neihgbourhood Facility Provision, Functional Usability and Planning Reality

Neighborhood Section	Provision Status (Nominal)	Functional Usability Barriers (Expert & Observational Reality)	Triangulation Outcome
SS2	Moderate provision; high accessibility.	**The Success Model:** Dense mixed-use development with shops, eateries, and parks within walking distance. Continuous connectivity reinforces functional accessibility.	**Convergent (Positive):** Paper provision matches physical reality.
Section 3	Highest facility provision; high convenience.	**Clustered Inaccessibility:** Facilities are concentrated at specific nodes. Gated and guarded layouts reduce functional access for pedestrians despite high nominal provision.	**Complementary:** Expert insights explain accessibility gaps as a planning issue.
Section 9	Very high scores for provision, safety, and accessibility.	**Car-Habituation Divergence:** Hostile road hierarchies and fragmented networks. Residents perceive convenience due to **habitual car use** rather than actual walkability.	**Divergent:** Positive perception masks car-oriented structural limitations.
SS9	High provision, convenience, and safety.	**Industrial-Residential Conflict:** Structurally restrictive environments. Mixed industrial	**Divergent:** Residents fail to perceive the restrictive

		zoning without pedestrian integration limits non-motorized movement.	nature of the industrial interface.
SS8	Lowest scores for provision and accessibility.	**Negative Convergence:** Industrial-dominated land use and poor infrastructure. Economic-driven planning priorities have deprioritized liveability and pedestrian needs.	**Convergent (Negative):** Structurally weak urban form confirmed by all data sources.

6.5.2 Physical Activity Determinants: The Threshold Condition

The influence of the built environment on physical activity in Petaling Jaya varies according to activity intensity. Moderate physical activity, particularly walking, is strongly associated with proximity to transit stops and the maintenance quality of pedestrian facilities. Access to transit embeds walking within daily routines, making continuous, well-maintained pedestrian networks essential for supporting routine and incidental physical activity. High commercial accessibility in Petaling Jaya is associated with increased consumption of foods high in sugar, salt, and fat. Market-driven development patterns have produced a food environment dominated by convenience stores and fast-food outlets, limiting residents' exposure to healthier food options.

Triangulated evidence from expert interviews, observations, and resident perceptions indicates that the local food environment is shaped primarily by commercial interests, with limited application of healthy food zoning principles. This has resulted in sustained exposure to energy-dense, nutrient-poor foods. Without planning and regulatory intervention, continued commercial densification is likely to function as a persistent risk factor for diet-related chronic diseases. In contrast, vigorous physical activity is largely independent of neighbourhood-scale urban form. Participation at higher intensity levels is primarily influenced by individual constraints, including time availability, work commitments, and access to private facilities such as gyms. This indicates that urban planning interventions are more effective in promoting moderate rather than vigorous physical activity.

Safety operates as a critical threshold condition across all activity levels. Perceived insecurity especially concerns related to crime and traffic hazards during evening hours acts as a decisive barrier to outdoor physical activity. When this safety

threshold is not met, investments in pedestrian infrastructure, greenways, or public parks are unlikely to yield behavioural change, as residents refrain from utilising these spaces regardless of their availability.

6.5.3 The Unhealthy Food Exposure Crisis

High commercial accessibility in Petaling Jaya is associated with increased consumption of foods high in sugar, salt, and fat. Market-driven development patterns have produced a food environment dominated by convenience stores and fast-food outlets, limiting residents' exposure to healthier food options. Triangulated evidence from expert interviews, observations, and resident perceptions indicates that the local food environment is shaped primarily by commercial interests, with limited application of healthy food zoning principles. This has resulted in sustained exposure to energy-dense, nutrient-poor foods. Without planning and regulatory intervention, continued commercial densification is likely to function as a persistent risk factor for diet-related chronic diseases.

6.5.4 Strategic Benchmarking with International Best Practices

To address the identified gaps in Petaling Jaya, this study argues that the Majlis Bandaraya Petaling Jaya (MBPJ) can move beyond the nominal provision of infrastructure by adapting targeted mechanisms from established international best practices, particularly those implemented in Vancouver and Melbourne. Vancouver's Healthy City model demonstrates a strong commitment to non-motorised mobility through the development of an extensive greenway network. The city has set a strategic target for 50% of all trips to be undertaken by non-motorised modes, supported by clear spatial benchmarks. These include ensuring that every resident lives within a five-minute walk or a ten-minute cycling distance of a greenway. The supporting design standards prioritise human-scale mobility through measures such as traffic calming, reduced vehicle lane widths, and expanded sidewalks, reinforcing the primacy of pedestrians and cyclists in everyday urban movement.

In parallel, Vancouver integrates food systems into urban planning through formalised urban agriculture zoning. The introduction of Class A (Residential) and Class B (Commercial/Industrial) urban farm designations recognises food production

as a legitimate land use. This is further strengthened by infrastructure grants that support operational and financial sustainability, embedding healthy food access within the urban fabric. Melbourne's planning approach is anchored in the 20-Minute Neighbourhood concept, which provides a holistic framework for creating liveable and health-supportive communities. This model is guided by six core hallmarks: neighbourhoods must be safe, well connected, supportive of local economic activity, adequately serviced by essential amenities, resilient to climate impacts, and characterised by high-quality public realms.

A key implementation mechanism within Melbourne's approach is the use of a structured checklist assessment tool. Although non-mandatory, this tool has proven effective in guiding planning decisions by enabling planners to systematically evaluate whether proposed developments align with health, accessibility, and liveability objectives prior to approval.

6.5.5 The Integrated Implementation Framework

The Integrated Implementation Framework developed in this study addresses the critical "missing link" between infrastructure provision and healthy lifestyle outcomes in Petaling Jaya. The framework calls for a fundamental shift away from car-oriented road hierarchies towards health-oriented land use planning, positioning functional usability as the core mechanism through which urban form influences behaviour.

6.5.5.1 Pillar 1: Connectivity and Active Mobility

Connectivity and Active Mobility responds directly to the fragmented pedestrian network identified in convergent-weak zones, particularly SS8 and SS9. The proposed PJ Greenway Network adapts Vancouver's Greenway model to the local context, prioritising continuous, safe, and human-scale mobility. This pillar moves beyond symbolic pedestrian provision by mandating narrowed vehicle lanes, widened sidewalks, and pedestrian-priority corridors as enforceable design standards. Critical road-crossing barriers at industrial–residential interfaces are addressed through inclusive pedestrian signals and grade-separated crossings, transforming structural obstructions into functional connections.

6.5.5.2 Pillar 2: Food Environment Transformation

Food Environment Transformation reframes healthy food access as a land use planning responsibility rather than a market outcome. The framework introduces Healthy Food Zoning to counter the dominance of fast food and convenience outlets in PJ's commercial landscape. Mandatory fresh food ratios in high-density developments ensure that access to nutritious food is embedded within everyday environments. In structurally weak industrial interfaces, particularly in SS8 and SS9, the framework proposes Class B urban farming as a strategic rezoning intervention. This approach converts land-use conflicts into health-supportive assets while strengthening local food resilience. Vendor composition controls further regulate neighbourhood markets to prioritise fresh and locally sourced produce.

6.5.5.3 Pillar 3: Enhancing Functional Usability Through Safety and Design

Enhancing Functional Usability through Safety and Design recognises safety as a threshold condition for physical activity. Drawing on Melbourne's "Safe and Accessible" hallmark, the framework targets low-safety perception zones through design-led interventions rather than restrictive controls. Consistent, high-intensity lighting along Greenway routes is proposed to support evening activity, while gated and guarded barriers that fragment connectivity are replaced with passive surveillance and active street edges. This approach maintains security without undermining accessibility or walkability.

Collectively, the three pillars form an integrated, implementation-oriented framework that aligns land use regulation, urban design, and safety considerations to support active mobility and healthy dietary behaviours. By embedding these mechanisms within MBPJ's planning practice, the framework bridges the gap between infrastructure provision and actual health outcomes, offering a transferable model for health-oriented urban land use planning.

Table 6.2
From Empirical Gaps to Planning Actions: An Integrated Framework for Healthy Urban Living in Petaling Jaya

Identified Gap in PJ	Integrated Framework Pillar	Proposed MBPJ Implementation Action
Fragmented pedestrian and cycling connectivity caused by car-oriented road hierarchies	Pillar 1: Connectivity & Active Mobility (PJ Greenway Network)	Establish a PJ Greenway Network to connect fragmented neighbourhoods, with priority intervention in convergent-weak zones (SS8 and SS9)
Pedestrian infrastructure present but functionally unusable	Pillar 1: Mandatory Design Standards	Apply pedestrian-priority corridor standards using narrowed vehicle lanes and widened sidewalks, adapted from Vancouver's Greenway design
Major road-crossing barriers at industrial–residential interfaces	Pillar 1: Barrier Resolution	Install inclusive pedestrian signals and grade-separated crossings at industrial–residential interfaces, particularly in SS9
Market-driven foodscape dominated by fast food and convenience outlets	Pillar 2: Food Environment Transformation (Healthy Food Zoning)	Introduce healthy food zoning to shift food access from market-led provision to planning-led regulation
Limited access to fresh and affordable food in high-density areas	Pillar 2: Mandatory Fresh Food Ratios	Require new commercial developments in high-density zones (e.g. Section 3) to allocate a minimum proportion of floor space to fresh food retailers
Underutilised industrial land creating land-use conflicts	Pillar 2: Industrial Interface Farming (Class B)	Rezone structurally weak industrial interfaces in SS8 and SS9 to permit Class B urban farming
Unregulated vendor mix reinforcing unhealthy diets	Pillar 2: Vendor Composition Control	Regulate neighbourhood market vendor composition to prioritise local and fresh produce, adapting Vancouver's licensing approach
Perceived insecurity discouraging outdoor activity	Pillar 3: Safety as Functional Threshold	Apply Melbourne's "Safe & Accessible" hallmark to low-safety perception zones
Gated and guarded developments fragmenting connectivity	Pillar 3: Security through Design	Prohibit physical barriers that disrupt connectivity; mandate passive surveillance and active street edges instead
Low evening use of public spaces	Pillar 3: Lighting and Perceptual Safety	Implement consistent, high-intensity lighting along all Greenway routes to

	lower the safety threshold for outdoor activity

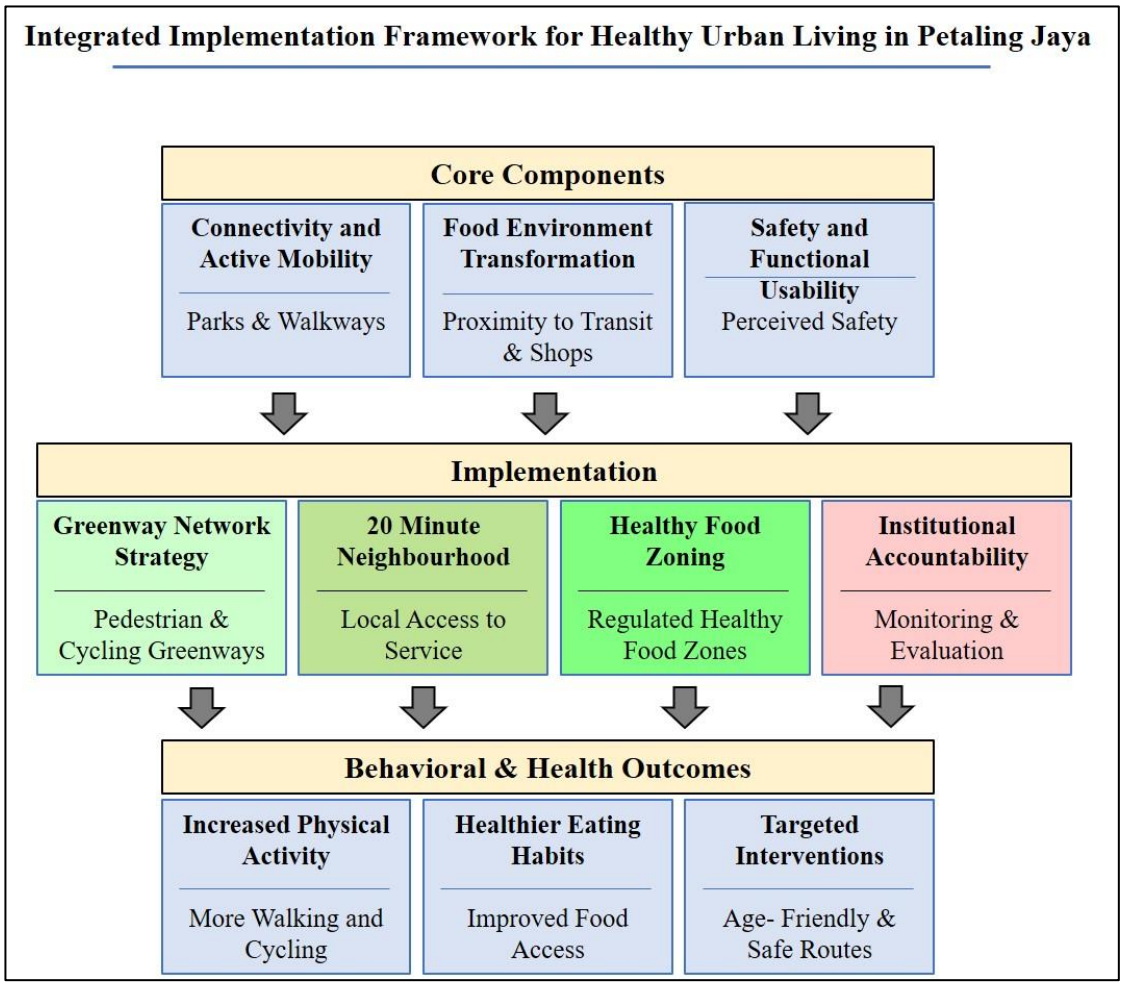


Figure 6.1 Integrated Implementation Framework for Healthy Urban Living in Petaling Jaya

6.5.6 Institutional Mechanisms and Accountability

Effective implementation of a health-oriented urban land use framework requires strong institutional coordination and clear accountability mechanisms. In this regard, the Majlis Bandaraya Petaling Jaya (MBPJ) assumes a central leadership role in facilitating cross-sectoral governance through a structured multi-stakeholder engagement model. This model formalises collaboration between municipal planning departments, public health authorities, and private developers. Public health agencies contribute expertise through health impact assessments, while private developers are required to align new developments with established Healthy City hallmarks, ensuring

that health objectives are embedded within planning and development processes rather than treated as secondary considerations.

Implementation is further strengthened through a phased delivery and funding strategy. In the initial phase, pilot interventions are proposed to demonstrate feasibility and generate early impacts. Drawing on Melbourne's grant-based approach, small-scale but high-impact upgrades such as parklets in SS8 and temporary play spaces can be implemented at relatively low cost to test design effectiveness and community response. The second phase focuses on scaling successful interventions into permanent infrastructure. At this stage, long-term investments, including Greenway corridors and urban farming irrigation systems, are institutionalised through municipal capital budgets and development contribution mechanisms, reflecting Vancouver's model of leveraging developer levies rather than relying solely on short-term grants.

To ensure transparency and sustained accountability, the framework proposes the establishment of a public-facing Healthy City Dashboard managed by MBPJ. This monitoring tool enables continuous evaluation of progress against clearly defined performance indicators. Key metrics include the proportion of trips undertaken by non-motorised modes, with a target exceeding 50 per cent; the nutrient density ratio, measuring the balance between fresh food vendors and fast-food outlets in commercial areas; annual assessments of residents' evening perceptions of safety to confirm that the safety threshold is being met; and proximity indicators capturing the percentage of residents living within a five-minute walk of the Greenway Network. Together, these metrics provide an evidence-based mechanism for tracking implementation outcomes and reinforcing institutional accountability.

6.5.6.1 Conclusion: Towards a Resilient Petaling Jaya

This study advances an integrated framework that addresses the critical "missing link" between urban land use planning and healthy lifestyle outcomes in Petaling Jaya. The framework shifts the city from a model of nominal provision towards one of functional active living, recognising that the mere presence of facilities does not guarantee their effective use. In the context of PJ, entrenched gated developments, car-oriented road hierarchies, and fragmented industrial–residential interfaces necessitate targeted, design-led interventions to transform existing infrastructure into genuinely usable and health-supportive environments.

To realise these outcomes, Petaling Jaya must move away from market-driven land use practices that prioritise vehicular efficiency and commercial intensity at the expense of human health. The adoption of a health-oriented planning framework represents a critical upstream public health intervention, positioning urban land use as a preventive strategy rather than a reactive response. By embedding health considerations into planning decisions, the city can ensure that its built environment actively supports rather than constrains the long-term resilience and wellbeing of its residents.

6.6 Limitations of the Study

Despite its contributions, this study has several limitations that should be acknowledged. The cross-sectional research design limits the ability to establish causal relationships between urban environment features and healthy lifestyle behaviours. While statistical associations were identified, changes over time could not be examined. The focus on Petaling Jaya as a case study also limits the generalisability of the findings to other urban contexts. Differences in socio-cultural, economic, and institutional conditions may influence the applicability of the results elsewhere.

Data collection was further constrained by the COVID-19 pandemic, which affected both respondent recruitment and on-site observation. Obtaining survey participants proved challenging due to movement restrictions and public health concerns, and access to certain areas for photographic documentation of the urban environment was limited. These factors may have influenced sample representation and the comprehensiveness of observational data.

Additionally, the reliance on self-reported data for physical activity and dietary behaviour may introduce recall or social desirability bias. Nevertheless, these limitations do not undermine the overall contribution of the study. Instead, they reflect common constraints in urban planning research and highlight opportunities for methodological and empirical advancement in future studies, including longitudinal designs, multi-site comparisons, and enhanced mixed-methods approaches.

6.7 Concluding Remarks

In conclusion, this study demonstrates that urban land use planning plays a critical role in shaping healthy lifestyle behaviours. By empirically examining the relationships between urban environment features, physical activity, and dietary behaviour, the research provides evidence that neighbourhood environments can either enable or constrain healthy living. The integration of physical activity and dietary considerations within a single planning framework represents a significant contribution to both theory and practice. The findings emphasise the need for planners and policymakers to move beyond traditional land use approaches and adopt health-integrated, people-centred planning strategies. As cities continue to grow and urban lifestyles become increasingly sedentary, the role of urban land use planning in promoting public health becomes ever more important. This study concludes that embedding health considerations into planning policies and practices is essential for achieving sustainable, resilient, and healthy cities in Malaysia and beyond.

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APPENDICES

APPENDIX 1

Questionnaire survey

No.



Dear Sir/ Madam,

I am PhD Postgraduate student from Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA (UiTM) Shah Alam. I am conducting a survey on the "Influence of Urban Land Use Planning on Healthy Lifestyle in Petaling Jaya".

This questionnaire consists of five parts. Part A is on demographic information, Part B is about physical activity, Part C is on healthy diet, Part D is about the physical aspect in the neighbourhood and Part E is on health status.

This survey is conducted as a requirement for completion of Doctor of Philosophy in Built Environment from the UiTM Shah Alam. It is targeted to the residents in Petaling Jaya.

Kindly answer all questions. Your response to each question in this questionnaire will only be analyzed in aggregate forms and be kept strictly confidential. In other words, individuals who respond to this questionnaire will not be identified. The survey will take approximately 10 minutes and your participation is very much appreciated.

If you have any question or comment regarding this questionnaire, do not hesitate to contact me Shamirah binti Rosli at 0194492183 or email at shamirahrosli@yahoo.com

Thank you for your cooperation and assistance.

Date:_____

PART A: BACKGROUND OF THE RESPONDENT

Please tick (/) your answer.

1. Gender:

Male ☐

Female ☐

2. Ethnic:

Malay ☐ Indian ☐

Chinese ☐ Others ☐

3. Marital status:

Single ☐ Widow/ widower ☐

Married ☐ Divorce ☐

4. Body weight:

---------- kg

5. Height

---------- cm

Address: ……
……..

Origin (if previously not in Petaling Jaya. State your answer
City: ……
State: ……

6. How long you've been staying in this house?

Less than a year ☐

1 year – 4 years ☐

5 years – 9 years ☐

10 years and above ☐

7. Age:

20 years old – 29 years old ☐

30 years old – 39 years old ☐

40 years old – 49 years old ☐

50 years old – 59 years old ☐

60 years old – 69 years old ☐

70 years old and above ☐

8. Highest education level:

No formal education ☐

Primary school ☐

Secondary school ☐

University/ College ☐

9. Monthly income:

Less than RM 1000 ☐

RM 1000 – RM 1999 ☐

RM 2000 – RM 2999 ☐

RM 3000 – RM 3999 ☐

RM 4000 – RM 4999 ☐

RM 5000 – RM 5999 ☐

RM 6000 – RM 6999 ☐

RM 7000 – RM 7999 ☐

RM 8000 – RM 8999 ☐

RM 9000 – RM9999 ☐

RM 10000 and above ☐

No income ☐

10. Type of house:

Terrace House ☐

Semi- Detached ☐

Detached ☐

Condominium/ Service Apartment ☐

Medium Cost Apartment ☐

Low Cost Apartment/ PPR ☐

11. Occupation:

a. Legislator/ Senior Official/ Manager ☐

b. Professional (Engineer, Doctor, Teacher, Planner) ☐

c. Technician/ Associate Professional (Finance Dealer, Nursing, Construction Supervisor, etc) ☐

d. Clerical Support Workers (General Office Clerk, Secretary, Cashier, etc) ☐

e. Service/ Sales Worker (Cooks, Travel Guide, Shop Salesperson, etc) ☐

f. Skilled Agricultural/ Livestock and Fishery Worker/ Forestry ☐

g. Craft/ Trade Worker (Carpenter, Jewelry Worker, etc) ☐

h. Plant/ Machine Operation/ Assembler (Equipment Assembler, Sewing Machine Assembler) ☐

i. Elementary Occupation (Cleaners, Sweepers, Street Vendors, Driver, Construction/ Renovation Worker, Pest Control Worker, Painting Worker, etc) ☐

j. Armed Forces Occupation (Government Military, Police or Fireman) ☐

k. Housewife/ Caring for family ☐

l. Retired ☐

m. Student ☐

n. Volunteer/ Not Working for Pay ☐

PART C: HEALTHY DIET

Please tick (/) your answer.

Food consumption	Frequency in a week				
	Non	1 day – 2 days	3 days – 4 days	5 days – 6 days	Every day
Home cook					
Organic food (from outside)					
Order from outside (non- fast food)					
Fast food					
The most frequent food consumption			The second most frequent food consumption		

Please tick (/) your answer.
(Answer can be more than one)

If you eat at home, how do you get your raw food?

- Grocery shop/ supermarket ☐
- Online ☐
- Urban farming ☐

If you eat outside/ take away, where do you get your food?

- Online ☐
- Drive thru ☐
- Buy food at any restaurant/ stalls/ fast food/shop ☐

Please tick (/) your answer.

Intake of balance diet	Breakfast	Lunch	Tea time	Dinner	Supper
Rice, noodle, bread, cereals, cereal products and tubers					
Fruits and vegetables					
Meat, poultry, fish, legumes, milk and dairy products					
Balance diet		Moderate intake of balance diet		Imbalance diet	

Please rate your intake of sugar, salt, fat and calorie.

1 – Very low
2 – Low
3 – Moderate
4 – High
5 – Very high

Indicator	1	2	3	4	5
Sugar					
Salt					
Fat					
Calorie					

PART D: PHYSICAL ASPECT

Please tick (/) your answer.

1 – Very disagree 2 – Disagree 3 – Moderate 4 – Agree 5 – Very agree

Indicator	1	2	3	4	5
Facilities provision in your neighbourhood area					
There are variety of shops, stores, market or other places to buy things that I needed.					
There are recreational area, open space and gym.					
Public transport (Bus/ Taxi/ E-hailing (Grab)					
There are sidewalks on most of the streets.					
There are facilities for bicycle such as special lanes, separate paths or trails, shared use paths for cycles and pedestrians.					
Facilities convenience and safety in your neighbourhood area					
The free or low cost recreation facilities, such as parks, walking trails, bike paths, recreation centres, playground, etc. are safe and well maintained.					
I feel safe walking or jogging alone during the day.					
I feel safe walking or jogging alone during the evening.					
There are pedestrian signals to help walkers feel safe crossing busy streets.					
Most sidewalks on streets are well connected.					

Indicator	10-15 min walking distance	20-30 min walking distance	5
Variety of shops, stores, market or places to buy things.			
Recreational area (Badminton court/ Sports center/ Pocket parks/ Gym/etc			
Public transport (Bus/ Taxi/ E-hailing (Grab)			
Healthy food/ Market			
Restaurant/ Stalls/ Fast food restaurat			

PART E: HEALTH STATUS

Please tick (/) your answer.
(Answer can be more than one)

- ☐ Cardiovascular
- ☐ Cancer
- ☐ Respiratory disease/ Pneumonia
- ☐ Diabetes
- ☐ High blood pressure
- ☐ Obesity
- ☐ High blood glucose level
- ☐ High level of fat in the blood
- ☐ None

Thank you

APPENDIX 2

Example of Observation Checklist for SS4

Dimension	Indicator	Observation Focus	Output
Proximity to Green Areas	Presence of green spaces	Parks, playgrounds, green buffers within or near residential area	Identification of small-scale neighbourhood parks and landscaped open spaces located within walking distance of residential clusters, primarily functioning as passive recreational areas
	Accessibility to green spaces	Direct pedestrian access, entrances, physical barriers	Observation indicates generally direct pedestrian access to neighbourhood parks, with limited physical barriers, supporting basic use for leisure and light physical activity
	Connectivity	Presence of pedestrian routes linking homes to green spaces	Pedestrian routes are present linking residential areas to nearby green spaces, although connectivity is modest and primarily serves local movement rather than extensive recreational walking
Proximity to Commercial Areas	Availability of daily-use facilities	Shops, supermarkets, food outlets	SS4 is predominantly residential but benefits from close proximity to commercial facilities located in adjacent sections (SS2, SS3, Kelana Jaya), including

			shops, eateries, clinics, and convenience stores
	Walking proximity	Approximate walking distance to nearest commercial area	Commercial facilities are located within short travel distances, allowing access by walking, cycling, or short vehicular trips
Facilities Convenience	Sidewalk availability	Presence of sidewalks along main and local streets	Sidewalks are available along residential streets and near key activity nodes, supporting pedestrian movement within the neighbourhood
	Sidewalk continuity	Continuous or interrupted pedestrian paths	Sidewalk continuity varies, with some interruptions observed, particularly along major roads and at junctions
	Supporting facilities	Benches, street lighting, shading	Basic supporting facilities such as street lighting is generally present, contributing to neighbourhood convenience, while amenities such as benches and shading are limited
Safety Features	Pedestrian crossings	Zebra crossings, traffic calming measures	Pedestrian bridges and controlled crossings are available near major roads and LRT stations, enhancing pedestrian safety
	Visibility and lighting	Adequacy of lighting and	Adequate street lighting and residential surveillance contribute to good visibility

		visibility along walkways	and a generally positive perception of safety
Land Use Context	Surrounding land use	Residential, commercial, institutional, mixed-use	Land use is predominantly low- to medium-density residential, supported by nearby green spaces and adjacent commercial areas, reflecting a semi-mixed land use structure



Green Area

1. Jalan ss4/13, jalan ss4/ 15
2. Al ehsan ss4A kelana mosque, ss 4A playground
3. Lorong ss 4a/4a
4. Ss 4C/6 playground, jalan ss 4c/8
5. Ss 4B/4 playground, ss 4B walking field and playground
6. Basketball public court, jalan ss 4c/9, jalan ss 4c/16
7. Ss 4D basketball field and playground, jalan ss 4d/12 (dekat dengan kaw komersil)
8. Madrasah persaudaraan islam, kelana jaya, jalan ss 4b/11
9. Ss 4D/6 playground, jalan ss 4d/4

Commercial area

02 ss 4 pub & restaurant, jalan ss4/17

Saxco marketing sdn bhd, jalan 4c/5

Kee kee bentong chicken rice ah kua bak kut teh

Otherwise café, jalan ss 4D/14

Pedestrian walkway

Jalan SS 4B/16, dekat madrasah persaudaraan Islam, kelana jaya

Jalan SS 4B/18

SMK Kelana Jaya

Jalan Bahagia

Bahagian Penguatkuasaan Jabatan Kastam.









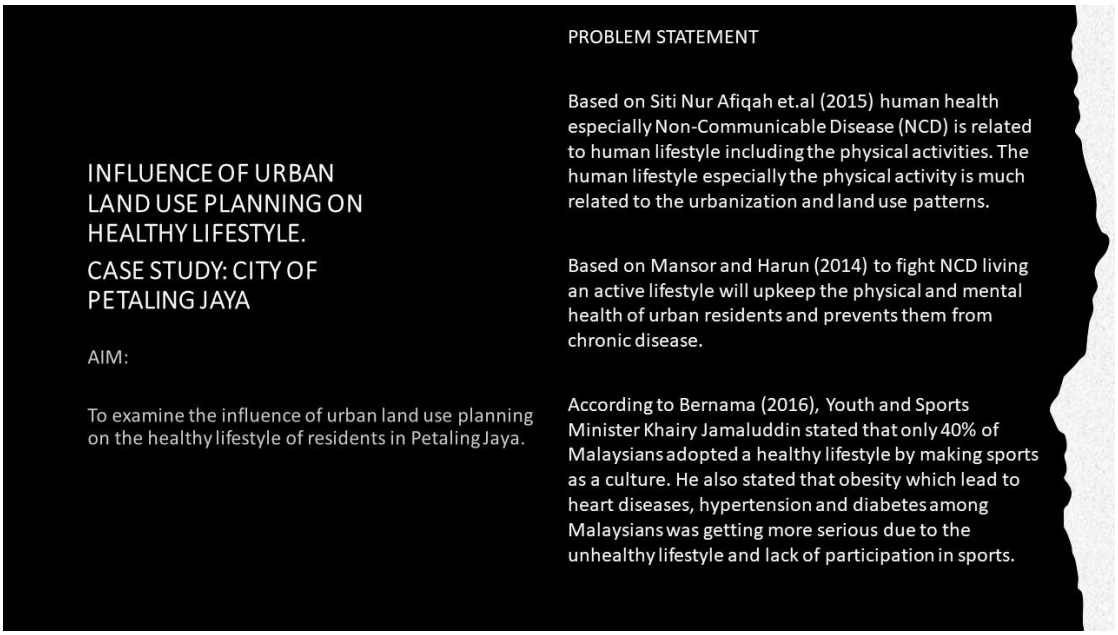


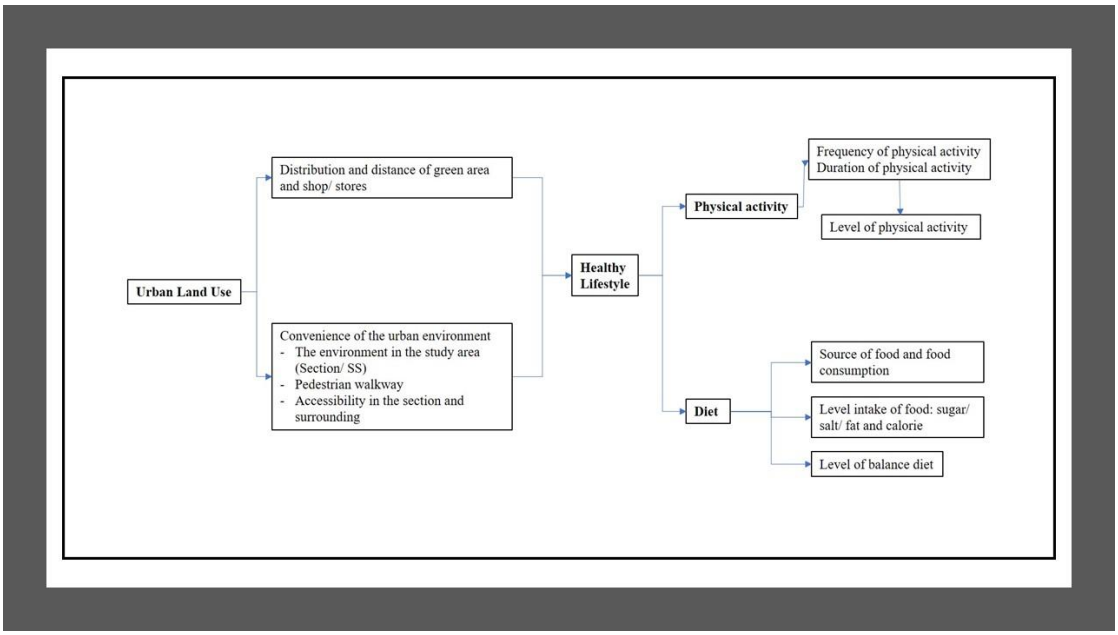

RESTORAN KAR HEONG

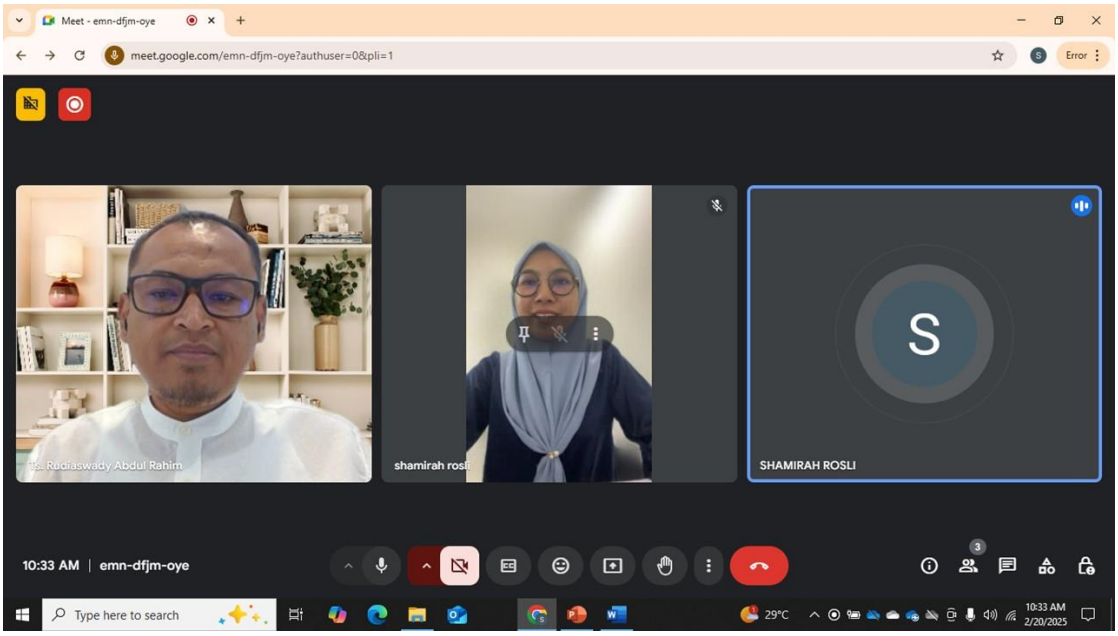
APPENDIX 3

Introduction Slide Presentation to the Expert Interview regarding the Research






Urban Land Use
Distribution and distance of green area and shop/ stores
Convenience of the urban environment
- The environment in the study area (Section/ SS)
- Pedestrian walkway
- Accessibility in the section and surrounding
Healthy Lifestyle
Physical activity
Frequency of physical activity
Duration of physical activity
Level of physical activity
Diet
Source of food and food consumption
Level intake of food: sugar/ salt/ fat and calorie
Level of balance diet


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APPENDIX 4

Expert Interview

Malaysian Association Environmental Health (MAEH)
No. 29-2, Jalan Empire 1A, Taman Equine
43300 Seri Kembangan
Selangor Darul Ehsan
20 February 2025

R: Ts. Rudiaswady Bin Abdul Rahim – Setiausaha Kehormat Persatuan Kesihatan Persekitaran (MAEH), Pensyarah di Institut Latihan Kementerian Kesihatan Malaysia, Sungai Buloh

S: Shamirah Binti Rosli

S: Pertama sekali saya ingin mengucapkan ribuan terima kasih kepada Tuan kerana sudi menerima pelawaan saya untuk ditemu bual bagi kajian saya. Saya juga amat menghargai kerana Tuan dapat meluangkan masa memandangkan Tuan juga mempunyai kekangan masa.

R: Iya Insyaallah.

S: Jadi saya mulakan dahulu dengan memperkenalkan diri saya. Saya Shamirah Binti Rosli. Saya merupakan pelajar PhD daripada Kolej Alam Bina, UiTM Shah Alam. Saya mempunyai tiga (3) orang penyelia. Penyelia utama ialah Prof Madya TPr. Dr. Oliver Ling Hoon Leh daripada Kolej Alam Bina UiTM Shah Alam, penyelia kedua, Prof Madya TPr. Dr. Marlyana Azyyati Marzukhi juga daripada fakulti yang sama dan penyelia ketiga, Prof Madya Dr. Farah Ayunie Shafie daripada Fakulti Sains Kesihatan, UiTM Puncak Alam. Okay, jadi boleh saya minta Tuan perkenalkan diri dahulu?

R:Boleh. *Bismillahirrahmanirrahim. Assalamualaikumwarahmatullahitaalawabarakatuh*. Selamat Pagi, Salam Sejahtera, Salam Malaysia Madani. Selawat ke atas Rasul, Selawat ke atas junjungan Nabi kita

Allahumma Solli 'ala Muhammad. Semoga kita dipermudahkan segala urusan kita pada hari ini, *Insyaallah*. Saya juga mengucapkan terima kasih kepada Puan Shamirah Rosli yang telah memilih saya untuk menjalankan ataupun mengaadakan sesi temu bual bagi perjalanan pengajian Puan di peringkat PhD dalam bidang Alam Bina dan *Insyaallah* saya akan memberi kerjasama yang baik dan juga input yang baik seperti mana yang telah dikehendaki untuk menyiapkan penyelidikan dalam untuk menamatkan PhD. Okay, saya memprkenalkan diri saya juga. Saya Ts. Rudiaswady Bin Abdul Rahim. Berumur 44 tahun. Sekarang ini bertugas di Institut Latihan Kementerian Kesihatan Malaysia, Sungai Buloh sebagai Pensyarah di institut latihan di bawah Program Kesihatan Persekitaran dalam bidang Perundangan dan juga Kesihatan Persekitaran, dan saya juga daripada.. *background* Environmental Health dan selain daripada itu juga saya terlibat dalam *Association* selaku Setiausaha Kehormat dalam Persatuan Kesihatan Environment Malaysia atau lebih dikenali sebagai (MAEH) atau dalam bahasanya iaitu Persatuan Kesihatan Persekitaran Malaysia. Jadi saya dah bertugas hampir 22 tahun, Insyaallah saya akan memberikan maklumat yang sepenuhnyalah. Dan untuk makluman juga saya baru sahaja menamatkan pengajian saya di peringkat Sarjana di Universiti Kebangsaan Malaysia (UKM) dalam jurusan Pengurusan Persekitaran di Fakulti Sains Sosial Kemanusiaan. Baru sahaja menamatkan pengajian saya dan baru sahaja *graduate* pada bulan Disember 2024. Dan untuk makluman saya juga baru selesai balik daripada mengerjakan Umrah lebih kurang daripada 21 haribulan Januari hari tu la. Insyaallah. *Condition* tu agak tak berapa nak sihat sikit lah. Saya sekarang ni berada di Jitra, Kedah kerana ada lawatan klinikal pelatih-pelatih Program Diploma Kesihatan Persekitaran, dan dalam masa yang sama juga saya terlibat dalam beberapa teknikal dari segi perundangan, dan untuk makluman semalam ada kes perbicaraan di Mahkamah Majistret Jitra jadi saya bersama-sama dengan pegawai-pegawai kesihatan persekitaran di negeri Kedah untuk sama-sama mengendalikan kes perbicaraan di mahkamah Jitra. Itu saja daripada saya.

S: Okay, terima kasih Ts. Rudiaswady. Saya juga ingin mengucap tahniah kerana telah meghabiskan pengajian peringkat Sarjana. Untuk hari ini, saya ingin menemubual Tuan secara umumlah untuk saya dapatkan pandangan Tuan dari bidang kepakaran Tuan berkenaan dengan kajian saya. Jadi saya pun taknak ambil masa lama juga daripada masa Tuan. Tuan boleh nampak ya apa yang saya *share* di skrin?

R: Okay, boleh.

S: Kajian saya berkenaan dengan pengaruh guna tanah terhadap gaya hidup sihat. Di mana secara umumnya, bagaimana seorang perancang bandar menyusun setiap aktiviti guna tanah yang dapat menggalakkan individu melakukan gaya hidup sihat. Di sini tujuan kajian saya adalah untuk mengenalpasti pengaruh perancangan guna tanah bandar terhadap gaya hidup sihat di dalam kawasan Bandaraya Petaling Jaya. So saya punya Case Study adalah di Bandaraya Petaling Jaya. Problem statement bagi kajian saya adalah jika dilihat secara global WHO. Kita dapati bahawa punca kematian tertinggi adalah merupakan *Non- Communicable Disease (NCD).* Melalui pembacaan saya, saya mendapati antaranya adalah penyakit jantung, *Diabetes*, *High Blood Pressure.* Jadi berdasarkan problem statement ini, kajian-kajian sebelum ini, salah satu contoh daripada Siti Nur Afiqah (2015), beliau menyatakan bahawa *NCD* berkait rapat dengan gaya hidup. Salah satunya adalah *Physical Activity*. Beliau juga menyatakan bahawa gaya hidup sihat berkait juga dengan pembangunan bandar dan juga corak guna tanah. Berdasarkan Mansor dan Harun (2014) menyatakan untuk kita menangani *NCD*, kita perlu mengamalkan gaya hidup sihat. Berdasarkan Bernama (2016), terdapat hanya 40% rakyat Malaysia yang mengamalkan gaya hidup sihat dan menjadikan sukan sebagai aktiviti fizikal. Untuk kajian saya, bagi saya mengenalpasti pengaruh perancangan guna tanah bandar terhadap gaya hidup sihat, saya menggunakan beberapa *indicator* bagi aspek-aspek guna tanah bandar terhadap gaya hidup sihat. Sebelum itu, saya ingin memaklumkan kepada Tuan, Petaling Jaya, Selangor merupakan case study saya. Saya memilih lebih kurang tujuh Seksyen/ SS bagi kajian saya kerana seksyen-sekyen tersebut merupakan pembangunan yang paling awal berbanding PJS, PJU. Jadi saya menggunakan responden yang dipanggil matang untuk kajian saya. Setiap seksyen mempuyai perbezaan guna tanah, di mana terdapat guna tanah perumahan, guna tanah yang lebih kepada industri, ada yang lebih kepada komersial dan bagaimana perbezaan guna tanah mempengaruhi gaya hidup sihat. Kembali kepada slide presentaion tadi, di mana saya mengambil kira beberapa aspek untuk dijadikan sebagai indicator perancangan guna tanah iaitu pengagihan kawasan hijau dan juga *commercial area* yang terdiri daripada rumah-rumah kedai, *shopping complex. Indicator* seterusnya ialah convenience of the urban environment di mana kita akan lihat persekitaran seksyen itu tersendiri samada responden di setiap seksyen selesa atau pun tidak selesa dalam mereka menjalani aktiviti harian mereka. Kita lihat dari segi keselamatan, *accessibility*

residents untuk pergi dari stu tempat ke satu tempat. Di sini kita lihat, adakah perancangan guna tanah boleh menggalakkan penduduk di kawasan tersebut menjalankan aktiviti fizikal? Sebagai contoh penyediaan kawasan hijau seperti taman rekreasi atau taman permainan kanak-kanak yang disediakan dalam kawasan perumahan dan juga kawasan komersial, adakah dapat menggalakkan individu melakukan aktiviti fizikal? Aspek seterusnya adalah gaya hidup sihat. Mengikut pembacaan saya sebelum ini, terdapat lima (5) faktor gaya hidup sihat iaitu *physical activity, healthy diet, tobacco use alcohol dan BMI*. Bagi kajian saya, saya memilih dua faktor iaitu physical activity dan diet kerana ia merupakan faktor utama bagi gaya hidup sihat berdasarkan kajian-kajian sebelum ini. Bagi mengukur kadar aktiviti fizikal penduduk di Petaling Jaya, saya menggunakan *frequency and duration of physical activity*. Bagi mengukur diet penduduk di Petaling Jaya saya menggunakan source of food and food consumption sebagai pengukur. Contohnya penduduk mendapatkan sumber makanan daripada *home cook*, atau pun makan di luar samada di restoran biasa atau pun di fast food restaurant atau *organic food*. Saya juga bertanya mengenai level of balance diet setiap responden di Petaling Jaya. Jadi ini secara umumlah kajian saya. Di sini saya sertakan contoh bagaimana saya melihat aspek-aspek perancangan guna tanah terhadap gaya hidup sihat. Berikut merupakan pelan guna tanah Seksyen 9 di mana terdapat guna tanah perumahan, kawasan hijau, kawasan komersil dan sebagainya. Untuk menilai pengaruh guna tanah terhadap gaya hidup sihat (aktiviti fizikal dan diet), saya melihat *walkability* responden untuk ke kawasan hijau dan kawasan komersil. Di samping itu aspek keselesaan juga diambil kira. Sebagai contoh, Seksyen 9 berdekatan dengan Taman Kelana Jaya dan jaraknya adalah dalam lingkungan *walking distance*, tetapi adakah responden mudah untuk *access* ke taman tersebut memandangkan responden perlu melalui jalan besar/ jalan utama untuk sampi ke taman tersebut. Penilaian yang sama juga bagi responden untuk ke kawasan komersil. Contoh lain adalah, walaupun kawasan lapang terletak dalam kawasan perumahan itu sendiri adakah penduduk menggunakannya? Adakah kawasan hijau tersebut mudah dan selesa untuk digunakan? Jadi seterusnya saya ingin mendapatkan pandangan Tuan dari bidang kepakaran Tuan. Terima kasih.

R: Boleh saya teruskan ya? Bismillahhirrahmanirrahim. Terima kasih di atas penerangan dan juga pembentangan berkaitan dengan kajian yang dijalankan. Di sini saya nyatakan bahawa faktor guna tanah yang sememangnya sekarang ini difikirkan

sangat penting terutama sekali kepada penduduk ataupun masyarakat berdasarkan kepada kawasan kajian iaitu di Petaling Jaya. Apabila dikaitkan dengan isu-isu keselamatan, isu-isu kesihatan seperti diet dan sebagainya dan dipengaruhi dengan faktor guna tanah yang bersesuaian yang perlu dibuat perancangan awal bagi memudahkan semua aspek dan juga aktiviti-aktiviti manusia ini terpelihara berdasarkan aspek-aspek keselamatan dan juga keperluan penduduk bagi kehidupan mereka seharian. Di sini saya nyatakan, apabila kita berbalik semula kepada lebih kurang dua puluh (20) tahun ke belakang di mana Petaling Jaya ni, pembangunan dia tidaklah sama seperti sekarang ini. Jadi faktor guna tanah itu boleh dikatakan dalam keadaan masih lagi terancang dengan semua aktiviti termasuklah penduduk di sekitar kawasan PJ, terutama yang melibatkan seksyen ni selalunya dalam Seksyen dan juga SS ni kebanyakkannya adalah kawasan penempatan ataupun kawasan perumahan. Apabila kita berbalik kepada 20 tahun ke belakang, di mana pada ketika itu perancangan yang telah dibuat oleh pihak perancang bandar melalui dalam aspek urus guna tanah dan sebagainya telah disusun mengikut keperluan semasa dan juga yang telah ditetapkan, mungkin yang boleh saya katakan di sini, yang telah ditetapkan oleh pihak Kerajaan Negeri Selangor dan juga perundangan-perundangan yang telah sediada oleh pihak berkuasa tempatan, untuk dijadikan prasarana seperti penempatan dan juga perumahan. Dalam memajukan sesuatu kawasan, penempatan-penempatan tersebut wujud apabila ada faktor-faktor ekonomi dan juga aktiviti-aktiviti pendidikan terutamanya. Jadi apabila nak wujudkan sesuatu kemudahan guna tanah yang melibatkan faktor-faktor ekonomi, aktiviti pendidikan dan sebagainya kita memerlukan penempatan-penempatan penduduk untuk kita menjalankan aktiviti-aktiviti tersebut. Daripada situ, ekonomi Kerajaan Negeri Selangor terutamanya di kawasan Petaling Jaya perlu dititikberatkan bagi Selangor maju ketika itu. Jadi prosesnya misalnya guna tanah perumahan, pihak berkuasa tempatan mendapatkan cukai pintu dan cukai tanah, penggunaan tanah dan sebagainya dan juga prasarana berkaitan dengan sekolah atau pun pendidikan atau pun industri. Jadi dalam aspek yang saya katakan ini, apabila penduduk telah mendiami sesuatu kawasan yang telah dibina, mereka akan memilih suatu tempat atau pun lokasi yang berdekatan dengan tempat kerja, dan selain daripada itu juga dalam faktor guna tanah yang melibatkan ada hubung kait dengan penduduk, mereka ini akan memilih satu keadaan yang selesa dan saya rasalah pada 20 tahun sebelum ini adalah keadaan yang sangat selesa. Tiada jalan *jammed*, *parking* kereta tak *crowded*, prasarana aktiviti-aktiviti masih lagi dalam keadaan ada pokok, *green areas*

dan sebagainya dan mereka pun bebas dalam beraktiviti beriadah di samping keluarga dan sebagainya pada ketika itu. Jadi jika kita lihat hari demi hari, daripada 20 tahun sebelum hinggalah sekarang ini tahun 2025, pembangunan semakin dirancang dan digunakan faktor guna tanah dan sebagainya. Pada ketika itu penduduk-penduduk di kawasan Petaling Jaya mempunyai masa, ruang dan keadaan selesa kerana pada ketika itu kawasan-kawasan tersebut telah dibangunkan dan mempunyai fasiliti yang telah ditetapkan. Jadi, mereka bebas untuk pergi ke kedai dalam keadaan ketika itulah. Jika kita lihat ketika ini dari segi faktor keselamatan dan sebagainya. Penduduk ini sebenarnya apabila mereka mendiami di kawasan-kawasan bandar mereka hanya memikirkan keadaan yang mudah untuk access, selesa untuk access dan mereka juga akan memikirkan faktor keselamatan. Apabila pada ketika itu mereka mendiami 20 tahun sebelum ini, keadaan keselesaan itu, faktor keselamatan berada pada keadaan yang boleh dikatakan neutral, tiada lagi peningkatan jenayah, kenderaan-kenderaan dan juga sebagainya masih lagi berkurangan, faktor guna tanah mereka boleh access dalam kawasan-kawasan kebun dan sebagainya. Saya terlibat dalam aktiviti kawalan denggi di kawasan Petaling Jaya, kita menyatakan bahawa apabila kita menjumpai tempat-tempat pembiakan di kawasan-kawasan flat, kawasan di luar rumah, kerana mereka (penduduk) menggunakan aktiviti di sekitar kawasan tanah mereka seperti bercucuk tanam, menanam pokok-pokok yang boleh digunakan untuk memasak contohnya seperti pokok kari, serai, pokok cili. Jadi ketika itu kawasan-kawasan guna tanah itu masih lagi boleh digunakan oleh penduduk untuk beraktiviti. Jadi apa yang saya nak kaitkan di sini, dalam aktiviti kawalan denggi 20 tahun sebelum itu, mereka (penduduk) ini telah pun mengadakan aktiviti-aktiviti riadah menggunakan faktor guna tanah di sekitar kawasan mereka dan kawasan-kawasan itu masih lagi kawasan yang boleh diguna dan tidak dikawal selia. Jika kita lihat ketika ini, perancangan demi perancangan telah pun diatur, bermaksud dahulu jika kita lihat kawasan-kawasan penempatan sudah pun dibuat, di kawasan Petaling Jaya lorong-lorong belakang langsung tidak boleh masuk semua ada gate. Sekarang ini jika resident duduk di sini, kawasan taman di sebelah buka tingkap pun nampak tapi mereka susah nak access sebabnya mereka terpaksa naik kenderaan, terpaksa pergi ke roundabout and then u-turn balik. Jadi dalam aktiviti fizikal dan juga diet ataupun faktor kesihatan. Mereka menampakkan bahawa er mereka susah nak akses eh. Susah nak akses. Kadang-kadang kita nak tengok dari segi fasiliti jalan raya mereka walaupun dekat tapi mereka nak cross jalan tu tak boleh kerana terpaksa laluan dan sebagainya. So jadi apa yang saya kata dekat sini a penduduk

ataupun residen ni sebenarnya mereka perlukan dalam keadaan yang mudah untuk kita asses walaupun di sebelah rumah sebab Semua penduduk-penduduk di bandar ni mereka ni mempunyai masa yang sangat terhad. Satu apabila mereka telah bertugas ataupun bekerja dalam tempoh 8 jam bertugas dan perjalanan balik juga ambil masa lebih kurang 2 jam dan hanya mempunyai masa hanya sedikit sahaja. Dan kadang-kadang aktiviti-aktiviti kesihatan seperti diet dan sebagainya tu terpaksa dibuat sebelah malam dan kerana dan juga kebanyakannya adalah pada hari minggulah. Kebanyakan kalau kita tengok di kawasan Petaling Jaya hari minggu Memanglah aktiviti-aktiviti riadah ni sangat tinggi, sangat banyak. Jadi yang saya boleh katakan disitu kita nak relate kan bahawa masa, okey keperluan masa mereka, keperluan keluarga dan sebagainya sangat terhad. Jadi hanya menggunakan pada hari minggu sahaja. Jadi dalam faktor tersebut mereka terhad untuk menjalankan aktiviti semua tu, kecuali pada hari minggu. Hari minggu ni kadang-kadang kepada yang berkeluarga mungkin akan er menggunakan masa dan aktiviti mereka er di sebelah hari minggulah. Kecuali kalau kata residen tu memang masih lagi bujang dan mempunyai masa yang a banyak dan mereka pun a apa pengurusan masa yang baik mungkin dia boleh a menggunakan, melakukan joging dan sebagainya. Dan selain daripada itu juga apa yang kita tengok sekarang ni a selain daripada faktor-faktor er penduduk yang perlu dikaitkan adalah dari segi keselamatan. Mereka bimbang apabila, keselamatan ni banyak. Bukan kata keselamatan jalan raya saja, keselamatan ni juga dari segi aspek jenayah okey er kecurian er dan pelbagai lagi dia aspek keselamatan dan mereka ni membimbangkan bahawa contoh er kalau kata er kawasan di kawasan Petaling Jaya ni yang melibatkan isu keselamatan dan sebagainya mereka sukar untuk seperti anak-anak kanak-kanak sekarang sukar untuk mereka nak membebaskan anak-anak mereka untuk sesi beriadah. Jadi kalau daripada generasi muda untuk nak sampailah mereka ni susah sebab mereka tidak boleh mereka perlu bersama dengan anak-anak untuk keselamatan. Mereka tak boleh nak access sepenuhnya. Macam contohnya saya ambil contoh pasal isu Rayyan lah mak ayah tak boleh nak apa ni nak bebaskan anak-anak untuk pergi beriadah. So jadi kalau nak pergi beriadah mesti perlu dengan parent. Parent kena sekali. Jadi kekangan parent pula saya kaitkan tadi 8 jam bertugas masa yang terhad, terpaksa nak pergi sesuatu taman dan sebagainya menggunakan kenderaan. Jadi menjadi kekangan kepada merekalah. So jadi aktiviti-aktiviti tersebut jadi berat kerana faktor guna tanah dalam perancangan aktiviti-aktiviti bangunan perlu difikirkan a kena ada mungkin kalau kalau kita tengok sekali dari segi pembangunan di kawasan Elmina contoh a dah ada

kawasan dalam a residen dalam green area, dalam kawasan taman dan dalam keadaan kesesuaian itu dalam keadaan yang selamat dan mereka pun dalam kalau kata beli rumah dekat situ di situ ada banyak fasiliti ada kawasan taman, ada access untuk er pergi shopping dan ada dan sebagainya apa semua ada zon-zon yang telah ditetapkan untuk residen tersebutlah. So jadi a apa yang dikaitkan dekat sini juga adalah a berkaitan dengan isu persekitaran dan juga kesihatan persekitaran yang mana apabila dikaitkan dengan perancangan dan juga faktor guna tanah yang tidak terancang dan melibatkan aktiviti-aktiviti residen. Di situ juga boleh menyebabkan a kesan rumah hijau a kalau kita tengok sekarang ni a kenderaan yang tinggi, kenderaan yang banyak yang boleh menyebabkan a pengaruhnya kesihatan kepada mereka. Itu sebab kalau kita tengok sekarang ni a penduduk-penduduk di bandar ni a walaupun a dalam keadaan berusia walaupun dalam keadaan dalam 40-an wajah mereka tu dalam keadaan berusia seolah-olah a 50 dan 60. Sebab itu adalah faktor kesan rumah hijau yang memberi kesan kepada penduduk kita. Ah sebab mereka pada asal dasarnya pada guna tanah itu perlu di dititikberatkan dalam perancangan a yang boleh dikatakan a a dalam faktor keselamatan dan juga keselesaan keluarga juga. Dan selain daripada itu berkonsepkan pada ketika ini yang mana kesemua kawasan-kawasan guna tanah tu adalah yang terlibat oleh pihak kuasa tempatan. Contoh macam Petaling Jaya er mungkin dalam majlis bandaraya Petaling Jaya dan juga yang di mana dikawal a diadakan perancangan a maksudnya a town planer okey a yang perlu dibuat perancangan dan dalam masa yang sama juga a perancangan-perancangan a faktor guna tanah ni dia terlibat dalam faktor ekonomi. Bermaksud setiap pembangunan yang menjalankan apa Apakah income? Maksudnya income baik, pendapatan balik kepada pihak kuasa tempatan dan juga pihak pihak kerajaan negeri. A dalam dari segi penempatan er setiap pembangunan yang dijalankan. So mesti ada ada income yang dapat semula. So itu peran yang telah yang mungkin yang telah dirancangkan oleh kuasa tempatan. Jadi faktor-faktor ini juga akan memberi kesan er yang boleh dikatakan tidak tidak selamat kepada penduduk terutamanya. Sebab sebabnya kebanyakan fasiliti-fasiliti yang diberikan semuanya aktiviti-fasilitah apabila kita teng a apa ni tak ada kawasan-kawasan tanah a kawasan yang nampakkan ada a penampakan hijau, pokok-pokok kebanyakan dibirikan dalam dalam setiap orang tu building yang tinggi rumah bagaim kita katakan semua Jadi rumah tu di situ akan ada kesan rumah hijau yang memberi kesan kepada semua penduduk terutamanya penduduk-penduduk yang yang berada di kawasan-kawasan flat dan juga kawasan-kawasan yang berada di masukkan terce area ataupun kawasan landed kawasan rumah

landed. Sebab a pendaraan dan juga aa sistem udara di kawasan tersebut telah pun menjadi terhalang dan selain daripada itu juga akan menjadi kelembapan dan memberi kesan kesihatan persekitaran kepada penduduk tersebut. Kesannya adalah kalau kita tengok mereka ni akan lebih er cepat turuk dan a kesihatan terganggu dan juga a selain daripada itu juga lucuknya a penyakit-penyakit a tidak berjangkit. Ah contoh kalau segi kalau kita tengok dari segi akut pernafasan akan memberi tekanan stres kepada penduduk dan menyebabkan tekanan darah tinggi. Jadi di samping itu juga untuk menjalankan aktiviti-aktiviti sihat mereka sukar untuk er beriada dan kesan itu akan mengis jantung dan sebagainya dan faktor pemakanan juga mempengaruhi di mana a penduduk-penduduk di mana ni mereka ni lebih gema kepada a bukan masak terus maksudnya bukaniti yang dimasak sendiri di step keluarga tersebut mereka lebih suka untuk senangkan sebab masak mereka beli kedai dan mereka akan ataupun sekarang ni dan sebagainya. So ataupun makanan-makanan fast food. So jadi apabila a tiada makanan seimbang kesan kesihatan kepada penduduk juga akan memberi kesan yang sangat a tinggi. Okey. Jadi dengan jumlah tersebut a penduduk memang akan berfikiran macam tu. Kalau kita tengok sebab er penduduk ataupun manusia ni dia akan mempengaruhi di antara satu sama Contoh jiran eh. Okey. Jiran ni dia akan kata, "Oh, saya lebih mudah beli senang ah." Balik kerja makan-makan and then saya rehat dan tidur. Jadi dia menceritakan kepada jiran tersebut. Jadi jiran yang di sebelah ni juga sedangkan waktu dia telah mengamalkan kayu yang sihat, masak yang secara aasi, dimasak oleh a isteri dan sebagainya, makanan yang seimbang tetapi dipengaruhi oleh a jiran sebelah. Jadi dalam keadaan itu a lama kelamaan jiran tersebut juga er terikut-ikut dengan apa ni dengan punya saiz masak tu kurang a dan di lah kalau kita tengok tu dia akan beri so selain daripada itu juga a faktor ekonomi dan juga saran hidup di mana harga barang juga tinggi komitan manusia hanya kalau kita tengok kebanyakan lebih kepada nak berjimat dan er kesan kesihatan makanan juga membu pendapatan-pendapatan ataupun harga barang yang semakin meningkat dan sebagainya. Dan di selain daripada itu juga er apabila ada er makanan-makanan yang contoh dihi ataupun makanan-makanan kebanyakan kalau kita tengok sekarang ni tidak dapat dikawal sepenuhnya. Ha contoh makanan-makanan yang tidak. Kalau kita tengok sekarang ni maggi semua yang memberi kesan yang yang sangat tinggi kepada kepada penduduk ataupun manusia yang seki yang berada di kawasan PJ lah dan er kawasan pertandingan boleh dikatakan kawasan er maju dan a perancangan yang kita tengok mungkin ada fasa-fasa yang ada perancangan a pengguna tanah ni yang telah pun diberi kawasan

perancangan yang telah diteraj dengan baik dan ada yang tidak diterajut dengan baik. Dan sini peranda adalah faktor-faktor bergolongan. Ada golongan B5G, ada golongan B40 dan ada golongan yang berbentuk anda kepada pandangan sederha anda pasan tinggi. Jadi ini juga mempengaruhi kesan dan budaya budaya hidup a masyarakat tulah. Kalau kalau kita kata kawasan apa ni penduduk yang pendapatan rendah mereka ni mungkin lebih kepada sikap a sikap mereka yang mungkin langkah pengatan guna apa saja tak ada aset nak pilih maksudnya benda-benda recycle dan sebagainya. So kara sederhananya mungkin dia ada perancangan tetapi dalam yang er masih lagi dalam panc untuk fasa yang seterusnya dan kalau keadaan tinggi ni mereka lebih lesen menggunakan semua apa yang mereka akan boleh sediakan kalau dari segi kurang dia kalau tak boleh taman sok bolehkan kabiliti dalam sepatutnya untuk pergi tempat-tempat lagu sihat dan sebagainya. So mungkin itu peringkat pertama untuk perangan saya Okey.

S: Terima kasih tuan dengan penerangan yang diberikan. Ah tapi betullah er sepanjang yang tuan bagi penerangan tu a a melalui kajian saya a memang ada result-r a yang saya dapat a berkenaan dengan a er makanan. Er maksudnya er bagaimana mereka mudah untuk mendapatkan makanan mudah untuk masak er di rumah sebab okey er macam tadi saya ah saya dapati aa buenan ada sentiasa sebut a aa bahagian rumah flat kan a okey sebab salah satu er a study area saya a dalam seksy aa ada termasuk juga rumah flat a tak silap saya di bahagian SS8 ada satu a flat dan apartmen low cost saya rasa dekat situ. Jadi saya dapati a okey and ada lagi satu apartment service apartment a jadi bahagian apartmen yang bawah tu kan memang dia dah ada sedia macam convenience store ke apa semua tu kan. Okey jadi saya result yang saya dapat salah satunya untuk SS8 ni memang ramai yang makan memilih untuk membeli makanan di luarlah bukan Home Cook. Ah contohnya kalau macam di seksyen sembilan dan seksyen 3 a iaitu dia merupakan kawasan kejirananlah rumah rumah teres ataupun rumah tanah lot kan. A di situ saya dapati memang mereka memilih untuk a home cook memasak sendiri. A jadi di mana kita boleh lihat yang er mereka yang mendiami perumahan er apa er kita panggil rumah rumah tinggilah rumah flat apartment semua a kepada ya ya ya tak apa tak ap takah ah jadi a di mana kita dapat lihat aah aa rumah-rumah rumah apartmen, rumah flat ni memang a dan a dan di SS8 bersebelahan dengan SS9A. SS9A ni a guna tanah dia hmm dia bukan kawasan kejeran, dia a apa perumahan yang tak teratur. Tapi dalam kawasan tu memang ada aktiviti er macam kedai runcit. Lepas tu ada macam

macam a kedai-kedai kita panggil warunglah lebih kurang warung macam tu. Jadi a apa yang saya boleh a kaitkan macam a penduduk di SS8 dan SS9A ni sendiri pun memang dia mudah untuk mendapatkan a makanan a luar maksudnya untuk tidak memasak di rumahlah. Ah jadi memang di situ pun ternampaklah berkaitan er kawasan a jenis guna tanah a aktiviti nakuh tanah di setiap seksyen tulah. Hmm.

R: Okey. A apa yang boleh saya kaitkan dekat sini a melalui apa ni a puan maklum dalam a di mana a apabila ada kita kena tengok ada servis apartment, ada a apartment yang low cost dan juga ada kawasan-kawasan flat mungkin kategori-kategori itulah. So jadi dalam faktor buna tanah ni kalau kita tengok dalam faktor sesuatu kawasan yang boleh dikatakan ada perjualanan. Contoh kalau kita nak masuk ke kawasan tu sebab penduduk ni dia akan sepenuhnya er untuk menambah pendapatan mereka. Sebab mungkin dari segi menjalankan perniagaan secara apa ni berai kan. Jadi kebanyakan itu ada penjaja mungkin ada penjaja semua kebanyakan a semua jenis-jenis makanan telah pun di situ. So jadi kalau kita tengok dari segi macam contoh Mungkin dia ada sebaya tapi kalau kita tengok semua makanan yang nak dimakan er dah tersedia di kawasan-kawasan tersebut dan a juga kalau kita tengok a kalau kata makan di luar a dalam aspek keselamatan dan juga a kesihatan a makanan dia juga makanan yang dikatakan makanan yang tidak sembanglah saya segi proses itu kita mempengaruhi er kayu kesihatan kepada mereka dan akan memberi er faktor-faktor yang mungkin menjejaskan kesihatan mereka dan di situ juga akan ada aing disease yang sangat tinggi dan di selain itu kita akan adalah a penyakit bidang penjag satu kapasiti yang sangat tinggi kepada a penduduk-penduduk di situ. Dan that's why lah kalau kita tengoklah er er kalau kita tengok Kebanyakan penduduk-penduduk di kawasan bandar terutamanya kawasan PJ dia akan mengi setiap pada hari Jumaat untuk menjalankan pemeriksaan rutin bagi ujian DP kan. So jadi benda tu a terseimbang dan faktor tanah ni apa yang saya kata mereka akan gunakan sepenuhnya ruang yang ada bagi menjalankan aktiviti ekonomi dan juga apa-apa pendapatan yang mereka perlu seperti perniagaan dan sebagainya dan juga apa aktiviti yang kita semua di kawasan-kawasan tersebut dia ada jadi home cook tu memang tak ada kalau dah makan sia-sia naik tidur contoh macam tulah kan jadi dari segi faktor environment pula kalau kita tengok di kawasan-kawasan yang low first year okey sebab dia tak ada a service apartment tak ada tempat cuma harap kepada pihak kalau di Petung Jaya tu mungkin pihak yang membersihkan kawasan tu dengan kutip sampah dan alam flora okey tapi apabila ada aktiviti er penyediaan makanan aktiviti

sampah. Ah itu juga melibatkan faktor-faktor dari segi kesihatan persekitan terman lalat, lipas, er tikus, a semut dan situ juga mempunyai a ada kesan lain. Contohnya a vektor fizik maksudnya ada a penyakit bawah vektornya tempat apa ni persekitaran yang tidak selamat dan tidak seimbang dan akan menjadikan satu kawasan tersebut kawasan-kawasan yang boleh kasan a outbre area dari segi a out area sesatu penyakit dan kalau kita tengok Jaya tu memang ada a apa dia tinggi. So ada apa lagi?

S: Oh okey. A saya rasa a setakat ni okey maksudnya a saya dah dapat a pelbagai aspeklah pandangan daripada tuan. A dan saya rasa a mungkin sampai kat sini a lah a perbincangan a dan er keap memandangkan ah okey ya sampai di sini a sebab a terima kasih banyaklah kepada tuan kerana memberi input a kepada saya untuk saya meneruskan kajian saya dan memang banyaklah kiranya info-info yang mungkin saya terlepas pandang ataupun mungkin tak diambil kira. Jadi melalui daripada temual daripada tuan saya boleh menambah baik in kajian sayalah.

R: Okey saya tambah sikitlah. Saya tambah sikit berbahaya kita ni dan bahagian pihak perancang contoh eh carangan saya bahagian pihak perancang a perlu a ada kerjasama dengan a kesihatan persekitaran. Okey dengan kesihatan maksudnya sebagai perancangan Dalam untuk meng tanah sesuatu rancangan perlu ada dengan aspek kesihatan persekitaran di mana dalam aspekan persekitaran tu kalau kita tengok akan mempun secara keseluruhannya yang berkaitan dengan apa yang saya maksudkan tadilah dari segi komunikator disisnya dari segiya okey penyakit tidak penjangkit penyakit penjangkit jadi di situ adalah segala faktor dan daripada perancangan yang baik satu faktor guna tanah er ia juga akan memberi er kesan yang baik kepada kesan juga tapi di sini kawasan sekeliling maksudnya ada la kawasan taman okey jadi di situ akan menampakkan a budaya hidup sihat dan menyahiti dan juga gaya hidup a penduduk ataupun manusia yang ada di supaya lebih lebih siap kita faham bahawa faktor cuaca juga mempengaruhi kesan kita dan faktor cuaca juga memberi kesan kepada manusia itu juga faktor memberi kesan kepada jadi daripada situ kita perlu membuat perancangan yang baik a di mana a hasil daripada perancangan yang baik itu akan memberi kesan yang sangat baik dan juga selamat dan semua patut diberi daripada kesihatan persekitaran maksudnya envirment bertenang so jadi kesan-kesan tersebut akan bebas daripada sini dan akan menjadi penduduk juga perancangan bandar tersebut akan lebih tersusun dan juga guna yang sihat yang menjadikan penduduk-penduduk

semua ni akan er merasa mereka lebih selamat dan juga terpelihara dalam kecamatan saya kata a kesihatan manusia sejakat maksudnya kesihatan usia tu dipengaruhi juga faktor perancangan dan tanah a faktor ekonomi a segala perusan pud keselamatan dan sebagainya

S: hmm okey okey oh aa apa er tuan cakap mengenai dengan er apa ni planner tadi. Er saya sebelum ni saya ada jumpa dengan Dr. Farah. Dr. Farah pun memang ada a menjelaskan jugalah a dia berkaitan dengan contohnya a kalau kita buat pembangunan mungkin design bangunan tu sendiri er yang boleh er mungkin menimbulkan masalahlah. Contohnya macam er Dr. Farah ada jelaskan yang er Kalau kita buat bangunan yang a mungkin boleh menakung air di mana a apa denggi boleh nilah. Ah so saya saya faham a untuk er pihak perancang air bekerjasama dengan a bahagian a persekitaran a kesihatan persekitaran ni kan. A sebab memang dia dia amat berkaitlah a antara dua dua pihak ni.

R: Ya. A saya kata tadilah a bentuk dan juga design sesuatu bangunan dalam sesuatu tanah tu juga memperolehi er adalah faktor yang penting dan mewujudkan persekitaran yang sihat di mana kalau kita tengok sekarang ni er mungkin juga perancang akan ada dengan pihak arkitek pihak yang kesihatan persekitaran di mana kalau kita tengok okey bangunan mungkin kita boleh didikan satu tetapi bagaimana bentuk dan juga reka bentuk tersebut yang kalau kita tengok 5 tahun yang akan datang kesan-kesannya akan ada tangunan akan ah tangungan air dijejaskan oleh faktor cuaca tadi circle akan wujud jugalah indikator-indikator yang melibatkan berlakunya kesihatan persekitaran. Contohnya kalau kita tengok dari kalau kita tengok di kawasan a kawasan tu kawasan perumahan terus contoh kebanyakan a hanya menggunakan kawasan di bahagian hadapan saja. Bahagian belakang dah tak boleh nak buat apa-apa lagi. Kadang-kadang hanya ada romembukan er udara tak masuk a kawasan tak dijaga. So di situ akan memberi kesan yang kadang-kadang ada kawasan yang macam saya kata tadi terus duit terus ada keselamatan pusingan dan sebagainya. So di situ a apa yang a dari segi pengalaman saya adalah peningkatan yang sangat tinggi dan menjejaskan a an sejat dalam satu guna tanah di kawasan persatuan tersebut. Hmm. Okey. Okey. Okey. Okey. Baik tuan. Sekiranya memang sesi temu hari ini memang memberi input banyaklah kepada saya. Jadi sebelum kita berhenti di sini tuan boleh tak saya nak ambil gambar

dulu untuk rujukanlah. Okap. Satu dua tap saya rasa betul tak saya ambil nanti takut sekejap eh tuan screen share dekat dekat okey okey saya dah a dah full screen dah okey R: boleh saya ambil yang aa saya nak screen screenshot untuk yang ada slide tadi tak yang slide

S: ah boleh boleh boleh kejap eh saya share balik tapi dia rasa macam tak orang tak ramai satu ni datang Alright, thank you.

R: Okey dah eh.

S: Okey.

R: Okey.

S: Jadi tuan a okey sampai di sinilah sesi temubual kita. Aa okey. Jadi saya ucapkan terima kasih banyak kepada tuan aa sudi meluangkan masa untuk sesi tuan ni dan memang a input hari ni memang banyak bantu saya untuk a menyiapkan kajian saya. A jadi terima kasih banyaklah kepada tuan

R: ya. Sama. Semoga apa yang disampaikan dan apa yang diperlukan tu a objektif dia tu adalah sampai jugalah kepada puan untuk siapkan a pengajian PhD insya-Allah. So itu cadangan yang boleh saya bagi dan kalau jika ada apa-apa yang diikutkan a saya amat mengalukan. untuk dapatkan insya-Allah.

R: Ah okey. Okey. Baik puan. Terima kasih.

S: Okey. Sama-sama. Assalamualaikum.

R: Waalaikumussalam.

APPENDIX 5

Surat Jemputan Temubual

Shamirah Binti Rosli

Ts. Rudiaswady Bin Abdul Rahim

Malaysian Association Environmental Health (MAEH)

No. 29-2, Jalan Equine 1A, Taman Equine

43300 Seri Kembangan

Selangor Darul Ehsan 13 Februari 2025

Tuan,

Permohonan untuk Temu Bual Bagi Kajian Pengaruh Perancangan Guna Tanah Bandar Terhadap Gaya Hidup Sihat Di Petaling Jaya, Selangor (*Influence of Urban Land Use Planning on Healthy Lifestyle. Case Study: City of Petaling Jaya, Selangor*)

Dengan segala hormatnya merujuk kepada perkara di atas, saya Shamirah Binti Rosli pelajar bagi Program AP991- Doctor of Philosophy (Built Environment), Kolej Alam Bina, Universiti Teknologi MARA Shah Alam memohon untuk menemu bual Tuan bagi kajian yang sedang dijalankan.

2. Tujuan saya ingin menemubual Tuan adalah kerana saya ingin mendapatkan pandangan atau cadangan Tuan bagi kajian yang saya jalankan. Temu bual ini akan menumpukan beberapa topik utama termasuk:

- Peranan perancangan bandar dalam menggalakkan aktiviti fizikal dan diet yang sihat.
- Kesan Kawasan hijau dan kebolehlaluan pejalan kaki terhadap kesihatan
- Peranan pihak-pihak berkaitan dalam meningkatkan persekitaran bandar yang lebih sihat
- Cabaran dan peluang dalam mengintegrasikan aspek perancangan bandar dalam kesihatan.

3. Sesi temu bual ini dijangka akan berlangsung selama 30 minit dan boleh diadakan mengikut keselesaan Tuan, samada secara bersemuka atau atas talian.

4. Saya amat berbesar hati jika Tuan dapat menyumbang sedikit sebanyak pandangan dan pendapat bagi kajian yang saya jalankan ini. Kerjasama daripada pihak Tuan amat saya hargai dan saya dahulukan dengan ribuan terima kasih.

Sekian, terima kasih.

Yang benar,

(SHAMIRAH ROSLI)

APPENDIX 6

Surat Pemakluman Menjalankan Kajian Di Sekitar Petaling Jaya

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Petaling Jaya
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5 FEBRUARI 2020

Tuan,

MAKLUMAN MENJALANKAN KAJI SELIDIK DI SEKITAR PETALING JAYA

Dengan segala hormatnya merujuk perkara di atas.

2. Untuk makluman pihak tuan, pelajar seperti butiran di bawah merupakan pelajar di bawah seliaan saya. Beliau sedang menjalankan kajian yang bertajuk "Influence of Urban Land Use Planning on Healthy Lifestyle in Petaling Jaya".

Nama	: Shamirah binti Rosli
No. Pelajar	: 2017638128
Program	: Doktor Falsafah (Alam Bina)

3. Bagi menjalankan kajian ini, beberapa orang pelajar akan melakukan kaji selidik dengan mengedarkan borang kaji selidik kepada orang awam di sekitar Petaling Jaya.

4. Diharap pihak tuan maklum mengenai kaji selidik yang akan dijalankan. Segala kerjasama dan sokongan dari pihak tuan amat saya hargai dan saya dahulukan dengan jutaan terima kasih.

Sekian, terima kasih.

Yang benar,

.....

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AUTHOR'S PROFILE



Shamirah Rosli obtained Bachelor of Town and Regional Planning (Hons) in 2014. She later continues her study in Master of Science in Urban Development and Management upon completion of her degree and graduated in 2017. Both of her Degree and Master's Degree are from Universiti Tekonologi MARA (UiTM) Shah Alam, Selangor Darul Ehsan.

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