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Spatial and Socio-Economic Determinants of Fast-Food Consumption Among Urban Dwellers: A Geographical Analysis in Wattala–Mabola Urban Council, Sri Lanka

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ABSTRACT

Rapid urbanization and changing lifestyles have contributed to the increasing prevalence of fast-food consumption in cities around the world. In Sri Lanka, urban residents are increasingly relying on quick-service dining options, yet the spatial and socio-economic determinants shaping this behavior remain underexplored. This study investigates the influence of income, spatial proximity, and the distribution of fast-food outlets on consumption patterns within the Wattala–Mabola Urban Council area. A mixed-methods approach was employed. Primary data were collected through structured questionnaires distributed to 116 randomly selected residents using a stratified sampling method across 6 Grama Niladhari divisions based on ethnic composition. In-depth interviews with 15 purposively selected participants, systematic observations, and several secondary data including fast-food outlet locations and urban infrastructure complemented the dataset. Spatial distribution patterns were analyzed using ArcGIS 10.8, while socio-economic relationships were examined using independent chi-square tests and multiple regression analysis at a 0.05 significance level, controlling external factors. Theoretical interpretations were guided by Spatial Interaction Theory, the Behavioral Geography Model, Central Place Theory, Location Theory, Tobler’s First Law of Geography, and the Distance Decay Principle. Results indicate that fast-food outlets are highly concentrated in the southern region of Wattala–Mabola Urban Council area, particularly along the main roads and densely populated neighborhoods. Which is reflecting patterns of accessibility and economic activity. Independent chi-square analysis showed no statistically significant relationship between income or proximity and the mode of consumption, whereas multiple regression revealed ($R = 0.28$) a weak positive association between income and consumption frequency and a negative association with the distance.

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These findings suggest that although income and spatial accessibility influence fast-food consumption, modern urban factors such as mobility, food accessibility modes, and digital ordering moderate these effects. This study provides empirical evidence on how spatial structures and socio-economic factors jointly shape urban fast-food consumption, offering practical insights for urban planning, public health interventions, and policy development aimed at promoting healthier dietary practices in rapidly urbanizing settings.

Keywords: Fast-food, Proximity, Spatial distribution, Urban, Wattala–Mabola

1. INTRODUCTION AND BACKGROUND

Food remains one of the most fundamental human needs, yet the patterns of food consumption have undergone significant transformation across the globe due to rapid urbanization, lifestyle changes, and socio-economic transitions. In recent decades, the consumption of fast food has become an increasingly prominent trend, particularly in urban settings where convenience and accessibility often outweigh nutritional considerations. Fast food is generally characterized as ready-to-eat, commercially prepared food high in fat, salt, and sugar, designed for rapid consumption rather than long-term nutritional value (World Health Organization, 2016). This global dietary shift has generated growing concern among health researchers and urban planners, as the proliferation of fast-food outlets has been linked to unhealthy eating habits, obesity, and other non-communicable diseases (Libuy et al., 2022).

The rise of fast-food consumption is not limited to developed countries. Developing nations such as India and Sri Lanka are also witnessing similar patterns, particularly in urban areas where changing lifestyles and rising incomes have transformed traditional food habits (Pandey et al., 2020). In India, urbanization has been identified as a key driver of dietary change, with higher-income urban populations showing greater reliance on fast food, leading to nutritional insecurity. Comparable trends can be observed in Sri Lanka, where the increasing density of fast-food outlets in suburban areas reflects the growing influence of westernized food culture. The Wattala–Mabola Urban Council area, located within the Colombo metropolitan region, represents a dynamic urban environment where these global and local transformations intersect. The area's socio-economic diversity, proximity to major transportation routes, and ongoing commercial expansion have contributed to the proliferation of fast-food establishments, making it a compelling site for geographical inquiry.

Prominent international fast-food chains such as KFC, Pizza Hut, Domino's, and Dinemore have established outlets in Wattala–Mabola area, capitalizing on the area's urban vibrancy and accessibility. Their marketing strategies, including price discounts, take-away promotions, and delivery services, have further encouraged frequent consumption among residents. However, the clustering of these outlets raises critical questions about the spatial inequalities in access and the socio-economic factors that shape consumption behavior. Studies from countries such as Great Britain demonstrate that the proximity of fast-food outlets to residential areas and schools can significantly influence dietary patterns, particularly among children and young adults (Libuy et al., 2022). Thus, understanding the spatial distribution of fast-food outlets and their relationship to socio-economic characteristics is essential for identifying how urban geography influences health behavior and food choice.

From a geographical perspective, spatial patterns of consumption are not random but are shaped by socio-economic processes and locational dynamics. This study employs several geographical theories to interpret the observed relationships. Central Place Theory (Christaller, 1933) helps explain how the hierarchical organization of urban centers and income distribution influence the spatial concentration of fast-food outlets. Distance Decay Theory is relevant in examining how proximity affects consumption behavior, as accessibility tends to decrease with distance from outlets. Additionally, Behavioral Geography Models provide a framework for understanding how individual preferences, awareness, and decision-making are influenced by the spatial environment. Together, these theories support a comprehensive spatial-socioeconomic analysis of fast-food consumption within an urban context.

The growing prevalence of fast-food consumption causes serious implications for urban health and sustainability. The loss of nutritional balance, coupled with rising dependency on convenience foods, contributes to various health concerns, including obesity, cardiovascular diseases, and diabetes. Despite these challenges, limited empirical research has been conducted in Sri Lanka to examine the spatial and socio-economic determinants that influence fast-food consumption. This study seeks to address this research gap by exploring how spatial distribution, income levels, and proximity interact to shape consumption behavior in the Wattala–Mabola Urban Council area.

The findings of this research hold significant implications for urban planning, public health, and local governance. Identifying the geographical patterns and socio-economic drivers of fast-food consumption can inform targeted interventions to promote healthier urban environments. By integrating spatial analysis with socio-economic inquiry, this study contributes to a more holistic understanding of urban food behavior within the field of human geography.

The main objective of this study is to examine the spatial and socio-economic determinants of fast-food consumption in an urban context by analyzing the distribution patterns of fast-food outlets, associations with income and proximity, and the influence of these factors on consumption frequency within the Wattala–Mabola Urban Council area. And also, to map and analyze the spatial distribution pattern of fast-food outlets to identify clustering trends and accessibility variations within the Wattala–Mabola Urban Council area; to examine the association between income, proximity, and the mode of fast-food consumption using the independent chi-square test; to determine how income and spatial proximity influence the frequency of fast-food consumption using multiple regression analysis.

2. LITERATURE REVIEW

• Economic Factors

Economic status plays a significant role in shaping fast-food consumption patterns, particularly in urban contexts where disposable income and lifestyle convenience influence dietary behavior. A survey conducted among Malaysian youth revealed a clear relationship between income levels and the frequency of fast-food consumption. According to the study, 15.3% of respondents earning less than 4,849 MYR (Malaysian Ringgit) per month consumed fast food, compared to 83.7% of those earning between 4,850 and 10,959 MYR, while only 1% of individuals with monthly incomes above 10,960 MYR reported regular consumption (Hatta et al., 2022). This suggests that moderate-income groups are the most active consumers of fast food, likely due to their ability to afford convenience-oriented food without prioritizing health-conscious alternatives.

Similarly, research conducted in Bangladesh identified household income as a major determinant of fast-food consumption behavior. The study found that individuals from higher income households were more likely to consume fast food frequently, while those from lower income backgrounds showed less preference for such meals, often due to affordability constraints and adherence to traditional diets (Nusrat, 2022).

Comparable findings were reported in a study carried out in Udupi Taluk, Karnataka, India, where income levels were directly associated with the prevalence of fast-food consumption. Among participants, 26.3% of those earning less than Indian Rupees (INR) 10,000 per month consumed fast food, while the rate increased to 48.1% among those with monthly incomes between INR 10,000 and 20,000, before declining to 25.6% among those earning above INR 20,000 (Khongrangjem et al., 2018). These findings indicate that middle-income populations represent the most frequent consumers, as they balance affordability with the growing demand for convenience in food choices.

A study conducted in Anuradhapura, Sri Lanka, revealed a clear association between income level and fast-food consumption. The findings showed that 11.4% of respondents earning between Sri Lankan Rupees (LKR) 500 and 20,000 per month consumed fast food, compared to 39.5% among those earning LKR 20,000–50,000, and 49.1% among individuals with a monthly income exceeding LKR 50,000 (Uduruwana, 2015). This demonstrates that higher income groups are more inclined toward fast food consumption, likely due to increased purchasing power and lifestyle convenience associated with urban living.

Similarly, research conducted across the Gampaha and Colombo districts revealed varying levels of fast-food consumption across income categories. The study reported that 13% of participants earning less than LKR 10,000 per month consumed fast food, while the proportion was 10% among those earning LKR 10,001–20,000, 8% among those earning LKR 20,001–30,000, 13% among those earning LKR 30,001–40,000, 19% among those earning LKR 40,001–50,000, and 37% among those with monthly incomes above LKR 50,001 (Nirmani et al., 2017). These figures indicate that as income rises, the frequency of fast-food consumption also tends to increase, reflecting greater affordability and accessibility among medium and high-income groups.

Overall, both national and international studies confirm that fast food consumption is most prevalent among individuals with medium to high monthly income levels. This trend reflects not only economic capability but also lifestyle transformations associated with urbanization, modernization, and the growing appeal of convenience-oriented diets in contemporary society.

- **Spatial Factors**

A study conducted in the United States titled “*Fast-Food Landscape: Exploring Restaurant Choice and Travel Behaviour for Detroit Neighbourhoods*” revealed that most residents tend to visit fast food restaurants located near their homes, primarily due to accessibility and affordability. The study further noted that low-income households are more likely to patronize nearby outlets rather than travel longer distances to access restaurants offering greater diversity (Eckert & Vojnovic, 2017). Moreover, research in the United States has indicated that proximity to fast food restaurants is associated with higher levels of consumption and obesity. However, contrary to this assumption, Richardson et al. (2011) found no significant association between the proximity of fast-food outlets and consumption frequency, suggesting that other socio-economic or behavioral factors may mediate this relationship.

In an urban Canadian context, Liu et al. (2020) examined the relationship between time-weighted activity-space exposure to fast-food outlets and consumption patterns among youth. Their findings demonstrated a significant positive association between the number of fast-food outlets located within 500 meters to 1.5 kilometers of daily activity spaces and the frequency of fast-food consumption. Similarly, in Malaysia, Azmi et al. (2024) reported that 31.7 percent of consumers purchased fast food from outlets located within 2.5–3.5 kilometers of their residence, 19.8 percent within 3.6–4.5 kilometers, 15.1 percent within 4.6–5.5 kilometers, and 33.3 percent from outlets situated beyond 5.5 kilometers, emphasizing that proximity remains a critical factor in consumption behavior.

In Nigeria, spatial analysis of fast-food outlets in Calabar revealed that restaurants are strategically positioned near essential amenities such as schools, banks, and entertainment facilities. These outlets are often concentrated in densely populated neighborhoods, central business districts (CBDs), and tourist zones. The study further found that outlets located closer to consumers recorded higher visit frequencies (Eneyo et al., 2022).

Overall, evidence across diverse geographical contexts indicates that spatial accessibility plays a crucial role in shaping consumer choices regarding fast-food consumption. However, despite the growing body of literature on this topic, limited research has been conducted in Sri Lankan urban settings, particularly within local councils such as Wattala–Mabola area, to examine how spatial proximity influences consumption patterns in relation to socio-economic factors. This gap highlights the need for localized empirical investigations to understand the spatial determinants of fast-food consumption in the Sri Lankan context.

3. THEORETICAL FRAMEWORK

Urban food consumption is shaped by both spatial and socio-economic factors, and understanding fast-food consumption patterns in Wattala–Mabola area requires the application of several geographical theories. Spatial Interaction Theory (Reilly, 1931) suggests that higher-income individuals have greater mobility and purchasing power, enabling them to access a wider range of fast-food outlets, whereas lower-income groups tend to exhibit more localized consumption patterns. Complementing this, the Behavioral Geography Model (Golledge & Stimson, 1997) helps interpret individual choices, such as dining mode and frequency, by considering how environmental and socio-economic factors influence decision-making.

Central Place Theory (Christaller, 1933) and Location Theory (Weber, 1909) explain the strategic placement of fast-food outlets, which are often concentrated in higher-income areas to maximize accessibility, market potential, and profitability. In addition, Tobler's First Law of Geography (1970) and the Distance Decay Principle (Hagerstrand, 1967) emphasize the role of proximity: households located closer to fast-food outlets are more likely to consume frequently, while the likelihood of consumption declines as distance increases.

Together, these theories provide a solid foundation for analyzing the spatial distribution of fast-food outlets and the influence of income and proximity on consumption behavior. They support the use of independent chi-square tests to examine associations between socio-economic characteristics and mode of consumption, and multiple regression analysis to determine how income and spatial proximity jointly affect consumption frequency. By integrating these theoretical perspectives, the study can systematically interpret both the spatial and socio-economic determinants of fast-food consumption within the urban context of Wattala–Mabola area.

4. METHODOLOGY

4.1. Study Area

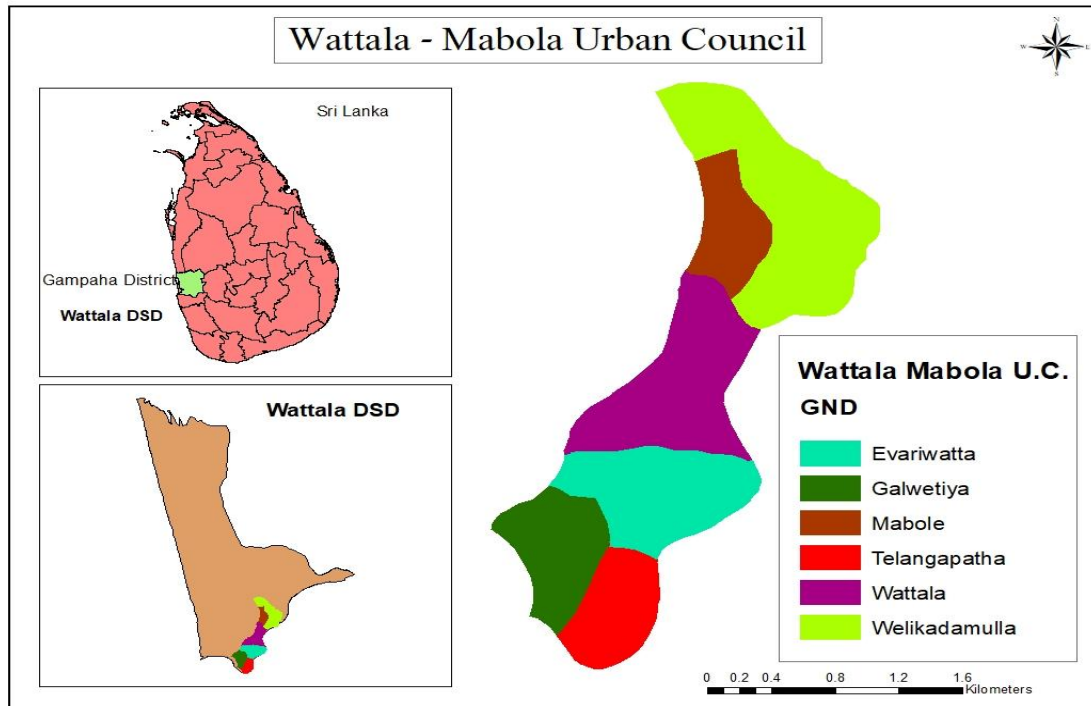


Figure 1. The study area was delineated by the researcher using data from the Wattala Divisional Secretariat and mapped with ArcGIS 10.8 software (2024).

The study was conducted in the Wattala–Mabola Urban Council, under the Wattala Divisional Secretariat Division in Gampaha District, Western Province, Sri Lanka. The division comprises 46 Grama Niladhari Divisions, six of which are fully developed and fall within the Urban Council. The area is located at 7.0021° N latitude and 79.9025° E longitude and is bounded by Negombo Lake to the north, the Kelani River to the south, Ja-Ela-Mahara Division to the east, and the Indian Ocean to the west.

With a population of 31,471, Wattala–Mabola is a rapidly urbanizing area characterized by a multicultural, multi-ethnic population. The area was selected for this study due to the absence of previous research on fast food consumption in this locality and its suitability for analyzing the influence of spatial and socio-economic factors, such as income and proximity, on consumption patterns in line with the study objectives.

4.2. Data and Data Collection Methods

Data for this study were collected using both primary and secondary sources, with primary data serving as the main basis of analysis. Primary data were obtained through structured questionnaires, interviews, and direct observation. The questionnaire was designed using a structured mixed-method approach and was administered to selected urban residents within the Wattala–Mabola area.

In addition, semi-structured interviews were conducted with two specific groups: seven government officers from the Wattala–Mabola Urban Council and the Wattala Divisional Secretariat Division, and eight members of the public, totaling fifteen participants. These interviews aimed to capture qualitative insights into the socio-economic and spatial factors influencing fast food consumption.

The direct observation method was employed to understand the spatial distribution of fast-food outlets and the socio-economic characteristics of the urban context. Secondary data were also collected from research reports, books, internet sources, satellite images (Sat), Open Street Map (OSM), and official publications, including the 2024 annual report of the Wattala Divisional Secretariat Division, to complement and validate the primary data.

4.3. Sampling Methods

This study employed a combination of probability and non-probability sampling methods. For the probability of sampling, a stratified sampling method was applied. The six Grama Niladhari (GN) Divisions within the Wattala–Mabola area were stratified, and samples were selected based on ethnic composition within each division. The total population of these six GN Divisions is 31,471. Considering the limited time frame and challenges in accessing a larger sample, a total of 116 respondents were randomly selected from the divisions of Telangapatha, Evariwatta, Wattala, Mabola, Galwetiya, and Welikadamulla. These respondents were categorized into five ethnic groups, and questionnaires were distributed proportionally, with one questionnaire representing approximately 300 urban dwellers (300:1).

The number of samples drawn from each Grama Niladhari Division is summarized in the following table.

Table 1. Questionnaire Sampling Table.

Grama Niladhari Divisions	Ethnic Groups					Total Samples
	Sinhala	Tamil	Muslim	Burgar	Other	
Telangapatha	9	3	2	1	1	16
Evariwatta	12	4	1	1	1	19
Wattala	7	4	1	1	-	13
Mabola	6	2	10	1	-	19
Galwetiya	5	5	1	-	-	11
Welikadamulla	12	6	18	2	-	38
Total Samples						116

Source: The Annual Report of the Wattala Divisional Secretariat Division (2024) was used by the researcher for the purpose of this study.

In addition, interviews were conducted using a non-probability purposive sampling method to gather qualitative insights from individuals with relevant knowledge and experience regarding fast-food consumption in the study area.

4.4. Data Analysis

The primary and secondary data collected for this study were analyzed using both quantitative and qualitative methods, in line with the research objectives. Quantitative data were subjected to inferential statistical analysis, while qualitative data were examined through thematic analysis.

To achieve the first objective, ArcGIS 10.8 software was used to delineate the study area and map the spatial distribution patterns of fast-food outlets. The spatial features have been converted into polygon, line and point data layers using the digital mapping (DMP) process from secondary data such as satellite images (Sat) and Open Street Map (OSM). The Spatial Interaction Theory (Reilly, 1931) was applied to interpret the observed spatial phenomena.

For the second objective, questionnaire data were analyzed using inferential statistical techniques. Independent chi-square tests were conducted at a 0.05 significance level to examine the influence of socio-economic factors on fast-food consumption, guided by the Behavioral Geography Model (Golledge & Stimson, 1997).

The hypotheses tested were as follows:

- H₀: Monthly income does not influence the method of obtaining fast-food.
- H₁: Monthly income influences the method of obtaining fast food.
- H₀: Distance to the restaurant does not influence the method of obtaining fast-food.
- H₁: Distance to the restaurant influences the method of obtaining fast food.

To address the third objective, multiple regression analysis was conducted at a 0.05 significance level (excluding the influence of external factors) treating the number of times fast food is consumed per month as the dependent variable and monthly income and distance to the restaurant as independent variables. Central Place Theory (Christaller, 1933) and Location Theory (Weber, 1909) were used to interpret the influence of income, while Tobler's First Law of Geography (1970) and the Distance Decay Principle (Hagerstrand, 1967) were applied to interpret the effect of proximity on fast food consumption.

The analyses were performed using the following standard equations:

- Multiple Regression - $Y = a + b_1x_1 + b_2x_2$
- Independent Chi-square Test - $\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$

MS Excel was used to manage and analyze the data efficiently.

5. RESULTS AND DISCUSSION

5.1. Mapping and Analyzing the Spatial Distribution Pattern of Fast-Food Outlets

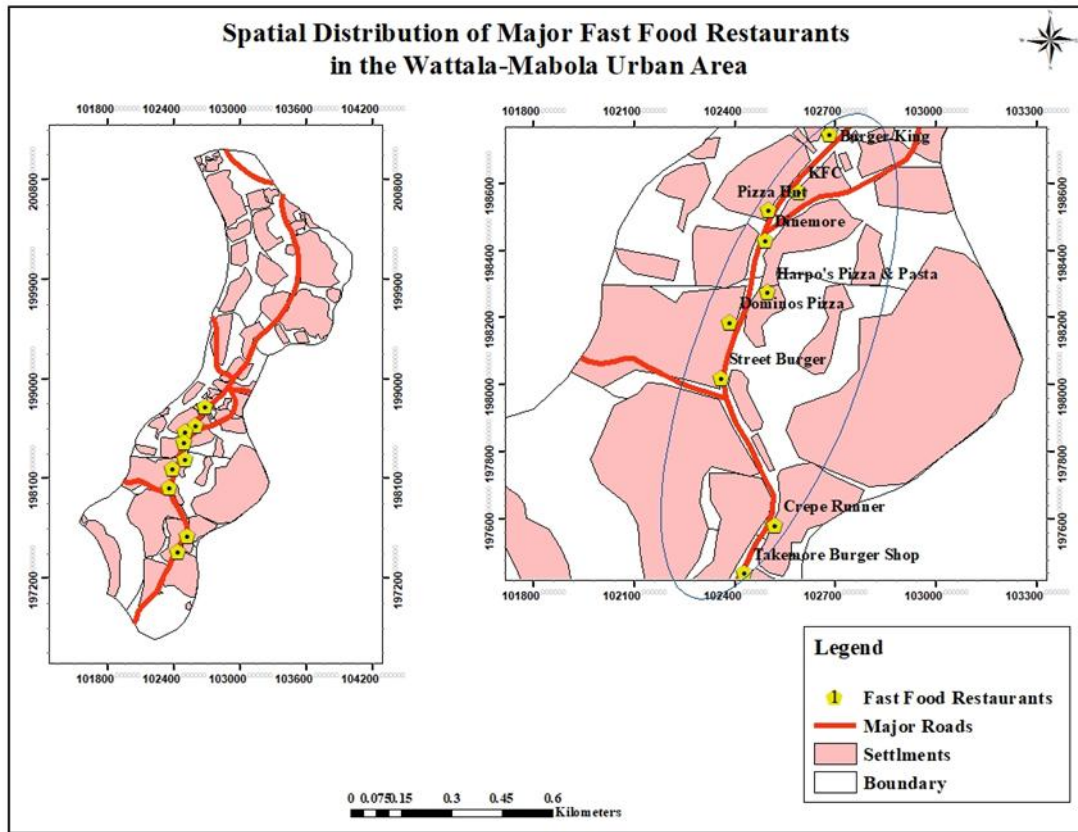


Figure 2. Spatial distribution of main fast-food restaurants in Wattala – Mabola Urban Council area; Source: Prepared by the researcher on the ArcGIS 10.8 software platform using secondary data related to geographic information communication technology data.

The spatial analysis revealed that fast-food restaurants within the Wattala–Mabola Urban Council area are predominantly concentrated in the southern region, particularly around the Wattala city area. This spatial clustering is largely associated with the proximity to main transportation routes and densely populated residential neighborhoods. Such locations provide enhanced visibility and ease of access for consumers, which are critical factors in determining the success and sustainability of fast-food businesses. The presence of both national and international fast-food chains in these areas further indicates an increasing consumer demand for quick-service dining options among the urban population.

The observed distribution pattern reflects a clear relationship between urban settlement structures, transport accessibility, and commercial concentration. The southern zone, which includes well-developed facilities such as transport networks, hospitals, banks, schools, religious centers, and shopping complexes, functions as the commercial core of the Wattala–Mabola Urban Council. This area also accommodates a large proportion of middle- and high-income residents, who, according to previous research, represent approximately 71.5% of fast-food consumers in the locality (Mubashshira, 2025). The clustering of fast-food outlets in such areas therefore aligns closely with the socio-economic characteristics of the population, where higher income levels and busy urban lifestyles drive the preference for convenient food options.

The Spatial Interaction Theory (Reilly, 1931) provides a suitable framework for interpreting these spatial phenomena. According to this theory, the flow of goods, services, and people between locations is determined by the attractiveness and scale of the centers, as well as the distance separating them. In the context of this study, the concentration of fast-food outlets near major roads and densely populated zones demonstrates the influence of accessibility and consumer attraction. The southern urban core acts as a major “attraction center,” drawing consumers from surrounding residential areas due to its commercial vibrancy and service diversity. Consequently, the gravitational pull of this area encourages fast-food investors to establish outlets in locations where customer interaction potential is highest.

In summary, the spatial distribution of fast-food outlets in the Wattala–Mabola Urban Council area exemplifies the principles of Spatial Interaction Theory, highlighting how accessibility, population density, and economic activity jointly shape the clustering trends of fast-food establishments. This pattern not only reflects commercial optimization strategies but also indicates potential public health implications, as areas with higher accessibility and socio-economic affluence show increased exposure to and consumption of fast food.

5.2. Examining the Association Between Income, Proximity, and the Mode of Fast-Food Consumption Using the Independent Chi-Square Test

The independent chi-square test is a statistical technique used to determine whether there is a significant association between two categorical variables. It compares the observed frequencies in each category with the frequencies expected under the assumption of independence. In this study, the test was employed to examine whether income level and proximity to fast-food outlets influence the mode of fast-food consumption among urban residents.

Specifically, two separate chi-square tests were conducted: one to assess the relationship between monthly income and the preferred method of fast-food consumption, and another to evaluate the relationship between distance to the nearest restaurant and the chosen consumption method. The identified modes of consumption among respondents include dining at the restaurant, taking food away (takeaway), and ordering online. This analysis provides insight into how socio-economic status and spatial accessibility may shape consumer behavior in the context of urban fast-food consumption. By understanding these associations, the study aims to reveal whether economic capacity and locational convenience contribute to variations in how people access and consume fast food within the Wattala–Mabola Urban Council area.

- **Association Between Income and the Mode of Fast-Food Consumption**

Table 2. The Calculated Value from the Chi-Square Test of Independence.

(O-E) ^2 / E - Table	At a restaurant	Take away	Delivery (online)	Total
< 30000	0.00	4.25	1.48	5.73
30001 - 60000	0.43	0.42	1.31	2.16
60001 - 100000	0.60	0.00	0.75	1.35
> 100001	0.01	1.19	0.28	1.48
Total	1.04	5.86	3.82	10.7178

Source: Developed by the researcher using data collected from respondents in the study area.

H0: Monthly income does not depend on the methods of obtaining fast food.

H1: Monthly income depends on the methods of obtaining fast food.

The independent chi-square test was employed to determine whether a significant relationship exists between monthly income and the methods of fast-food consumption among urban residents in the Wattala–Mabola Urban Council area. According to Table 2, the computed chi-square value was 10.7178, with 6 degrees of freedom ($df = 6$), and the critical value at the 0.05 significance level was 12.592. Since the calculated p-value (0.0975) is greater than the alpha level (0.05), the null hypothesis (H_0) is accepted (Figure 3). This indicates that there is no statistically significant association between monthly income and the methods of fast-food consumption.

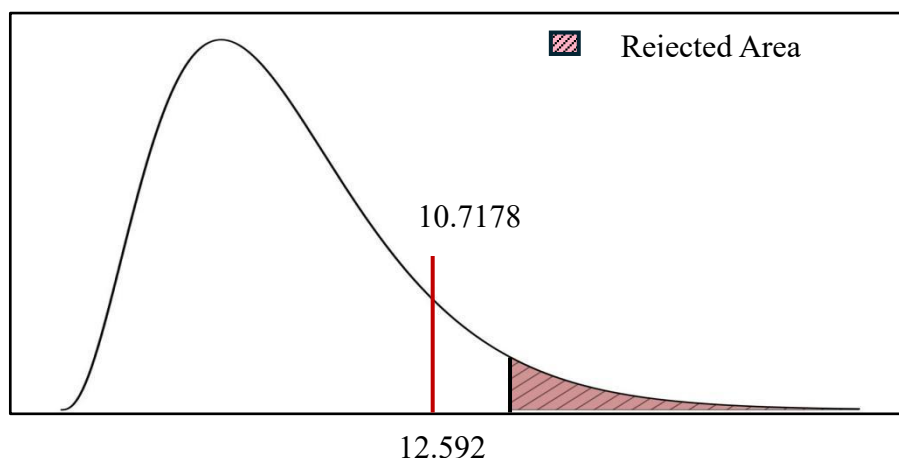


Figure 3. Significant Test Graph.

The null hypothesis is accepted at the 95% confidence level; therefore, the alternative hypothesis is rejected. This indicates that monthly income does not have a significant relationship with the methods of obtaining fast food.

In other words, income level did not significantly influence whether individuals preferred to dine in restaurants, take food away, or order online. The results suggest that fast-food consumption practices are relatively uniform across income groups, such as high, middle, and low-income earners all engage in similar modes of consumption. This trend highlights that fast food has become a socially normalized and accessible element of urban lifestyles, transcending traditional income-based consumption patterns.

The Behavioral Geography Model provides a meaningful framework to interpret this phenomenon. According to this model, individual decision-making in spatial and consumption behavior is shaped by perception, cognition, and lifestyle choices rather than solely by economic or spatial constraints. In this context, the absence of a significant relationship between income and consumption mode suggests that behavioral factors such as convenience, time-saving preferences, taste familiarity, and exposure to fast-food marketing play a more decisive role than financial capability. Urban dwellers, regardless of income, may perceive fast food as a convenient response to busy routines and modern lifestyles.

Therefore, this finding supports the notion that, in contemporary urban environments, behavioral motivations outweigh economic differences in determining fast-food consumption behavior. The growing tendency for individuals across income categories to adopt similar food acquisition methods reflects the influence of urban culture, lifestyle adaptation, and personal perception are core elements of the behavioral geography perspective.

• Association Between Proximity and the Mode of Fast-Food Consumption

Table 3. The Calculated Value from the Chi-Square Test of Independence.

(O-E) ^2 / E - Table	At a restaurant	Take away	Delivery (online)	Total
< 1km	0.91	0.64	2.49	4.03
1km - 3km	0.15	0.09	0.39	0.63
> 3km	0.5	0.45	1.48	2.43
Total	1.55	1.18	4.36	7.10

H₀: Distance to the restaurant does not influence the method of obtaining fast-food.

H₁: Distance to the restaurant influences the method of obtaining fast-food.

The independent chi-square test was also conducted to determine whether there is a significant relationship between the proximity of residents to fast-food outlets and their preferred mode of fast-food consumption. According to Table 3, the calculated chi-square value was 7.10, with 4 degrees of freedom (df = 4), and the critical value at the 0.05 significance level was 9.488. Since the calculated chi-square value is less than the critical value, the result indicates no statistically significant relationship between the distance from the residence to the fast-food outlet and the methods of obtaining fast food (Figure 4).

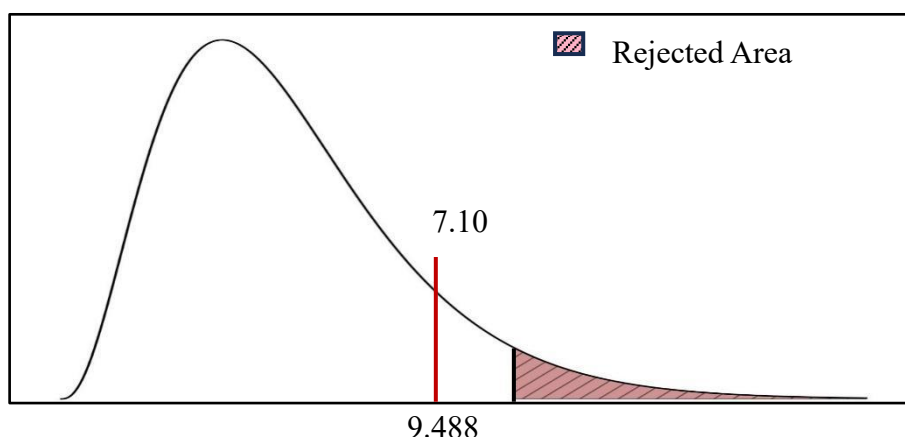


Figure 4. Significant Test Graph.

The null hypothesis is accepted at the 95% confidence level; therefore, the alternative hypothesis is rejected. This suggests that the distance to the restaurant does not have a significant relationship with the methods of obtaining fast food.

This finding suggests that urban residents, regardless of whether they live within 1 km or between 1–3 km of a fast-food outlet, tend to consume fast food in similar ways by visiting the restaurant, taking food away, or ordering online. In other words, the distance to the restaurant does not appear to influence how individuals choose to access fast food. This pattern reflects the growing accessibility and prevalence of fast food in urban areas, where convenience-oriented behavior and technological alternatives, such as online delivery platforms, reduce the effect of spatial distance on consumption decisions.

The Behavioral Geography Model provides an appropriate theoretical lens to interpret this observation. This model emphasizes that human spatial behavior is not solely determined by objective distance or physical constraints, but is strongly influenced by individual perceptions, attitudes, and decision-making processes. In this context, the lack of a significant relationship between proximity and consumption mode indicates that psychological and lifestyle factors such as time efficiency, comfort, and personal preference play a greater role than spatial distance in shaping fast-food consumption patterns.

Accordingly, many urban residents perceive fast food as a convenient and time-saving option, accessible regardless of location. Even when restaurants are situated farther away, the availability of online ordering systems and delivery services mitigates the importance of distance. Hence, the behavioral aspect of decision-making dominates over spatial factors, reinforcing that modern consumption behavior is driven more by perceived convenience and lifestyle choices than by geographical proximity.

In summary, the findings demonstrate that proximity does not significantly determine the mode of fast-food consumption among urban residents. Instead, the results underscore the behavioral geography perspective, where individual cognition, perception, and adaptive urban lifestyles shape spatial behavior in contemporary fast-food consumption.

5.3. Determining How Income and Spatial Proximity Influence the Frequency of Fast-Food Consumption Using Multiple Regression Analysis

To assess how monthly income and distance to the nearest restaurant influence the frequency of fast-food consumption among urban residents in the Wattala–Mabola Urban Council area, a multiple regression analysis was performed at the 0.05 significance level. In this analysis, the number of times individuals consumed fast food per month was treated as the dependent variable, while monthly income and distance to the restaurant were used as independent variables.

The model was designed to evaluate whether these two factors significantly predict the frequency of fast-food consumption after controlling other external influences. This approach allows for a more comprehensive understanding of how economic capacity and spatial accessibility interact to shape consumption behavior in an urban context. The results of the regression analysis are presented below.

$$Y = 4.56538740 + 0.00001495 x_1 - 0.94673521 x_2$$

X₁ = Monthly income

X₂ = Distance to the restaurant

Table 4. Regression Statistics.

<i>Regression Statistics</i>	
Multiple R	0.279618205
R Square	0.078186341
Adjusted R Square	0.061871055
Standard Error	6.819686888
Observations	116

Note. It was developed by the researcher using data collected from respondents in the study area.

According to Table 4, the nature of the relationship between the variables was examined using multiple regression analysis. The calculated multiple regression coefficient was 0.28, indicating a positive (direct) relationship between the dependent variable (frequency of fast-food consumption) and the independent variables (monthly income and distance to the restaurant). This means that changes in income and proximity are associated with corresponding changes in the frequency of fast-food consumption, although the strength of the relationship is relatively weak.

Table 5. ANOVA Table.

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	445.7538091	222.876905	4.7922139	0.010053965
Residual	113	5255.418605	46.5081292		
Total	115	5701.172414			

Note. It was developed by the researcher using data collected from respondents in the study area.

According to Table 5, the model’s significance value ($p = 0.01$) is less than the alpha level of 0.05, confirming that the regression equation is statistically valid.

Table 6. Output.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	4.56538740	1.58601185	2.87853298	0.00477922
Monthly Income - SL Rs. (x1)	0.00001495	0.00000586	2.55115021	0.01207358
Distance - km (x2)	-0.94673521	0.71745373	-1.31957667	0.18964371

Note. It was developed by the researcher using data collected from respondents in the study area.

According to Table 6, when examining the specific effects of each variable, the p-value for monthly income (0.0121) is less than 0.05, suggesting a statistically significant positive relationship. In contrast, the p-value for distance to the restaurant (0.1896) exceeds 0.05, indicating that proximity does not significantly influence consumption frequency within this sample. Furthermore, the regression coefficients show a positive value (0.00001495) for income and a negative value (−0.94673521) for distance. This implies that as income increases, fast food consumption frequency rises, while greater distance from restaurants tends to reduce consumption.

The results of the multiple regression analysis revealed that both monthly income and distance to the nearest fast-food restaurant influence the frequency of fast-food consumption among urban residents in the Wattala–Mabola Urban Council area, although the strength of this relationship is relatively weak. The model showed a multiple correlation coefficient of 0.28, indicating a low but positive relationship between the variables. This suggests that income and proximity together contribute to fast-food consumption behavior, even though other unobserved factors may also play important roles.

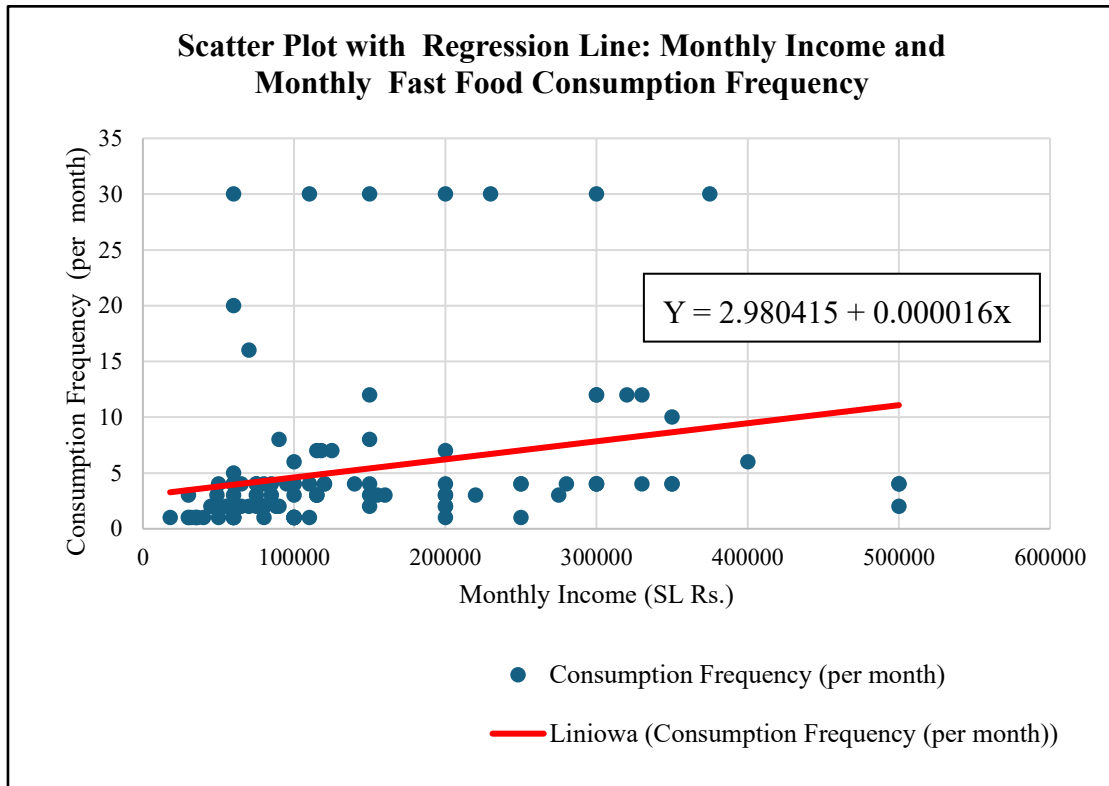


Figure 5. Relationship between Monthly Income and Frequency of Fast-Food Consumption; Source: Developed by the researcher using data collected from respondents in the study area.

As illustrated in Figure 5, the scatter plot between monthly income and fast-food consumption frequency shows a slight upward trend, confirming a positive linear relationship, higher-income residents tend to consume fast food more frequently.

The positive association between income and the frequency of fast-food consumption can be meaningfully explained through Central Place Theory (Christaller, 1933) and Location Theory (Weber, 1909). According to Central Place Theory, higher-order goods and services such as branded fast-food outlets tend to cluster in central urban locations where purchasing power and demand are greater. In this context, individuals with higher incomes are more capable of accessing and sustaining such services. The findings from Wattala–Mabola area align with this principle: residents with higher monthly incomes tend to consume fast food more frequently, reflecting how economic capacity reinforces spatial access to commercial food environments in urban centers.

Similarly, Location Theory emphasizes that businesses, including fast-food outlets, seek locations that minimize operational costs while maximizing market accessibility. Within this framework, the distribution of fast-food restaurants in Wattala–Mabola area likely follows patterns of population density and income concentration, enabling them to serve areas with higher purchasing potential. The observed positive effect of income on consumption therefore reflects not only individual affordability but also the locational decisions of businesses responding to urban economic structures.

Furthermore, previous research supports these findings. In Bangladesh, for example, fast-food consumption has been found to depend significantly on household income, with families earning higher incomes consuming fast food more frequently than those with lower incomes (Nusrat, 2022). Similarly, a Sri Lankan study reported that 43.9% of fast-food consumers belonged to the income group of LKR 20,000–50,000, and 49.1% were from those earning above LKR 50,000 per month (Uduuruwana, 2015). Another study by Nirmani et al. (2017) found that 37% of consumers with monthly incomes exceeding LKR 50,001 frequently consumed fast-food. These findings collectively demonstrate that higher-income groups are more inclined toward fast-food consumption, likely due to greater purchasing power, lifestyle convenience, and stronger integration into urban consumer culture.

In this regard, the present study’s results align closely with the broader empirical evidence, confirming that income remains a decisive factor shaping fast-food consumption patterns within urban environments such as Wattala–Mabola.

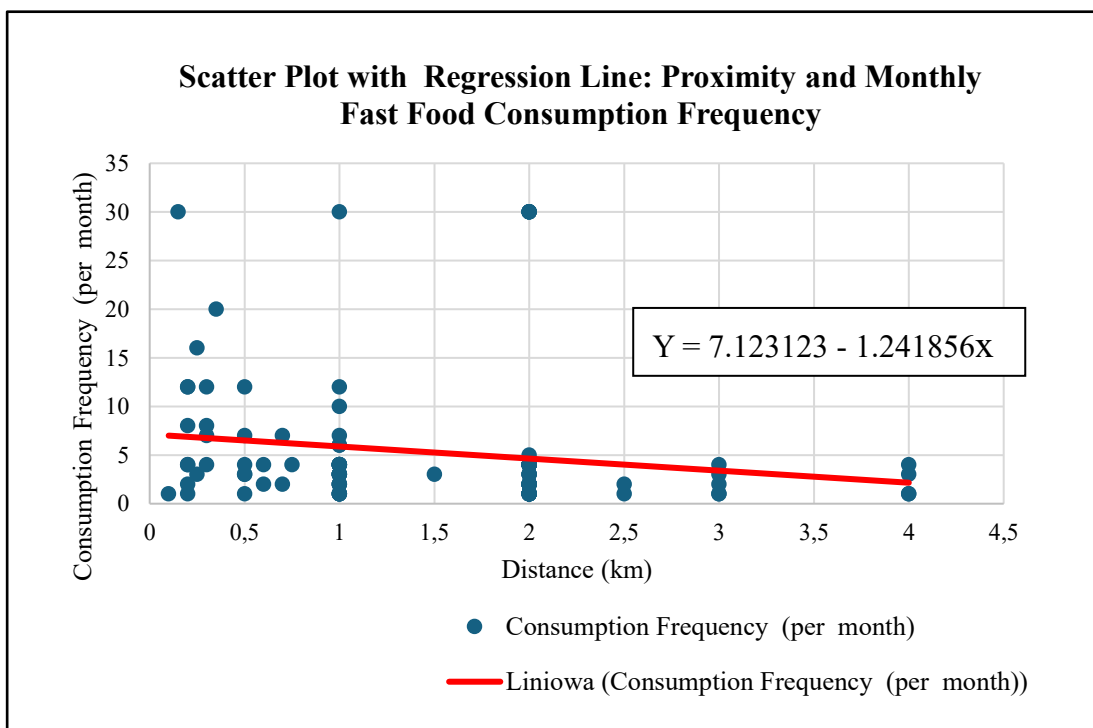


Figure 6. Relationship Between Distance to Restaurant and Frequency of Fast-Food Consumption; Source: Developed by the researcher using data collected from respondents in the study area.

Figure 6 presents the scatter plot between distance to the restaurant and fast-food consumption frequency, revealing a weak negative relationship.

In contrast, the influence of proximity, although negative as expected, was statistically insignificant. This indicates that while distance has some deterrent effect on consumption, it is not the dominant factor shaping behavior in this urban setting. This finding can be interpreted through Tobler's First Law of Geography, which states that "everything is related to everything else, but near things are more related than distant things." In principle, residents living closer to fast-food outlets are expected to consume more frequently due to convenience and reduced travel effort. However, the relatively weak relationship observed here suggests that modern urban dynamics such as increased mobility, food delivery services, and digital ordering platforms may have diminished the influence of physical distance in determining consumption frequency.

The same pattern can also be related to the Distance Decay Principle, which posits that the intensity of interaction decreases as distance increases. While the negative regression coefficient supports this theoretical expectation, the weak magnitude implies that the effect of distance is being moderated by other socio-economic and behavioral variables. For instance, lifestyle preferences, working hours, health awareness, and the availability of multiple fast-food brands across short distances may collectively reduce the significance of spatial distance in influencing consumption behavior.

In comparison with previous studies, similar findings and contrasts can be observed. A study conducted in the United States found no significant association between proximity to fast-food restaurants and consumption frequency (Richardson et al., 2011). Likewise, a Malaysian study reported neutral results, indicating that fast food was consumed both at shorter and longer distances from outlets (Azmi et al., 2024). These outcomes differ from the present study, where proximity showed a negative but insignificant relationship. However, the findings here align more closely with those of Liu et al. (2020) and Eneyo et al. (2022). In an urban Canadian context, Liu et al. (2020) demonstrated a significant positive association between time-weighted exposure to fast-food outlets within 500 meters to 1.5 kilometers and the frequency of fast-food consumption. Similarly, Eneyo et al. (2022) found that outlets located closer to consumers recorded higher visit frequencies. These comparable results suggest that while proximity plays a role, its influence may vary across urban contexts depending on the availability of alternative access mechanisms and urban lifestyle patterns.

Overall, the weak but meaningful relationship between income, proximity, and fast-food consumption frequency suggests that spatial and economic factors do influence behavior, but their combined explanatory power is limited. This could be attributed to sampling variability and the exclusion of other influential factors, such as age, occupation, family structure, or dietary attitudes, which were not incorporated into the current model. Despite this limitation, the results provide valuable insight into how urban socio-economic structure and spatial configuration jointly shape consumption habits in growing suburban areas like Wattala–Mabola Urban Council area, where both accessibility and affordability play complementary roles.

6. CONCLUSION

This study examined the spatial and socio-economic determinants of fast-food consumption within the Wattala–Mabola Urban Council area, focusing on outlet distribution, associations with income and proximity, and the influence of these factors on consumption frequency. The spatial analysis revealed a clear clustering of fast-food outlets in the southern region, particularly around Wattala city, closely aligned with main transportation routes and densely populated neighborhoods.

This pattern highlights how accessibility, population density, and economic activity collectively influence the location and success of fast-food establishments, consistent with Spatial Interaction Theory (Reilly, 1931). The presence of both national and international chains in these clusters further reflects growing urban demand for convenient dining options.

The results of the independent chi-square tests indicated no statistically significant association between monthly income and the methods of obtaining fast food, nor between the distance to the restaurant and consumption mode. These findings, interpreted through the Behavioral Geography Model, suggest that urban residents' choice of obtaining fast food is influenced by a complex interplay of social behaviors and lifestyle factors rather than solely by income level or spatial proximity.

Multiple regression analysis revealed a positive but weak relationship ($R = 0.28$) between fast-food consumption frequency and the independent variables of income and distance. The regression coefficients indicated that income has a positive effect on consumption frequency, while greater distance is associated with a reduction in consumption. These outcomes can be meaningfully interpreted through urban spatial theories. Central Place Theory (Christaller, 1933) and Location Theory (Weber, 1909) explain why higher-income areas attract more fast-food outlets, reflecting the interplay between purchasing power and locational decisions of businesses. Similarly, Tobler's First Law of Geography and the Distance Decay Principle clarify the observed negative effect of distance, although modern urban dynamics, including mobility, delivery services, and digital ordering, have attenuated this effect. The weak strength of the relationship may be attributed to sample limitations and the exclusion of other behavioral, cultural, and lifestyle factors, yet the observed trends indicate that income and spatial accessibility do influence fast-food consumption patterns in urban contexts.

In conclusion, this study demonstrates that income remains a key determinant of fast-food consumption frequency, while spatial proximity plays a moderating role influenced by urban infrastructure and lifestyle adaptations. The findings underscore the need for policymakers and urban planners to consider both socio-economic and spatial factors when designing interventions aimed at promoting healthier dietary practices. Moreover, the study contributes to a deeper understanding of how urban spatial structures, consumer behavior, and economic capacity interact to shape fast-food consumption patterns in rapidly urbanizing areas like Wattala–Mabola Urban Council.

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