

# Socioeconomic Backgrounds and the Relationship with Food Consumption Patterns and Food Adequacy Level among Low-Income Consumers in Lahad Datu, Sabah, Malaysia

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## Abstract

The primary objective of this study was to examine the socioeconomic backgrounds of low-income consumers in Lahad Datu, Sabah, Malaysia, and their association with food consumption patterns and food adequacy levels. A total of 160 respondents were selected through purposive sampling. Food consumption patterns were assessed using the Food Variety Score (FVS), while food adequacy levels were measured using the Malaysian Food Variety Indicator (MFVI). The findings revealed that 47.5% of the respondents had a lower FVS. Cereals and cereal products had the highest mean intake (29.38), followed by vegetables (21.0), while meat had the lowest mean intake (0.0). Similarly, analysis of the MFVI scores demonstrated mean scores of 22.19 for cereals and cereal products, 21.06 for vegetables, and 0.0 for meat. There was a significant relationship between the socioeconomic background, food consumption patterns, and food adequacy levels, particularly concerning the age of the respondents ( $r=0.254$ ,  $p=0.010$ ), household size of the respondents ( $r=0.203$ ,  $p=0.010$ ), and food consumption patterns ( $r=0.992$ ,  $p=0.000$ ). In conclusion, the study found that the food adequacy levels of the respondents were influenced by their age, household size, and food consumption patterns.

**Keywords:** Socioeconomic, Food Consumption, Food Adequacy, Low-income Consumers, Rural Area.

## Introduction

Food consumption pattern refers to repeated arrangements of consumption, characterized by types and quantities of food items and their combination in dishes and meals (Gerben-Leenes et al., 2010) while food adequacy level refers to an adequate supply of food at the household level (Zainal Badari et al., 2019). The concept of dietary adequacy embraces essential nutrient adequacy but also considers other food components and properties (Saviege et al., 1997). The level of food adequacy for each group of low-income consumers

varies in terms of the intake method. According to Firdaus et al (2020), the level of food adequacy and food safety is one of the benchmarks for measuring a country's progress level, and it depends on the monthly income received, which is the higher the monthly income received by the household, the better the nutrition of the food received by the body.

Socioeconomic factors, such as income, were important predictors of dietary adequacy (Nelson et al., 2002). In Malaysia, a low-income household is defined as one with a monthly income of less than MYR4,850 (Department of Statistics Malaysia, 2020). Apart from low monthly income, factors such as age, income, education, and the size of households or number of dependents can also contribute to the problem of malnutrition. Malnutrition is a nutritional condition characterised by an inadequate or excessive intake of calories, proteins, and micronutrients. It can be assessed based on body shape, size, and composition, as well as overall functioning and clinical outcomes (Younis et al., 2015). It is often observed that individuals facing malnutrition problems tend to come from low-income backgrounds. A study conducted among the Malaysian population examined the connection between socioeconomic factors and food sufficiency. Shariff et al. (2015) noted that older children from low-income urban Malaysian families showed the lowest levels of nutrient adequacy.

In a study conducted by Shahar et al (2019), it was observed that elderly individuals in Malaysia with low socioeconomic status exhibited inadequate dietary intake, particularly regarding fibre and fruit consumption. It was also noted by Chong, Appannah, and Sulaiman (2019) that various factors such as marital status, household income, food security status, and fat intake significantly influence the dietary quality of Indigenous women in Malaysia. Additionally, a study by Chang et al (2018) suggested that educational attainment is more influential than income in ensuring dietary balance and nutritional adequacy among the Chinese population.

Consumers' food consumption patterns are also influenced by their socioeconomic backgrounds. Badari et al (2013), found that low-income households prefer to buy cheaper foods as an alternative to meet their daily needs, such as rice, sugar, and green vegetables, over foods that are considered healthy, such as fruits, vegetables, and milk, due to unreasonable prices in the market. The same results were discovered by Ahmad Zubir (2021), who showed that food consumption among paddy farmers in a rural area in Kedah, Malaysia, was low. The food intake in households was influenced by socioeconomic factors such as low income, a larger number of households, fewer livelihood assets, low education, and a lack of ability and training. A study conducted by Zani et al (2019), among cassava farmers in Sulawesi also stated that households spent a very high percentage of their expenditure (89.8%) on food, compared to non-food items (10.2%). The expenditure on food was mainly for starchy staple foods, fish, and eggs, with lower spending on vegetables, fruits, and milk.

It has been shown that low incomes and low education are the primary factors contributing to poor dietary quality in households (Zainal Badari et al., 2019). Food adequacy is closely linked to diet quality and food security. The 1996 World Food Summit defined food security as ensuring that everyone has physical and economic access to safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food security can be gauged by examining food insecurity, where people have limited access to suitable, safe, and nutritious foods or healthy food choices due to economic constraints

(Hamad & Khashroum, 2016). Food insecurity among low-income consumers is often due to inadequate access to nutritious food, particularly when rising prices render households financially insecure. The COVID-19 pandemic has exacerbated this issue, with many households experiencing sudden unemployment, leading to changes in their food consumption patterns. Thus, this study aims to measure the relationship between socioeconomic backgrounds and food consumption patterns with food adequacy levels among low-income consumers in Lahad Datu, Sabah Malaysia.

### **Objectives and Hypothesis**

The specific objectives of this study were to analyse the socioeconomic profiles (age, gender, household income, household size, and education level) of the respondents, evaluate their dietary habits using Food Variety Scores (FVS), measure their nutritional adequacy using the Malaysian Food Variety Indicator (MFVI), and investigate the relationships between socioeconomic factors and dietary patterns with the nutritional adequacy of the respondents. Based on these objectives, the study hypothesised that there is no significant relationship between socioeconomic backgrounds with food consumption patterns and the food adequacy level of the respondents.

### **Literature Review**

#### *Socioeconomic Status*

Socioeconomic status shapes food consumption patterns and overall food adequacy among low-income populations. In Malaysia, the low-income population is particularly susceptible to under and over-nutrition, highlighting the need for targeted interventions to address these disparities (Shahar et al., 2019). Previous research has shown that in rural Malaysia, a significant proportion of low-income households experience some form of food insecurity, with over 80% of households classified as either food-insecure, containing food-insecure individuals, or experiencing child hunger (Ihab et al., 2014). These findings underscore the complex relationship between socioeconomic status and nutritional outcomes, particularly in resource-constrained settings (Jankhotkaew et al., 2022).

Compared to other developing countries in Asia, Malaysia has experienced rapid economic and socioeconomic development since gaining independence, leading to a marked reduction in undernutrition and micronutrient deficiencies (Khor, 2005). Nonetheless, undernutrition in the form of underweight, stunting, and anaemia can still be found in poor communities throughout the country (Khor, 2005). Addressing these persistent nutritional challenges requires a multifaceted approach that considers the unique sociocultural and economic factors that shape the food consumption patterns and food adequacy levels of low-income populations (Arokiasamy, 1990). By understanding the complex interplay between socioeconomic backgrounds and food-related outcomes, policymakers and public health practitioners can develop more effective and sustainable interventions to improve the overall health and well-being of the low-income population in Malaysia.

#### *Food Consumption Patterns*

Food consumption patterns among low-income households in Malaysia have become a growing concern in recent years, as economic disparities and rising living costs continue to impact the daily lives of vulnerable populations (Badari et al., 2013). Research suggests that

a significant portion of low-income Malaysian households experience varying degrees of food insecurity, with some households facing outright hunger.

Household food insecurity poses a significant challenge for low-income communities in Malaysia (Sulaiman et al., 2021). A comprehensive review of the literature has revealed that as many as 83.9% of low-income households in rural areas experience some level of food insecurity, with 35% categorised as facing "child hunger" (Ihab et al., 2014). The high prevalence of this issue is attributed to factors such as low socioeconomic status, limited access to affordable and nutritious foods, and a lack of awareness or resources to maintain a balanced diet (Shahar et al., 2019).

The repercussions of food insecurity on low-income Malaysians can be considerable, impacting both physical and mental health. Malnutrition, encompassing both undernutrition and overnutrition, is widespread, resulting in increased susceptibility to non-communicable diseases and poor health outcomes. To tackle these discrepancies, initiatives are crucial to improve access to affordable, nutritious foods and deliver nutrition education (Owolade et al., 2022).

The demand for food has risen due to factors such as income and population growth, urbanisation, and lifestyle changes. This has resulted in shifts in food purchasing and consumption patterns. The increased participation of women in the workforce has also been associated with a higher demand for processed foods (Pingali, 2007). Urban households have a wider range of food options and are more receptive to new products. They are also more likely to adopt new dietary habits than in rural areas. The transition from low-energy to high-energy and protein-dense foods has contributed to a rise in non-communicable diseases, particularly among urban households (Zainal Badari et al., 2012). However, the escalation in food prices may undermine the food intake adequacy of low-income urban households (Kirkpatrick & Tarasuk, 2007).

### *Food Adequacy*

Malaysia, a country with a diverse population and a rapidly growing economy, has long grappled with the issue of ensuring food security for its citizens, particularly among the low-income segment of society. Compared to other developing countries in Asia, Malaysia has seen significant improvements in its overall nutrition situation, thanks to the country's rapid economic and socioeconomic development since its independence in 1957 (Khor, 2005). However, undernutrition, in the form of underweight, stunting, and anaemia, remains a concern in poor communities throughout the country, with a reported prevalence of 25% underweight and 35% stunting among young children from poor rural households (Shahar et al., 2019; Khor, 2005).

The Malaysian government has recognised the importance of addressing food security and has implemented policies and programs to ensure adequate food for its citizens. In the country's Ninth Malaysia Plan (RMK 9), the government has focused on "food security assurance at an adequate level in meeting the country's needs" (Hasni et al., 2018). Despite these efforts, the low-income population in Malaysia continues to face various health and nutritional challenges, including under- and over-nutrition, highlighting the need for more sustainable intervention models to improve their quality of life (Shahar et al., 2019; Hasni et

al., 2018). One of the key factors contributing to food insecurity among the low-income population in Malaysia is their low socioeconomic status, which can lead to imbalances in their diet and low nutritional status (Hasni et al., 2018).

The concept of dietary adequacy encompasses ensuring essential nutrient adequacy while considering other food components and properties (Saviege et al., 1997). Adequacy refers to a diet that fulfils the requirements for energy and all essential nutrients (Ruel, 2003). Nutrient adequacy, as defined by Ruel (2003), involves meeting recommended intakes of energy and other essential nutrients. While most studies investigating the link between diet and health focus on nutrients such as energy, fat, protein, carbohydrate, vitamins, and minerals to assess dietary intake and predict specific health outcomes, health and dietary guidance for individuals or groups should emphasise the consumption of foods (Hodgson et al., 1994). Moreover, nutrient intake alone may not comprehensively capture food consumption due to biologically active components and properties in the food (Hodgson et al., 1994).

### **Methodology**

This study is quantitative research that involves gathering descriptive data through a survey. It concentrates on the low-income residents in the Silam sub-district, located in the Lahad Datu District of Sabah, Malaysia. The Silam sub-district consists of 10 villages and was selected by the researchers because of its significant concentration of low-income households and residents who belong to the low-income consumer group.

### *Sampling*

The respondents were chosen through purposive sampling. For this study, respondents had to meet specific criteria to be included, such as being 18 years old or older, belonging to a low-income household (earning below RM4,850), and serving as the head or spouse of the household. Those who did not meet these criteria were not eligible to participate. The population's average income in Lahad Datu was RM5,644, with the median income being RM4075. For this study, respondents with incomes below RM4850 (classified as low-income (Department of Statistics Malaysia, 2020)) were eligible to participate. One hundred eighty questionnaires were distributed, and 160 were completed by respondents, resulting in a % response rate of 89%.

### *Study Instruments*

The study utilized a questionnaire comprising three sections: Socioeconomic Backgrounds of Respondents, Food Variety Score (FVS), and Malaysian Food Variety Indicator (MFVI). The socioeconomic backgrounds section included age, sex, household income, household size, and education level of respondents. The food variety scores (FVS) approach was adapted and modified from Zainal Badari et al. (2012). The scoring system was based on weekly intakes, with 7 points for daily intake, 4 points for three to six times a week, 1 point for once a week, and 0 points for less than once a week. FVS was calculated by summing the total number of points. Only food items consumed by the household once a week contributed to FVS. Based on the scores given, only 8 categories of foods were selected for inclusion in the calculation of FVS. The FVS was then categorised based on tertiles with 33rd percentiles, 64th percentiles, and 100th percentiles. The MFVI was adapted and modified from Zainal Badari et al. (2019). The 8 food groups were scored based on the daily serving size, with the minimum score being

0 and the highest score being 10. Then, the total score was categorised into low score, moderate score, and higher score to show the adequacy level.

#### *Data Collection and Analysis*

The ethics committee (Faculty of Human Ecology, Universiti Putra Malaysia) approved the ethics before the study could be done. The consent form was given to the selected respondents to get their approval before they answered the questionnaires. The data was collected from July to September 2022. The respondents need to answer the questionnaires with the guidance of the researcher. All parts of the questionnaire were self-administered, and the researcher would help the respondents if any query happened during the collection. The data collected were then analysed using IBM SPSS software version 26.0. The descriptive analyses were done to describe the socioeconomic backgrounds, the FVS, and MFVI scores. The Pearson Correlation test was used to analyse the relationship between the socioeconomic backgrounds of respondents and food consumption patterns (FVS) with food adequacy (MFVI).

## **Results**

### *Socioeconomic Background of Respondents*

The socioeconomic backgrounds are shown in Table 1. Most of the respondents were men (59.4%), aged between 36-40 years old (40.0%), with households' monthly income between RM2000-2500 (51.8%), and household size between 4-6 (68.8%). Most of the respondents had finished their high secondary school (45.0%), followed by a diploma (37.5%) and degree (17.5%).

Table 1

*Socioeconomic backgrounds of respondents (N=160)*

Variable	Frequency (n)	Percent (%)
<i>Sex</i>		
Men	95	59.4
Women	65	40.6
<i>Age</i>		
≤ 30	32	20.0
31 – 35	43	27.0
36 – 40	64	40.0
≥ 41	21	13.0
<i>Household monthly Income (RM)</i>		
2000.00 – 2500.00	83	51.8
2600.00 – 3000.00	44	27.6
≥ 3100.00	33	20.6
<i>Household size (Person)</i>		
1 – 3	50	31.3
4 – 6	110	68.8



*Education level*

No formal education	0	0.0
Primary school	0	0.0
Low secondary school	0	0.0
High secondary school	72	45.0
Diploma	60	37.5
Degree	28	17.5

*The Food Consumption Patterns and Food Adequacy of Respondents*

The food consumption patterns of respondents based on the eight food groups were measured using FVS. The results are shown in Table 2. The highest mean score was cereals and grain products with 29.38 (SD=7.59), followed by vegetable (mean=21.00, SD=10.52), fish and products (mean=14.00, SD=8.12), poultry/egg (mean=13.65, SD=7.36), fruits (mean=9.98, SD=6.08), milk and dairy products (mean=7.22, SD=6.73), and legumes (p=6.65, SD=7.01).

Table 2

*Mean Food Variety Score (FVS) by 8 food groups (N=160)*

Food group	Mean	Standard Deviation (SD)	Range score
Cereals and grain products	29.38	7.59	7 – 140
Vegetables	21.00	10.52	0 – 70
Fruits	9.98	6.08	14 - 28
Poultry/egg	13.65	7.36	0 – 21
Meat	0.00	0.00	0 – 0
Fish and products	14.00	8.12	0 – 21
Legumes	6.65	7.01	0 – 14
Milk and dairy products	7.22	6.73	0 – 14

The FVS score was then categorised based on tertiles, with 33rd, 64th, and 100th percentiles, as shown in Table 3. The results showed that 47.5% of respondents had low percentiles, 36.9% had moderate percentiles, and 15.6% had high percentiles.

Table 3

*FVS category of respondents (N=160)*

Percentiles	Frequency (n)	Percent (%)
0 – 52 (Low)	76	47.5
53 – 105 (Moderate)	59	36.9
106 – 156 (High)	25	15.6

The food adequacy level of respondents was measured by using MFVI. The results are shown in Table 4. The highest mean score was cereals and grain products with 22.19, followed by vegetables (21.06), fruits (14.63), fish and products (13.28), milk and dairy products (7.53), legumes (7.13), poultry/egg (6.34), and meat (0.00).

Table 4

*Mean Malaysian Food Variety Indicator (MFVI) by 8 food groups (N=160)*

Food group	Maximum score	Minimum score	Mean score
Cereals and grain products	35	5	22.19
Vegetables	35	0	21.06
Fruits	35	10	14.63
Poultry/egg	10	0	6.34
Meat	0	0	0.00
Fish and products	20	0	13.28
Legumes	15	0	7.13
Milk and dairy products	15	0	7.53

The MFVI score among respondents was then categorized into low, medium, and high. The results showed that 47.5%, equivalent to 76 respondents, were at a low level, 53 respondents (33.1%) were at a high level, and the rest were at a moderate level. Thus, it can be assumed that 76 respondents had low food adequacy.

Table 5

*MFVI category of respondents (N=160)*

Percentiles	Frequency (n)	Percent (%)
0 – 51 (Low)	76	47.5
52 – 102 (Moderate)	31	19.4
103 – 155 (High)	53	33.1

### ***The Relationships of Socioeconomic Backgrounds with Food Consumption Patterns and Food Adequacy among Respondents***

Further analyses have been done to measure the relationships between selected socioeconomic backgrounds (age, household income, household size) and food consumption patterns (FVS) among respondents with food adequacy levels (MFVI). The findings are shown in Table 6.

*Table 6: Relationship between selected socioeconomic backgrounds and food consumption patterns (FVS) with food adequacy level (MFVI)*

Variable	r value	p-value
Age	0.254**	0.010
Household income	0.074	0.355
Household size	0.203*	0.010
Food consumption patterns	0.992***	0.000

\*p<0.05, \*\*p<0.01

### **Discussion**

The food consumption patterns observed in this study were generally low. Of all the food groups, cereals, grain products, and vegetables were consumed the most, while fruits, legumes, and dairy products were not preferred as much, possibly due to their high prices. This aligns with a study by Vij & Mann (2022) which found low fruit consumption among farming families in Punjab, India. Additionally, Gódor (2016) reported that consumers with



higher incomes prioritize purchasing healthy and high-quality food, whereas those with lower incomes may struggle to find food in sufficient quantities, and the quality may not be as much of a concern for them.

The food adequacy among the Malaysian population was assessed using the MFVI method, which measures food intake. The analysis revealed that overall food adequacy was low, although the intake of fruits was found to be sufficient. However, it was noted that the low intake of fruits was likely due to the increased price of food, which resulted in a high proportion of monthly income being spent on food. According to a report by Trostle (2008), the prices of staple foods have increased by over 60% since 2006, mainly attributed to rising food prices and a weak global economy, contributing to the challenge of food insecurity.

The relationship between specific socioeconomic backgrounds and food consumption patterns can have varying impacts on food adequacy levels depending on several factors. This study found that the age of respondents was significantly related to food adequacy levels. This suggests that socioeconomic backgrounds, including income, education level, occupation, and access to resources, can influence food consumption patterns and subsequently affect food adequacy levels. Infants, children, and adolescents have distinct nutritional needs for growth and development, so their food adequacy level is crucial for meeting these requirements. Older adults may also have unique dietary considerations due to changes in metabolism, nutrient absorption, and health conditions. However, it's essential to acknowledge that age alone does not determine food adequacy. Other factors such as household income and size, food access, dietary diversity, cultural practices, and individual health conditions also play significant roles.

The analysis also revealed that household size had a significant relationship with the food adequacy level of respondents. The size of a household can impact food adequacy in various ways. Larger households typically require more food to meet the nutritional needs of all members. Additionally, larger households may face challenges in maintaining food adequacy if resources are limited or if they have difficulties in accessing nutritious food. Furthermore, the income and resources available within the household can influence the ability to afford an adequate quantity and variety of food. Sharing resources and responsibilities within a larger household may enhance food security, as members can pool their efforts and support each other in accessing and preparing meals. This study was supported by Sekhampu (2017), who reported that the number of household members is another predictor of food security. Mutiah & Istiqomah (2017) also reported that households with many members are expected to consume more food than smaller households. Food-secure households are dominated by small households, and food-insecure households with moderate hunger are dominated by moderate-sized households.

### **Limitation of the Study**

This study was conducted in a rural area of Lahad Datu, Sabah, Malaysia. The remote location of the study made data collection quite challenging and time-consuming. Additionally, most of the respondents were employed, so data collection could only be carried out during the weekends, further extending the process. The limited understanding of nutrition among the respondents also posed challenges to the data collection process. Moreover, the willingness of the respondents to answer the questionnaire depended on their transparency, particularly

for the socioeconomic section and food frequency questionnaire, introducing bias to the study.

### Conclusion and Recommendation

It can be concluded that not all respondents had adequate food. This is because most of the respondent's food intake was not varied as recommended. The food consumption patterns of respondents were low and not varied, the same as the food adequacy level of respondents. Furthermore, the food adequacy level of the respondents was influenced by their age, household size, and food consumption pattern.

A few recommendations can be made for this study. The government and related agencies can implement food and nutrition programs to increase food adequacy, especially among low-income consumers, and increase their food security. Further studies can be conducted to measure the food adequacy level among low-income consumers nationwide by improving the instruments and data analyses.

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