



Factors Associated with Food Insecurity among the Urban B40 Group in Kuching, Sarawak, During the Covid-19 Pandemic

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Abstract

Movement restrictions were one of many measures used to reduce the spread of the Covid-19 disease in Malaysia. The movement restrictions in Malaysia included suspending international travel, prohibiting gatherings, closure of non-essential business, and limiting travel distances. These restrictions negatively affected the economy, especially those already in poverty. The poor now have less capacity to attain safe and sufficient nutritious food to meet their dietary requirements for an active and healthy lifestyle. In Malaysia, those in poverty are grouped into the B40 income group, representing the bottom 40 per cent of income makers in Malaysia. This study determined the factors associated with food insecurity among the urban B40 group in Kuching, Sarawak, during the Covid-19 pandemic. This cross-sectional quantitative study collected data face-to-face using structured questionnaires from 302 urban B40 households in Kuching, Sarawak.

The data collected included sociodemographic characteristics, food security, coping strategies, depressive symptoms and self-reported health status. Logistic regression was used to determine the factors associated with food security. The results showed that among the respondents, the majority, 239 (79.1%) were food insecure, and among the variables tested, only age and self-reported health status were significant predictors ($p < 0.01$) of food security in Kuching, Sarawak, during the Covid-19 pandemic. Every year increase in age increases the chance of being food secure by 4.1%, while those with a good self-reported health status have a

2.25 times increased chance of being food secure compared to those with poor self-reported health status. The Covid-19 crisis profoundly disrupted the landscape of previously known factors associated with food security. With the results of this study, policymakers can use this new information to better target aid when faced with scarce resources during a crisis. Some examples are using resources to support those in poorer health status and providing education to the younger age group to utilise resources better among the B40 group.

Keywords: B40, Covid-19, Food security and insecurity, Poverty

What was Known

- The previously known factors associated with food insecurity were poverty, income level, education, debt, expenditure, illnesses, coping strategies, household size and the ethnic minority.

What's New and Next

- The known factors were not tested during a crisis such as the Covid-19 pandemic.
- When testing the previously known factors associated with food insecurity, the only significant predictors were age and health status.
- This result shows that in times of crisis, previously known factors change. Results from this study help policymakers make targeted choices for providing aid in times of scarcity.

Introduction

The first cases of Covid-19 were detected in Wuhan City, Hubei Province, China, on the 31st of December 2019 as a cluster of unknown causes of pneumonia¹. After its detection in China, the virus continued its spread globally, finally reaching Malaysia on the 25th of January 2020². To control the Covid-19 pandemic, Malaysia implemented measures such as movement restrictions and their various forms were implemented to reduce the spread of the Covid-19 disease. The movement control implemented includes suspending international travel, prohibiting gatherings, closure of non-essential business, and limiting travel distances are just some examples³. These measures negatively impact Malaysians, especially those already in poverty⁴. Because of Covid-19 and its restrictions, the previously ongoing aids and services such as the School Supplementary Feeding Program, Food Basket Programme, the PeKa B40, and the Community Empowers the Nation Programme have been halted. In addition, those

already in poverty lost their means of making an income. Without aid and income, these families now face an increased risk of illnesses and poor mental health caused by food insecurities⁵.

The FAO defined the most widely accepted modern interpretation of food security. During the World Food Summit in November of 1996, the FAO defined food security as when all people, at any given time, have physical, social and economic means to attain safe and sufficient nutritious food to meet their dietary requirements for an active and healthy life. Any violation of the above, one is considered to be food insecure⁶. Hunger has a significant impact on health. Children and adolescents without food cannot thrive, perform poorly at school, are more susceptible to infectious diseases, and have a higher risk of developing non-communicable diseases. Adults without food are also at a higher risk of chronic diseases such as hypertension, diabetes, heart disease, kidney disease and cancers^{7,8}.

Malaysia is an upper-middle-income country. However, income inequality in Malaysia is relatively high compared to other Southeast Asian countries⁹. To target those in need, the Malaysian Government has developed a system. This system places Malaysians into three income groups: the bottom 40 (B40), the middle 40 (M40), and the top 20 (T20) per cent income bracket among the population. In Malaysia, the B40 group are those considered to be in poverty. The B40 group has a household income of less than Ringgit Malaysia (RM) 4,850, the M40 has a household income of between RM 4,850 to RM 10,959 a month, and the remaining T20 receives a household income of more than RM 10,959 a month¹⁰. Before the Coronavirus disease (Covid-19) pandemic, the welfare of the B40 was protected by cash aid programs, the *Bantuan Rakyat 1 Malaysia* (BR1M) and other services catered specifically for the B40. These other services encompass health, food and other consumables¹¹.

In Sarawak, the rural poor have been extensively studied for food security and coping strategies^{12, 13}. Studies have shown that the rural Sarawak people can cope despite being categorised as food insecure because of the unique geographical characteristics and local culture. This is because the rural people have land to forage, hunt and grow crops while the urban people do not^{4, 12, 14}. Consequently, the prevalence of food insecurity is higher among urban Sarawak people than rural ones¹⁵. Next, those with low income, low education level, have loans, increased expenditure, illnesses or disabilities, poor coping strategies, larger households, and the ethnic minority are known to be the most susceptible to food insecurity¹⁴. In addition,

poor mental health has been studied to show a deep interconnection between a time of crisis and among those with food insecurity^{16,17}.

Therefore, this study presents an excellent opportunity to study a unique situation. First, the known factors associated with food security have yet to be studied during a crisis. Thus, the results of this study can provide insights to promote food security among the urban poor (B40) during a crisis. Secondly, the results from this study can help policymakers make better decisions with scarce resources during a crisis. Next, in Sarawak, most studies have been conducted among the rural communities. Hence, the factors associated with food security among the urban Sarawak people leave much to discover. Identifying these factors among urban people can allow for better city planning. Potentially achieving a sustainable urban environment like the sustainable urbanisation for food described by Bricas¹⁸. This study aimed to determine the factors associated with food insecurity among the urban B40 group in Kuching, Sarawak, during the Covid-19 pandemic.

Materials and Methods

Study design, population and sample size

This researcher administered cross-sectional quantitative study design collected data on the sociodemographic characteristics, food security levels, coping strategies and health outcomes from the urban B40 households in Kuching City. The Malaysian National Registry has a record of all households registered as B40. However, for a feasible entry to the B40 urban community in Kuching City, this study purposively included the B40 households from a sampling frame obtained from a non-governmental organisation providing food aid for the B40 households in Kuching City. This study excluded those who have difficulty in speech, hearing, or mentally impaired. Respondents who did not give consent or were under eighteen without parental consent were also excluded.

Before administering the questionnaire, the researchers ensure the respondents feel their responses are anonymous and confidential. This was done to elicit the most honest possible response. First, the researchers were trained to be neutral and non-judgmental when interacting with respondents. Next, clear instructions to respondents about the importance of honest and accurate answers were given, educating them about the research objectives, assuring them that

their data will be used in aggregate form, and maintaining absolute anonymity and confidentiality.

A total of 370 households were sampled. From the 370 samples, 68 samples were removed, leaving a final sample size of 302. Of the 68 samples removed, these were either system or user-missing values.

The researchers interviewed a delegate from each household using a structured questionnaire to obtain the data. The one delegate will represent a household. The delegate from each household is the woman of the family. This was because they were the ones who plan and prepared meals for the household. The household's women are considered information-rich and accurate compared to those who do not plan and prepare the meals. The questionnaire consisted of four sections: Section A: Sociodemographic characteristics, Section B: Economic hardships, Section C: Coping strategies, and Section D: Health outcomes.

Before these instruments were used for this study, pilot testing was conducted among 206 participants from 10 urban villages in Sarawak, Malaysia. The Cronbach's alpha coefficient for this instrument ranged from 0.716 to 0.933, showing good to excellent internal consistency reliability. Six public health experts performed content validation for each item's relevance, clarity, simplicity, and ambiguity. The S-CVI/ave and S-CVI/UA for all domains were acceptable, ranging from 0.778 to 1. The final instrument used is valid and reliable for use in this study.

Data collection instrument and procedures

This researcher-administered study took place between April and March of 2022, collecting data over three sections to achieve its objective. Section A collected 15 items related to the participants' sociodemographic characteristics. They include information on the caregiver's age, the number of children, the child's age, current residents, race (Malay, Chinese, Indian, Iban, Melanau, Bidayuh, others), marital status (single, married, divorced, widowed), education level (completed primary education, secondary education, tertiary education) employment status (employed, unemployed), to specify the total household income per month, to specify the total household savings per month, the type of water sources (piped water, river water, well water), ownership of transportation, ownership of a house, ownership of land for growing crops.

Section B collected information on food security using the eighteen-item United States Department of Agriculture (USDA) Household Food Security Survey Module (HFSSM). The HFSSM asks its respondents 18 questions divided over five parts. The first part requires the respondent to answer on behalf of the household regarding their experiences with food shortages and the variety of food. The second requires the respondent to answer as the head of the household, and the questions will revolve around the frequency of meals skipped and the reasons for skipping meals. The third asks about the frequency of food shortages due to monetary problems. The fourth requires responses from households with children under 18, asking questions regarding food accessibility, availability, and quality. The fifth part of the questionnaire asks questions related to the child regarding the frequency of skipping meals and the frequency of being hungry. The results were coded and scored according to the guidelines provided by the U.S Department of Agriculture¹⁹. These scores were summed up, and the respondents were categorised into groups: those with a score of zero represent high food security, scores between 1 to 2 represent marginal food security, scores 3 to 7 represent low food security, and those with scores of 8 to 18 represents very low food security. The HFSSM module considers those with high and marginal food security to be food secure and those with low and very low food security to be food insecure.

Section C collected information on the level and types of coping strategies employed using the Malaysian Coping Strategy Instrument (MCSI). The MCSI asked a total of twenty-seven questions. Twelve questions were for food-related coping strategies, and the other fifteen asked non-food related coping strategies. The results will be analysed by their frequency in numbers and percentages. Finally, section D collected information on health outcomes. Health outcomes include the self-reported health status, and the caregiver perceived depressive symptoms using the PHQ-9 questionnaire.

For the self-reported health status, a question adapted from the National Institutes of Health²⁰ will be used for the perceived level of health status level. The question will ask the participants to rate their level of health on a Likert scale of one to five. One is the worst possible health, and five is the best. The National Institutes of Health²⁰ categorises the five responses into three. Those answering very good and good were categorised as good health, those who answered moderate will remain as fair health, and those answering poor or very poor will be categorised into poor self-rated health.

The PHQ-9 is measured on a Likert scale from 0 to 3, depending on severity. Answering "3" represents the most frequency of experiencing symptoms, while "0" represents; never experiencing symptoms. The scores are summed, and participants will be grouped into five severity categories. Ranging from those with no depressive symptoms to those with severe depressive symptoms.

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Data analysis

Data was keyed into Microsoft Excel directly after the survey. This data was later imported into IBM Statistical Program for Social Sciences SPSS Version 29, using an enterprise license from Universiti Sarawak Malaysia (UNIMAS) for the statistical analysis. Data were checked for missing values. Out of 370 samples, sixty-eight samples were removed due to missing values. Each instrument was coded according to its respective guidelines.

Associations were determined with univariate analysis. Simple binary logistic regression was used for continuous independent variables, and the Chi-square test was used when variables were categorical. Using the entered binary logistic regression, only significant variables were used to create a final model to determine the factors associated with food security. A p -value of less than 0.05 was considered significant.

Results

A total of 302 households were included in this study. The mean (standard deviation (SD)) for the age of the head of household for this study group was 54.29(14.26). Among the 302 households, there were 218 (72.19%) households with children. The mean (SD) age of children in each household was 3.63 (2.46). The mean (SD) BMI of the female caretaker of the household was 25.54 (5.38). The mean (SD) household income was 704 (645.33) Ringgit Malaysia (RM), with an average (SD) savings of 66.23 (225.62) RM per household. Of the 302 households, the majority were Malay, comprising 135 (44.7%) households. While the rest were Iban 84 (27.8%),

Chinese 60 (19.9%), Bidayuh 18 (6.0%), others 4 (1.3%) and Melanau 1 (0.3%). The majority, 191 (63.2%), were married, and the rest, 111 (36.8%), were divorced, widowed or single. Most completed primary education 125 (41.4%), followed by secondary school education 124 (41.1%), 45 (14.9%) had no formal education, and only 8 (2.6%) completed tertiary education. For ownership of transportation, the majority 111 (36.7%) do not own personal vehicles, followed by those who own a car 99 (32.8%), those who own a motorcycle 86 (28.5%) and those who own a bicycle for transportation, 6 (2.0%). For the ownership of a house, the majority, 152 (50.3%), own a house that does not require payment. Followed by those who own a house that requires payment 69 (22.8%), renting that requires payment 41 (13.6%), homeless 30 (9.9%) and rent but do not pay for the rental 10 (3.3%). For the ownership of land, the majority, 18 (6.0%), own land but do not use it for planting food, while 268 (88.7%) do not have ownership of land, and 16 (5.3%) own land and use it for planting food (Table 1).

Table 1 Sociodemographic characteristics of the participants (N=302)

Variables		n(%)	Mean(SD)
Age of the head of household (year)		-	54.29 (4.26)
Households with children		218 (72.19)	
Age of children (year)		-	3.63 (2.46)
BMI of female caretaker (kg/m ²)		-	25.54 (5.38)
Total household income (RM)		-	704 (645.33)
Total saving/household (RM)		-	66.23 (225.62)
Race	Malay	135 (44.7)	
	Iban	84 (27.8)	
	Chinese	60 (19.9)	
	Bidayuh	18 (6.0)	
	Melanau	1 (0.3)	
	Other	4 (1.3)	
	Married	191 (63.2)	
Divorced/Widowed/Single		111 (36.8)	

Table 1 Sociodemographic characteristics of the participants (N=302) (Continue)

Variables		n(%)	Mean(SD)
Education level	Primary school	125 (41.4)	
	Secondary school	124 (41.1)	
	Tertiary school	8 (2.6)	
	No formal education	45 (14.9)	
Ownership of transportation	Does not own personal vehicles	111 (36.7)	
	Owns a car	99 (32.8)	
	Owns s motorcycle	86 (28.5)	
	Owns a bicycle	6 (2.0)	
Ownership of house	Owns a house that does not require payment	152 (50.3)	-
	Owns a house that requires payment	69 (22.8)	
	Renting that requires payment	41 (13.6)	
	Renting that does not require payment	10 (3.3)	
	Homeless/Squatting	30 (9.9)	
Ownership of land	Does not have ownership of land	268 (88.7)	-
	Owns land and uses it for Planting food	16 (5.3)	
	Owns land but does not use it for Planting food	18 (6.0)	

For food security, the majority had very low food security 132 (43.7%), the rest had low food security 107 (35.4%), 37 (12.3%) were categorised into marginal food security, and 26 (8.6%) had high food security. The HFSSM module considers only those with high and marginal food security to be food secure and those with low and very low food security to be food insecure. The majority, 160 (53.02%), displayed high levers of coping strategy. This was followed by those displaying moderate levels of coping, 74 (24.48%), and low levels of coping strategy, 68 (22.49%) (Table 2).

Table 2 Levels of food security among the participants. The distribution of food security level and the level of coping is displayed in frequency and percentage (N=302)

Food Security level*	n (%)	Food Security level*	n (%)
High food security	26 (8.6)	Food secure	63 (20.9)
Marginal food security	37 (12.3)		
Low food security	107 (35.4)	Food insecure	239 (79.1)
Very low food security	132 (43.7)		
Level of coping	n (%)		
Low levels of coping	68 (22.49)		
Moderate levels of coping	74 (24.48)		
High levels of coping	160 (53.02)		

*Households with high or marginal food security are considered as having food security. Those with low or very low food security are considered to have food insecurity.

In terms of food-related coping strategies, most prefer coping by consuming whatever food was available at home 263 (87.1%), followed by using less expensive food 254 (84.1%). Just over half of the respondents use less preferred food 180 (59.6%). Less than half of the respondents use the other coping strategies. They are, receiving food assistance from neighbours 129 (42.7%), reducing the number of meals per day 102 (33.8%), reducing portion for each meal 96 (31.8%), prioritising buying staple food and less preferred food 92 (30.5%), borrowing money for food 51 (16.9%), prioritising food for certain household members over others 40 (13.2%), skipping meals for the whole day 37 (12.3%), purchasing food on credit 24 (7.95%) and finally, sending their children to relatives for food 92 (30.5%).

For non-food related coping strategies, to cope, most planned for future expenditure 203 (67.2%), followed by being thrifty with money 183 (60.6%). The other non-food related coping strategies were not as commonly used. The other strategies were engaging in odd jobs 136 (45.0%), reducing child's pocket money 78 (25.8%), not attending or giving gifts during festivals 66 (21.9%), receiving clothes from good-will 60 (19.9%), not giving money to the child 55 (18.2%), buying clothes only for children 40 (13.2%), selling valuables for money 40 (13.2%) and requesting money from relatives 38 (12.6%). For housing security, most delayed the payments of utility bills 68 (22.5%), followed by delaying bills until a warning letter or termination letter was received 42 (13.9%), and delaying the payment of house or vehicle payments 21 (7.0%). (Table 3).

Table 3 Coping strategies used by each household (N=302)

Coping Strategy	n (%)
Food-related Coping Strategy	
Used less expansive food	254 (84.1%)
Used less preferred food	180 (59.6%)
Consumes whatever food is available at home	263 (87.1%)
Receives food assistance from neighbours	129 (42.7%)
Borrows money for food	51 (16.9%)
Purchased food on credit	24 (7.95%)
Sends their children to relatives for food	18 (5.96%)
Prioritised buying staple food and less preferred food	92 (30.5%)
Reduces the number of meals per day	102 (33.8%)
Prioritise food for certain household members over others	40 (13.2%)
Skipped meals for the whole day	37 (12.3%)
Reduced portion for each meal	96 (31.8%)
Non-food related coping strategy	
n (%)	
Bought less expensive clothes	87 (28.8%)
Receives clothes from good-will	60 (19.9%)
Only bought clothes for children	40 (13.2%)
Reduced child's pocket money	78 (25.8%)
Did not give money to the child	55 (18.2%)
Table 3 Coping strategies used by each household (N=302) (Continue)	
Non-food related coping strategy	
n (%)	
Requested money from relatives	38 (12.6%)
Sold valuables for money	40 (13.2%)
Were thrifty with money	183 (60.6%)
Were engaged in odd jobs	136 (45.0%)
Bought less expensive products	206 (68.2%)
Planned for future expenditure	203 (67.2%)
Did not attend or give gifts during festivals	66 (21.9%)
Housing security	
n (%)	
Delayed the payment of house or vehicle payments	21 (7.0%)
Delayed bills until a warning letter or termination letter were received	42 (13.9%)
Delayed the payments of utility bills	68 (22.5%)

With regards on self-reported health status The majority, 174 (57.6%), were in very good and good health status. This was followed by moderate health status 102 (33.8%), and 26 (8.6%) had very poor and poor self-rated health. For depressive symptoms, the majority, 77 (60.2%), were found to have minimal depressive symptoms, followed by those with no depressive symptoms 90 (29.8%), those with mild depressive symptoms 60 (19.9%), those with moderate depressive symptoms 14 (4.6%), moderately-severe depressive symptoms 3 (1.0%), and finally, those with severe depressive symptoms 2 (0.7%). Among these results, 5 (1.7%) respondents scored ten or more. The five respondents are considered to have depression (Table 4.).

Table 4 Self-reported health status and depressive symptoms (N=302)

Health status	n (%)
Very poor & poor	26 (8.6)
Moderate	102 (33.8)
Very good & good	174 (57.6)
Depressive symptoms	n (%)
No depressive symptoms	90 (29.8)
Minimal depressive symptoms	133 (44.0)
Mild depressive symptoms	60 (19.9)
Moderate depressive symptoms	14 (4.6)
Moderately-severe depressive symptoms	3 (1.0)
Severe depressive symptoms	2 (0.7)

The univariate analysis showed that only age, BMI and self-report health status were significant variables (Table 5).

Table 5 The univariate analysis for the variables tested (N=302)

Variables	B	Std. Error	Wald Chi-square	df	p-value	OR (95% CI)
Age	.046	.0105		1	<.001	1.045 (1.022, 1.069)
BMI	-.026	.0308		1	.047	.917 (.917, 1.035)
Number of children in household	.039	.0647		1	.557	1.040 (.916,1.180)
Race			7.794	5	.168	
Marital status			6.509	3	.089	
Education level			5.084	3	.168	
Employment status			3.011	1	.083	
Total household income	>.001	.0004		1	.278	.999 (.999, 1.000)
Total household savings	.001	.0007		1	.363	1.002 (1.001,1.004)
Ownership of transport			2.739	4	.602	
Ownership of house			1.488	4	.829	
Ownership of land			2.804	2	.246	
Presence of depressive symptoms			2.782	5	.734	
Self-reported health status			12.403	1	<.001	
Receiving external aid			.007	1	.933	
Level of coping strategy			4.317	1	.038	

*Simple binary logistic regression was used for IVs that were continuous, and the Chi-square test was used when IVs were categorical. The dependent variable is food security. Food security is coded as "1" and food insecurity is coded as "0"

For the final regression model, the Omnibus test of model coefficient was significant, Chi-square (df) = 30.860 (3), $p < .001$, showing that there is at least one variable in this model that significantly predicts food security. The Hosmer and Lemeshow test shows Chi-square (df) = 12.558 (8), $p = .128$. This was interpreted as a good model fit, and the predictive capacity for this model is good. The final model shows that among the three variables tested, only age and self-reported health status are significant predictors of food security. Age had a B (S.E) = .004 (.011), odds ratio (OR) = 1.041, $p < .001$. This represents that for every increase in 1 year, there was a 4.1 per cent chance of being in the food secure category. For health status, this model B(S.E) = 1.178 (.341), OR=3.248, $p = .001$. This represents that those with good health status have a 124 per cent increase in food security compared to those with poor health status (Table 6).

Table 6 The final model of the multivariate analysis (N=302)

Variables	B	Std. Error	Wald Chi-Square	df	P-value	OR (95% CI)
Age	0.040	0.011	12.699	1	.000	1.041 (1.018-1.064)
Health status	1.178	.341	11.946	1	.001	3.248 (1.666- 6.335)
BMI	-.049	.031	2..545	1	.111	.852 (.897- 1.011)

*The dependent variable is food security. Food insecure was coded as "0", and those who are food secure were coded as "1". For health status, poor health status was used as a reference. Age and BMI were analysed as a continuous variable.

Discussion

A food insecurity systematic review conducted in Malaysia found that the prevalence of food insecurity among low-income households in Malaysia ranged between 48.8 to 100 per cent¹⁴. Similarly, our study determined that 79.1 per cent of its respondents have food insecurity during the Covid-19 pandemic. Thus, strengthening the current known knowledge of the prevalence of food insecurity among the low-income group, that those with low income continue to be at risk of food insecurity during a crisis.

While previous research has commonly identified factors such as education level, ethnic minority, loans, household income and levels of coping strategy as predictors of food insecurity, these factors were tested and were not significant predictors of food insecurity in this study. This

could be because of the unique context of the pandemic. The Covid-19 pandemic was an extraordinary event that disrupted many of the typical relationships and predictors of food insecurity^{21, 22}. The Covid-19 pandemic has exacerbated inequalities, disrupted accessibility and availability to food, caused the loss of employment, and reduced working hours and income, making everyone more susceptible to food insecurity regardless of income, ethnicity, loans and education level. The COVID-19 pandemic has had profound socio-economic implications globally, including in Kuching, Sarawak, Malaysia.

One example of the disruption caused by Covid-19 is the change in coping strategy. Using engaging in odd jobs as a coping strategy for this example. During the pandemic, many became unemployed. The unemployed were now more willing to explore any new options, engaging in previously uninterested jobs to cope. Such a phenomenon is not isolated to our study. Similar phenomenon has been explored and documented in other studies during the Covid-19 pandemic²³. This phenomenon could reflect the results from our study, showing that 45.0 per cent now engage in odd jobs as a coping strategy, whereas in another study group, this percentage was lower at 29.2 per cent²⁴. A second example of the disruption of typical predictors was having loans. Having loans was previously known to predict food insecurity. This was not true in our study. During the pandemic, the Malaysian government instructed banking institutes to allow loan repayment deferments²⁵, negating the effect of the predictive value towards food insecurity. A final example is education level. As described, most industries were halted during the pandemic. Industries that were operating were struggling to find employees, employing anyone willing to work, and education level was no longer an important consideration²⁶.

On the other hand, this study yielded unique findings: only age and self-reported health status significantly predict food insecurity among this study's respondents, highlighting the need for a nuanced understanding of the determinants of food insecurity in this population. The negative association between age and food insecurity revealed that older individuals in the studied population were more likely to be food secure compared to their younger counterparts. Similar studies found that food insecurity decreases with an increase in age²⁷. Several potential explanations can be considered. Food insecurity is an individual experience that includes the fear of running out of food, and perhaps older adults have gathered knowledge to utilise food better when compared to younger adults. Another explanation is that as people age, they often

experience a reduction in appetite, metabolism and dietary needs²⁸. This can contribute to a decrease in food insecurity. Furthermore, household composition plays a role. As people age, the people within the household age. The children in the household are grown, move out or have passed away. This represents fewer mouths to feed, and the older households have more food for themselves^{29, 30}.

This study found that those with better health were negatively associated with food insecurity. Our result was interpreted as those who self-reported to be in better health status have a 2.25 times increase chance of being food secure. Such finding is similar to previous studies (31-34). First, those with poor health may have specific dietary requirements or limitations affecting their food access. Those with poor health may have to follow specific diets and, therefore, have more limited food choices when compared to others. This may exacerbate food insecurity. Poor health status can also reduce an individual's productivity and income-generating ability, which reduces their ability to obtain food. In addition, those who self-report to be in better health tend to exhibit strong resilience and coping mechanisms³⁵. This allows them to better navigate adverse circumstances, such as the lack of food during the Covid-19 pandemic.

Limitations

The respondents to this study were part of a group caring for their welfare. Their response may be based on coaching, or there may be an element of negative response bias. This may justify the non-significant association between certain variables that were previously found to be significantly associated with food security. Second, to effectively target the B40 population, this study used a sampling frame obtained from a non-governmental organisation providing food aid for the B40 households in Kuching City. However large this sampling frame may be, it does not include all B40 households and may miss out on pockets of B40 households that were either not registered in the national registry or refused aid from these NGOs. Thus, it may not fully represent all B40 households in Kuching, Sarawak.

Conclusion

This study provides valuable insights into the factors associated with food insecurity among the urban B40 population in Kuching, Sarawak. The COVID-19 pandemic has had profound socio-economic implications for food security. Because of the pandemic, the findings

highlight the unique contributions of age and self-reported health status in predicting food security while demonstrating a deviation from previously identified factors.

First, the findings from our study emphasise that food insecurity occurs among urban low-income households. The current studies in Malaysia on food insecurity focus on the rural, the natives and the vulnerable. Our study highlights that the urban poor also require a representative voice and should not be neglected, as effective policies should be based on targeted evidence-based practices.

Second, our study also highlights the need for tailored interventions and support systems that address the unique challenges faced by different age groups and individuals with varying health statuses. For the first example, perhaps providing education to better utilise financial resources along with food aid could improve the resilience to food insecurity. Second, those with health problems can be referred to the nearest healthcare facility for management. However, this does not mean other previously identified factors are unimportant. Public health interventions must adopt a multifaceted approach to mitigate the effects of food insecurity during a crisis. Therefore, interventions must emphasise practices that address accessibility, affordability, strengthened social safety nets and resilient community networks to ensure food security for all individuals during and after a crisis.

Third, our study also recommends that other regions conduct similar studies to identify the factors associated with food insecurity locally. As evident in this study, some factors previously known to influence food insecurity were not the same for our study. Replicating our study in other regions should be conducted so that policymakers and public health practitioners can work towards mitigating food insecurity and improving the overall well-being of their unique population.

Ethical Approval Statement

Research ethics approval and ethics were obtained from the Ethics Committee of University Malaysia Sarawak, UNIMAS, reference number: UNIMAS/TNC(PI)/09-65/01(5) FME/21/90. Permission and consent to conduct this pilot study were also obtained from the head of villagers and the participants before collecting data. The participants were briefed on the research objectives, aim, benefits of the study, why and how they were chosen, the instructions for answering the survey, the absolute privacy and confidentiality of data collected, the right to withdraw from the study at any point in time and consent is given if they choose to participate. A

written disclaimer was shown on the front page of the questionnaire, indicating that consent is automatically considered given upon attempting.

Author Contributions

Yeo Zi Sheng is the main researcher involved in designing the study, formulating the content of the tools used for data collection, data collection, data analysis, manuscript writing and editing. The co-author is Cheah Whye Lian. Cheah Whye Lian was contributed in data analysis, manuscript writing and editing.

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Conflicts of Interest

This study declares no conflicts of interest. Only the author and co-author had access to the data for this study. No other party had any influence or access to this study.

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