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Association of Food Insecurity and Weight Status of Women in Tuba Island, Malaysia

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Abstract

Global concern is food insecurity and low weight status, contributing to poor health outcomes. Food deficiency happens when people can't get enough food much of the time; on the other hand, low weight status occurs when people eat more or less than they need. Women are a potentially vulnerable group of people facing weight and food insecurity. Therefore, this research was intended to establish the connection between the status of food insecurity and the weight status of women on Tuba Island. This is a cross-sectional study design, and about 114 women aged 18-45 years have participated in Tuba Island. The Radimer/Cornell hunger and food insecurity questionnaire and anthropometric measurements are the study's measurement methods. Via a face-to-face interview, this research was carried out. With 64.9 percent and 35.1 percent, respectively, the incidence of food insecurity was higher than food security. The prevalence of low weight status (underweight, overweight and obese) was 71.9%, which was just 28.1% higher than good weight status (normal weight). There was a significant relationship between job status (p=0.019) and household income (p=0.006) in terms of food insecurity; however, there was no significant relationship between food insecurity and weight status (p=0.437). This study showed no correlation between food insecurity and women's weight status on Tuba Island, although there is an association between job status and household income with food insecurity.

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Introduction

Food insecurity is characterised as an economic and social situation at the household level with restricted or uncertain access to adequate food. It has been categorised into two categories: moderate food insecurity and very low food insecurity. When a person encountered food insecurity but not hunger, low food security was considered, which the opposite of very low food insecurity[1] was. Many studies revealed that food insecurity is a complex problem as many people do not have the resources to meet their basic needs, increasing the risk of family food insecurity.[1,2,3] A broader look at the extent of food insecurity in 2018, 9.2% of the global populations were suffered from severe food insecurity; meanwhile, 17.2% of them were classified as moderate food insecure. African people rec

orded a higher prevalence (74.0%) due to a small population in their continent, and it was followed Latin America and Asia with 40.0% and 30.6%, respectively. Northern America and Europe recorded a very low prevalence than the rest, with 9.0% only.[4] Bawadi *et al*.[5] indicated one over three of the women in northern Jordan, 32.4%, were food-insecure. Abdu *et al*.[6] showed that 70.4% of women in Assayita District, Afar Regional State, Ethiopia involved in food insecurity. This prevalence was higher when compared to previous studies.

Meanwhile, in Malaysia, the prevalence of food insecurity are commonly high among indigenous population reside in certain districts. For example, 88 % were reported in Gombak, Selangor state[7] and 82.9 % in Carey Island and Tanjung Sepat, Selangor state.[8] Food insecurity also prevalent in the non-indigenous population in Malaysia, for instance, as seen in few components of food insecurity in the Malaysian Adult Nutrition Survey (MANS) study, such as food quantity insufficiency (25.0 %), food variety insufficiency (25.5 %), reduced the size of the meal (21.9 %) and 15.2 % skipped meals due to financial restraints.[9]

Several studies express that demographic characteristics influence an individual's food insecurity, such as household income, employment, education level, physical disability, marital status, etc. The survey also shows that, when changing the socio-demographic characteristics, household food insecurity was reduced.[10]

The lack of consistent access to food for a safe life is associated with food insecurity. In terms of calories, food insecurity may also mean someone is getting plenty to eat, but the nutritional content of their food is missing. However, most poor food security individuals might be expected to reduce food intake and reduce body calorie intake, thus underweight. Several studies found that food insecurity is one factor of poor nutrient intake, contributing to the underweight of women.[11] Women with a lack of income also decreased in consumption of high-rich nutrient foods due to high price; meanwhile, they consume high energy-dense food as it is cheapest.[12] These results are likely to be related to overweight and obesity as high energy food was associated with excess energy intake and eventually become overweight.[13] This double-burden malnutrition that was closely associated with food insecurity will affect women at reproductive age who were vulnerable due to increased nutritional demands for pregnancy and lactation. As a result, this will impact their nutritional status and further exploited the nutrition and health status of the offspring.[14] Therefore, by considering filling the gaps in knowledge, this study is aimed to determine the association between food insecurity and weight status among women at reproductive age at Pulau Tuba. The findings of this study may be beneficial in highlighting strategies that should be taken to develop and design proper nutritional interventions for this population.

Literature Review

Food insecurity has become a hot topic in Malaysia, especially during the pandemic of Covid-19. However, there is no definite epidemiological research on the prevalence of food insecurity among the population in Malaysia. Nevertheless, according to Global Food Security Index (GFI),[15] Malaysia reported improved food insecurity status in previous years. It jumped to the position of 28th in 2019 compared to the 48th position in 2018. The truth is Malaysia has achieved an improvement as the previous year, Malaysia reported higher prevalence in this issue. This has been proved when several reports had shown that the prevalence of food insecurity in previous years was high. A strong relationship between food insecurity and Malaysian people has been reported in the literature of Ilhab *et al*.[16] when 83.9% of 223 mothers in rural area were classified as household food insecurity. They

indicate that food insecurity status is associated with the quality of life and prone to adverse effects on the well-being of individuals in low-income communities. However, they did not mention the ways to counter this higher prevalence at that moment.

Another finding for food insecurity is, 24.9% household food insecurity, 19.5% was individual food insecurity, and 40.8% was child hunger detected among palm-plantation households, consisting of 169 Indian women. Briefly summarised, more than half of respondents (85.2%) of this population suffered from food insecurity, and the possible explanation is that due to inadequate food supply in the household. They stated that appropriate community-based interventions should be designed and implemented to address food insecurity and possible health and nutritional outcomes.[3] This finding follows Shariff & Lin[17] when they found food insecurity status among rural households in Sabak Bernam about 58%. It was considered higher as it over the food secure prevalence. These differences could be due to the fixed income of palm-plantation households, which may put them more risk of experiencing food insecurity than rural households.The same goes for this study; they never stated how they improvise the prevalence of food insecurity among this population. Therefore, the hypothesis drawn for the current study was illustrated from the previous literature, which is that food insecurity's prevalence among women in Tuba Island is higher.

Materials and Methods

This research was performed in a cross-sectional manner. It was carried out on 114 women on Tuba Island, Langkawi, Malaysia. The sampling technique used was the non-probability convenience method. The sample size was determined through the Cochran formula. The prevalence of food insecurity used in this analysis is 54.4 percent, according to Bakar *et al.*[18] With a 95% confidence level and desired precision of 0.1, 95 of the sample size was acquired. 20 % is added to increase the study's response rate, thus the results able to represent the target sample.

In consequence, the total sample size is 114. The respondent was selected by inclusion (women aged 18-45 years old, not pregnant and breastfeeding, and only from Tuba Island) and exclusion (vegetarian, suffer from disease and changed dietary pattern in the past six months) criteria and this study was conducted through a face-to-face interview. This study's measurement tools are a structured questionnaire that consists of three sections: demographic characteristic, anthropometry measurement, and Radimer/Cornell hunger and food insecurity instrument. Age, marital status, educational level, employment status, household income, number of persons contributing to household income, household size category, and monthly household food expenditure are the eight demographic characteristics established. An anthropometric calculation used by calculating weight and height to assess weight status to calculate the Body Mass Index (BMI). Ten items established the Radimer/Cornell hunger and food insecurity and assessed the status of food insecurity. Based on responses to ten questions, food insecurity was divided into four categories: food safe, household food insecure, person food insecure, and child hunger. It took approximately 20 minutes to complete the interview. The data were analysed using version 26 of the Statistical Kit of Social Science (SPSS). All variables, such as mean, standard deviation, median, frequency and percentage, were first viewed as descriptive statistics. The precise Fisher test was used to show the correlation of demographic characteristics with food insecurity and food insecurity with weight status. This study obtained ethical approval from the Research Ethical Committee UiTM.

Results

In this study, a total of 114 subjects participated. Table 1 illustrates the socio-demographic characteristic, food insecurity status and weight status of respondents. It showed the percentage of food insecurity status (64.9%) was higher than food security (35.1%) as 35.1% of household only reported food security. Meanwhile, with 42.1% of household food insecurity, 7.9% of household food insecurity was person food insecurity, and 14.9 % were in child hunger, which is a serious level of food insecurity. The mean+SD of weight, height, and BMI, respectively, were 67.89 + 14.88, 157.39 + 5.53, and 27.36 + 5.55. About 2.6% were recognised as underweight, and followed by 26.3% of respondents were classified as obese. The majority of them were overweight, with 43.0% of the percentage value and

the average of them (28.1%) were normal weight. It can be summarised that most women in Tuba Island were overweight, as evidenced by the higher percentage in BMI classification.

Table 1: Socio-demographic characteristic, food insecurity status and weight status of respondents

Characteristics	N (%)	Mean + SD
Age (Years)		32.84 + 9.04
18-31	51 (44.7%)	
32-45	63 (55.3%)	
Marital status		
Single	27 (23.7)	
Married	81 (71.1)	
Widowed/divorced	6 (5.3)	
Education		
No schooling	3 (2.6)	
Primary education	37 (32.5)	
Secondary education	63 (55.3)	
Tertiary education	11 (9.6)	
Employment status		
Government/private sector	13 (11.4)	
Self-employed	25 (21.9)	
Housewife	76 (66.7)	
Household income		
Less than RM908	42 (36.8)	
RM 909-RM2208	65 (57.0)	
More than RM2208	7 (6.1)	
No of the person contribute to household income		
None	8 (7.0)	
Only	74 (64.9)	
More than one	32 (28.1)	
Household size category		
5 members or below	81 (71.1)	
6-8 members	27 (23.7)	
9 members or above	6 (5.3)	
Household food expenditure		
RM500 and below	69 (60.5)	
RM501-RM749.99	36 (31.6)	
RM750 and above	9 (7.9)	
Food insecurity status		
Food secure	40 (35.1)	
Household food insecurity	48 (42.1)	
Individual food insecurity	9 (7.9)	
Child hunger	17 (14.9)	
Weight status		
Weight (kg)		67.89 + 14.88
Height (cm)		157.39 + 5.53
Body Mass Index		27.36 + 5.55
Body Mass Index Classification (kg/m^2)		

Underweight (< 18.5)	3 (2.6)
Normal weight (18.5-24.9)	32 (28.1)
Overweight (25.0 – 29.9)	49 (43.0)
Obese (> 30.0)	30 (26.3)

Table 2 revealed a correlation between socio-demographic factors and food insecurity. Food insecurity was significantly correlated with working status and household income, with a P-value equal to 0.019 and 0.006, respectively. Table 3 revealed the relationship between respondents' food insecurity and their weight status, with a P-value of 0.437, suggesting no substantial relationship between food insecurity and weight status.

Table 2: Relation between socio-demographic factors and the respondents' food insecurity

Characteristics	Food security, N (%)	Food insecurity, N (%)	P-value
Employment status			0.019
Government/private sector	9 (69.2)	4 (30.8)	
Self-employed	9 (36.0)	16 (64.0)	
Housewife	22 (28.9)	54 (71.1)	
Household income			0.006
Less than RM908	8 (19.0)	34 (81.0)	
RM908- RM2208	27 (41.5)	38 (58.5)	
More than RM2208	5 (71.4)	2 (28.6)	

*Analysed by Fisher' Exact Test
*Significant value (P<0.05)

Table 3: Association between food insecurity and weight status of respondents

Variable	Food security, n (%)	Food insecurity, n (%)	P-value
Body Mass Index classification (kg/m²)			0.437
Underweight	1 (33.3)	2 (66.7)	(< 18.5)
Normal weight	12 (37.5)	20 (62.5)	(18.5 – 24.9)
Overweight	(25.0 -29.9)	20 (40.8)	29 (59.2)
Obese	(> 30.0)	7 (23.3)	23 (76.7)

*Analysed by Fisher' Exact Test
*Significant value (P<0.05)

Discussion

About 64.9% of food insecurity prevalence found in this study, and it was dominated by household food insecurity. The prevalence of food insecurity was considered lower in this study than recorded in the previous studies.[3,19] It can be inferred, relative to these previous studies, that the lower prevalence of food insecurity seen in this research may be due to the lower cost of living for this population. This occurs due to collaboration between Ministry of Domestic Trade and Consumer Affairs (MDTCA) and Jawatankuasa Kemajuandan Keselamatan Kampung (JKKK), an incentive called *Koperasi Untuk Penduduk Pulau Tuba* to help reduce life

expenditure among this population in 2017. Since most head households are fishermen, they tend to get their food sources instead of making food purchasing. These results may explain why this study found a lower prevalence of food insecurity than previous studies.However, it was contrary to Mohamadpour's[3] findings when they indicated that food insecurity in their study was influenced by child hunger. This difference might occur due to the household category's size as our household category was dominated by almost half of respondents from 5 members and below. Thus, a low percentage of the big household category in this study might contribute to a low percentage of child hunger food insecurity.

Poor weight status is defined by BMI less than 18.5 kg/$m^{2,}$ which indicates underweight and BMI more than 25.0 kg/m^2 for overweight and obesity. The prevalence of poor weight status in this study is high by 71.9 % and was dominated by the overweight category. This accords with earlier observations, which showed that overweight prevalence in most countries exceeds the prevalence of underweight prevalence.[20] Moreover, the present study considers a higher prevalence of poor weight status than Malaysia Non-Communicable Disease Surveillance-1 (NCDS-1) reported by Tan *et al*.[21] It was supported by the study from He *et al*.,[22] as they indicated that their prevalence lower than the current study. A possible explanation for this might be that respondents in this study lack knowledge regarding energy and nutrient requirements. Thus, a high percentage of overweight and obesity occurs. This is because most of the respondents (87.8%) were classified as secondary and primary education, contributing to this growth. These explanations are directly in line with previous findings that stated that low education level was associated with obesity in women.[10,11]

Concerning the socio-demographic characteristics of food insecurity status in this present analysis, food insecurity was correlated with employment status and household income. According to our result, almost half of food-insecure respondents (47.4%) were housewife. Thus, it can be assumed that financial issue playsan important role in this relationship. This is because working individual usually have greater food expenditures compared to unemployed. Therefore, unemployed such as housewife tends to low purchasing power which contributes to the insufficient food supply. The previous studies showed that employment affects household food supply as it determinesfood purchasing; thus, lack of purchasing power will associate with food insecurity status.[20,711]

This study generates results that corroborate other studies' findings in this field in the context of household income. Pei *et al*.[23] reported insufficient income was a leading factor to food insecurity as it affects poor food purchasing and availability. It also supported Ali Naser *et al*.[24] They concluded that the association between these variables is a sequential relationship: income, food expenditure, and food variety promote food security. Therefore, the conclusion drawn from the current finding is that household income was associated because most of the respondents were unemployed housewives (73%). Besides, most of their husband or head of household reported as a fisherman. In line with the study from Rhoumah[25] agreed that poverty was related tothe fisherman. Thus, this explained how household income affects the food insecurity status in this study.

What stands out in these factors is that they contradicted our assumptions when we discovered that food insecurity is unrelated to weight status. This may be because the current study's sample size is only 114 women. Gad *et al*.[26] showed this when they concluded that a small sample is unlikely to imply a meaningful relationship between variables, regardless of how large the correlation is. However, taking a large enough sample will show proof of association, irrespective of how slight the effect of that association is. The previous studies of Pei *et al*.[27] and Dharod *et al*.[28] were also supported when their respondents were 222 and 195 respondents, respectively, and established a correlation between food insecurity and weight status.Overall, the most prominent findings that can be emerged from the current study is that the prevalence of food insecurity was lower than previous studies, and analysis showed there was no association between food insecurity and weight status. This study also represents the first and latest issue regarding food insecurity among Pulau Tuba residents.

Conclusion

The most influential finding from this study is that food insecurity and weight status were not related. The second major finding was that food insecurity and poor weight status (underweight, overweight, and obesity) were more prevalent in this study than food security and good nutrition (normal weight). This study also identified employment status and household income were significant factors influencing food insecurity. The evidence indicates that the relevant organisation should design programmes that prioritise financial planning and nutrition and food choices education to minimise the prevalence of food insecurity and obesity in this research. The government also requires greater efforts to provide job opportunities for the population of Tuba Island and ensure that each household has sufficient income. Future studies should also concentrate on these points and recognise other potential causes that could lead to food insecurity and low weight status at the same time.

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Conflict of Interest

The authors declare no conflict of interest.

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