# HOUSEHOLD FOOD SECURITY STATUS AND ITS ASSOCIATION WITH CHILD FEEDING PRACTICE AND CHILDREN'S WEIGHT STATUS AMONG LOW INCOME MOTHERS IN TERENGGANU

CHEAH PEI SHYUAN, HAYATI MOHD YUSOF, ASMA ALI, AND NOOR SALIHAH ZAKARIA[*]

*Faculty of Fisheries and Food Science, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia.*

*\*Corresponding author: salihah.zakaria@umt.edu.my*

**Abstract:** Food insecurity is normally associated with lower socioeconomic status and improper feeding practices which may consequently affect growth and development of young children. This study aims to assess household food security status and its association with child feeding practices and children's weight status among low income mothers in Terengganu. A cross-sectional study using convenience sampling was conducted at four public maternal and child health clinics (MCH) located in Terengganu. A total of 107 of low-income mothers between ages of 18 to 45 years with net household income less than RM 3000 who has at least one child aged two years and above were recruited. The instruments used were Household Food Insecurity Access Scale (HFIAS), Child Feeding Questionnaire (CFQ) and weight-for-age child growth chart for children' weight status at aged one year. Descriptive statistic and non-parametric tests were employed (SPSS 20). Majority of the households were food secure (85.0%). Yet, it is also important to note that about 15% of the household had experienced some degree of food insecurity. There was no significant correlation between household food security and all child feeding practice domains. Most of the mothers had children with normal weight (mean Z-score =-0.72+0.99). There was statistically significant association between household food security status and weight of children at one year of age (p=0.01). In conclusion, majority of the households experienced food secure. Household food security were associated with children's weight status at early age but not correlated with parent's child feeding practice.

Keywords: Household food security, child feeding practice, weight of children, low income

## Introduction

Food security is an important issue especially in developed countries. The growth of global population resulted in the increase of food demand around the world. In Malaysia, the population had increased to almost 2.7 million causing the increasing in demand for food (Md Razak *et al.,* According to FAO (1996), food security exists when all people, at all times, have ability to access sufficient and nutritious foods to meet their dietary needs for an active and healthy life. At the household level, food security refers to the ability of household to provide or purchase adequate foods to meet the dietary needs of all members of the household.

Household food insecurity is normally associated with those with a lower socioeconomic status that may impact the allotment of food to each household member (Ali Naser *et al.,* 2014). One of the consequences that can be seen from this issue is that children from low-income households always said to have inadequate dietary intake and poor growth development ( Fekadu *et al.,* 2015; Gundersen & Ziliak, 2015; Sreeramareddy, Ramakrishnareddy, & Subramaniam, 2015; Betebo *et al.,* 2017). A study among low-income mothers in Argentina revealed that some of them expressed that they did not have enough money to purchase food for their families. Due to financial restriction, there were also limited choices for healthy

foods which normally in high cost (Lindsay *et al.,* 2012). In the local setting, a study in a rural community in Sabak Bernam, Selangor involving 200 women of poor households with children in the age group of 1 to 6 years old had shown that more than 50% of the households experienced food insecurity, with 34% of the mothers reporting their child was hunger (Shariff & Khor, 2008). In Terengganu, Wong *et al.* (2014) stated that there were 85 out of 137 cases (62%) reported that children who less than five years old experienced some level of food insecurity, with 19% (n=26) of them reported at household levels.

As the global economic keeps on growing, parents with low income are hardly provide enough and nutritious foods to their child. Besides, there were also parents who are not concern about what should be given to their children to ensure adequate healthy dietary intake. This issue might occur due to the low education level and larger household size in terms of greater number of children among parents (Hadley *et al.,* 2011), further highlighting the solemn issues in household food insecurity and child feeding practices. However, from the literature searches, studies on household food security and child feeding practices were scarce in Malaysia. As such, the aim of this study was to assess the household food security and its association with child feeding practices and children's weight status among low income mothers in Terengganu.

## Materials and Methods

### Study design

A cross-sectional study using convenience sampling were conducted among low-income mothers during their visit to the four public maternal and child health clinics (MCH) located in Terengganu. The public clinics included Klinik Kesihatan (KK) Batu Rakit, KK Bukit Tunggal, KK Manir and KK Seberang Takir, Terengganu. Ethical clearance was obtained from the Medical Research and Ethics Committee (MREC), Ministry of Health (MOH) (NMRR-17-1581-36476).

### Sampling and subjects

Inclusion criteria included mother-child pairs from low-income family with net household income not more than RM3000 per month (Department of Statistics Malaysia, 2016) between the ages of 18 years to 45 years old; able to read or communicate in Malay or English and has at least one child who are 2 years and above. The youngest child has been chosen if the household has more than one child to obtain his or her weight at age 1 year old. Exclusion criteria included child who associated with any abnormality or disease and presence of maternal medical conditions considered. Informed consent was obtained from the mothers before being recruited into the study. A minimum sample size of 107 respondents were required to achieve a power of 80%, with an alpha of <0.05. The expected proportion in population was estimated based on the prevalence of low-income families (B40 of households) in Malaysia [16.4%; (Official Website of Economic Planning Unit, 2016)].

### Data collection

Self-administered questionnaires were administered in Bahasa Malaysia Potential respondents were approached and briefed about the study during their visit to the study locations. Those who provided their written consents were given instructions to complete the questionnaire with the completion being conducted under the supervision of the researcher. The completed questionnaires were then being collected all at once. Respondents were also requested to fill in any missing data upon checking the completed questionnaire.

### Outcome measures

Socio-demographic information were gathered from mothers including personal information and demographic data such as age, race, education level, monthly household net income and household sizes. Children' gender and weight at age 1 year old was obtained from the child health records in the medical book

which the mothers brought along during clinics visit. Children' weight scores at age 1 year old were plotted on the WHO child growth chart (2008) standardized z-scores, also termed SD scores, which adjust for the child's gender and age. Z-scores were used to evaluate the child's growth status.

The Household Food Insecurity Access Scale (HFIAS) was used to assess household food security status (Coates, *et al.,* 2007). The questionnaire had been translated to Malay language version and tested among low income Malay mothers by Izzah (2017). The scale included three domains of food insecurity: (1) experiencing anxiety and uncertainty about their family's supply of food; (2) limited preferences of the types of food; (3) how much food consumed if there is insufficient quantity of food supply. There were nine occurrence questions assessing the food security in the past four weeks (30 days) coupled with another nine "frequency-of-occurrence" questions that were asked as a follow-up to each occurrence question which was related to the determination of how often the condition for each occurrence questions occurred. The data was calculated using the scoring system of Household Food Insecurity Access Scale Score (Coates *et al*., 2007). Based on this scoring system, the degree of food insecurity in the household in the past four weeks (30 days) was measured. The score ranged from 0-27, with higher score indicated higher food insecurity level. Besides, the Household Food Insecurity Access Prevalence (HFIAP) categorical indicator was also used to report household food insecurity prevalence in categorical form (Coates *et al.*, 2007). The HFIAP indicator measured food insecurity by categorizing households into four levels of food insecurity which were food secure, mildly food insecure, moderately food insecure, and severely food insecure.

A seven-factor model Child Feeding Questionnaire (CFQ) was employed to evaluate the parental feeding practices to their respective children (Birch *et al.*, 2001). The questionnaire had been translated to Malay language version

and tested among low income Malay mothers by Izzah (2017). This questionnaire consisted of three main domains to assess parental beliefs, attitudes, and practices regarding the child feeding. All the items in the questionnaire were measured using a 5-point Likert-type scale. The scale with the lowest score of 1 to the highest score of 5 for each of the questions was used. A word anchor in increasing level (never to always) was used for each point on the scale. The minimum and maximum score for each factor was different due to each factor contains different number of questions based on CFQ scoring system (Birch *et al.*, 2001).

### *Statistical analysis*

The statistical analysis of data was performed using the IMB Statistical Package Social Science (SPSS) statistic version 20.0. Socio-demographic and anthropometric characteristics were analysed using the descriptive statistics. Chi-square test was used to assess the association between household food insecurity status and children' weight status. Whitney U Test was performed to compare the median of two groups. The variables included child feeding practice and children' weight status. The relationship between household food security status and child feeding practice was analysed by using Spearman Correlation. Significant value was set at $p<0.05$.

### Results and Discussions

A total of 107 low-income mothers were recruited. Table 1 showed the respondents' demographic and socio-economic profiles. The median of the mothers' age was 31 years old (IQR=6) with a majority within 30-39 years old age group (57.9%). Most of the low-income mothers were not working (67.3%) and their husbands were self-employed (53.3%). More than half of the low-income mothers received secondary education (67.3%) but it is of note that almost one-third of these low-income mothers received tertiary education (29.0%). Over half of the respondents reported receiving *Bantuan*

*Rakyat 1 Malaysia* (BRIM) as a financial aid (55.1%) but another 43% were not receiving any financial aid. In terms of monthly household net income, 43.9% mothers were having household income between RM1001 to RM2000. Two respondents (1.9%) reported facing financial problem because their household incomes were less than RM500. The majority of them in a household had an average of 3 to 4 members (51.4%).

Table 1: Socio-demographic characteristics of the respondents (n=107)

| Characteristics | | Frequency (n=107) | Percentage (%) |
|---|---|---|---|
| Site of recruitments | **KK Bukit Tunggal** | **56** | **52.3** |
| | KK Seberang Takir | 26 | 24.3 |
| | KK Manir | 18 | 16.8 |
| | KK Batu Rakit | 7 | 6.5 |
| Age of mothers, years old | **Median (IQR)** **31(6)** | | |
| | Below 20 | 1 | 0.9 |
| | 20-29 | 39 | 36.4 |
| | **30-39** | **62** | **57.9** |
| | 40-45 | 5 | 4.7 |
| Status of mothers | **Married** | **106** | **99.1** |
| | Divorced | 1 | 0.9 |
| Job (mothers) | Government | 10 | 9.3 |
| | Private | 7 | 6.5 |
| | **Not working** | **72** | **67.3** |
| | Self | 16 | 15.0 |
| | Part time | 2 | 1.9 |
| Job (fathers) | Government | 12 | 11.2 |
| | Private | 33 | 30.8 |
| | Not working/ retired | 3 | 2.9 |
| | **Self-employed** | **57** | **53.3** |
| | Full time | 2 | 1.9 |
| Monthly household net income | Less than RM500 | 2 | 1.9 |
| | RM500-RM1000 | 28 | 26.2 |
| | **RM1001-RM2000** | **47** | **43.9** |
| | RM2001-RM3000 | 30 | 28.0 |
| Sources of financial support | **BRIM** | **59** | **55.1** |
| | MAIDAM | 2 | 1.9 |
| | None | 46 | 43.0 |
| Education level (fathers) | Primary | 4 | 3.7 |
| | **Secondary** | **82** | **76.6** |
| | Tertiary | 21 | 19.6 |
| Education level (mothers) | Primary | 4 | 3.7 |
| | **Secondary** | **72** | **67.3** |
| | Tertiary | 31 | 29.0 |

| Household size | 1-2 | 2 | 1.9 |
|---|---|---|---|
| | **3-4** | **55** | **51.4** |
| | 5-6 | 41 | 38.3 |
| | 7 and above | 9 | 8.4 |
| Gender of children for 1 year old | Boy | 45 | 42.1 |
| | **Girl** | **62** | **57.9** |

The data indicating majority value are noted with bold font. BRIM = *Bantuan Rakyat 1 Malaysia*; MAIDAM = *Majlis Agama Islam Dan Adat Melayu Terengganu*

The mean score for household food insecurity is $0.46 \pm 1.14$ indicating that majority of low-income mothers reported household food secure. Table 2 shows the prevalence of household food insecurity. Eighty five percent (85%) of the household were food secure. Yet, it is also important to note that about 15% of the household had experienced some degree of food insecurity. Majority were categorised as moderately food insecure (10.3%) indicating that they sometimes or often eat just a few kinds of food or undesirable food, or rarely or sometimes reduce portions and frequency of meals. Indeed, 1.9% of the study population still suffered severely food insecure signifying they were still household members who often had to reduce the portions and frequency of the meals or had chance to experience the three most severe conditions in such a way that unable to acquire food due to insufficient financial support or lack of food resources.

Table 2: Prevalence of Household Food Insecurity (n= 107)

| HFIAS Prevalence | Number of Households (n) | Percentage of Households (%) |
|---|---|---|
| **Food Secure** | **91** | **85.0** |
| Mildly Food Insecure | 3 | 2.8 |
| Moderately Food Insecure | 11 | 10.3 |
| Severely Food Insecure | 2 | 1.9 |
| Total | 107 | 100.0 |

Table 3 showed the distribution of responses to nine items on HFIAS by low income mothers in Terengganu. Although majority of the households (90.7%) did not worry about food, 9.3% of the household were somehow worried about not having enough food 1-2 times per month. There were also 2.8% of the household reported that they have limited variety of foods which has occurred 3-10 times per month. Some of them also reported that they eat fewer meals in a day (7.5%).

Table 3: Distribution of responses to items on the Household Food Insecurity Assess Scale (HFIAS)

| Occurrence Questions | Never | | Rarely (1-2 times per month) | | Sometimes (3-10 times per month) | |
|---|---|---|---|---|---|---|
| | n | (%) | n | (%) | n | (%) |
| Worry about food | 97 | 90.7 | 10 | 9.3 | - | - |
| Unable to eat preferred food | 100 | 93.5 | 6 | 5.6 | 1 | 0.9 |
| Eat just a few kinds of foods | 101 | 94.4 | 3 | 2.8 | 3 | 2.8 |
| Eat foods they really do not want to eat | 104 | 97.2 | 2 | 1.9 | 1 | 0.9 |
| Eat a smaller meal | 102 | 95.3 | 3 | 2.8 | 2 | 1.9 |
| Eat fewer meals in a day | 99 | 92.5 | 8 | 7.5 | - | - |

| No food of any kinds in the household | 105 | 98.1 | 1 | 0.9 | 1 | 0.9 |
| Go to sleep hungry | 107 | 100 | - | - | - | - |
| Go the whole day and night without eating | 107 | 100 | - | - | - | - |

Households with low income normally experience food insecurity as reported in a previous study ( Farhadian, *et al.,* 2015; Alam *et al.*, 2016;). This study involved a larger sample (n=460) reported a lower percentage of food security among poor and low-income households in the eastern coastal economic area of Malaysia (52.8%). Recruiting respondents from the health clinics might have less ability to capture those with more vulnerable conditions such as people who live in rural or remote area, a marginally poorer with limited access for health clinic visits. A study conducted in a poor rural community in Sabah recorded 64.7% (n=102) households with at least a child between 1 and 5 years old were food insecure (Farhadian *et al*., 2015). The implementation of Food Basket Program that supply healthy foods for lower-income households by the Ministry of Health Malaysia might also aid to ease the burden of these low-income group in dealing with food resources. Previous findings showed that Iraq's food supplement program for children could reduce the food insecurity status of the household from 43.5% to 38% (Ghodsi, *et al.,* 2016). Moreover, in this group of respondents, over half of them received financial supports from the government such as BRIM which might improve their financial conditions. Besides, over half of our respondents (51.4%) had smaller household size comprising three to four members as compared to previous study participants whose majority had household sizes of six to eight members in which 52.5% (n= 187) were classified as food insecure (Ali Naser *et al.*, 2014). Household with lower members were less likely experience food insecurity as they may have adequate resources for providing enough food for all their household members.

In addition, there was no significant correlation between household food security and child feeding practice (Table 4). This result was consistent with Kuyper *et al*. (2009) which showed that among low-income mothers of children ages 4 to 5 years (n=87) in California, food insecurity status experienced by 34% families was not significantly related to any of the child feeding practices. However, a study reported an association between infant feeding practices and food security among a sample of 1110 mother-child pairs with children under the age of 12 months in Nairobi and Kenya. It has been documented that infants living in food-secure households have a greater chance of having adequate infant feeding practices than those in food-insecure households (Macharia *et al.*, 2018) Kenya. The study adopted a longitudinal design that involved a census sample of 1110 children less than 12 months of age and their mothers aged between 12 and 49 years. A questionnaire was used to collect information on: IYCF practices and household food security. Logistic regression was used to determine the association between food insecurity and IYFC practices. The findings showed high household food insecurity; only 19.5% of the households were food secure based on Household Insecurity Access Score. Infant feeding practices were inappropriate: 76% attained minimum meal frequency; 41% of the children attained a minimum dietary diversity; and 27% attained minimum acceptable diet. With the exception of the minimum meal frequency, infants living in food secure households were significantly more likely to achieve appropriate infant feeding practices than those in food insecure households: minimum meal frequency (adjusted odds ratio (AOR. Another study also reported that better household food security status was associated with better infant feeding practices for children 6-12 months of age in rural Bangladesh (Saha *et al.*, 2008). Parents from low-income households may face difficulties to practice appropriate child feeding practices as they may have limited resources to provide a diversify diet with adequate nutritious foods to their children. Yet, small proportion of

households with food insecurity in this study might restrict the detection of any significant associations with child feeding practices.

Table 4: Relationship between household food security and child feeding practice

| Variables/Domains | Median (IQR) | Spearman Correlation, r | *p-value |
|---|---|---|---|
| HFIAS score | 0(0) | - | - |
| Perceived responsibility | 12(3) | -0.092 | 0.346 |
| Perceived parent weight | 12(1) | -0.065 | 0.508 |
| Perceived child weight | 18(0) | -0.138 | 0.156 |
| Concern about child weight | 12(5) | -0.067 | 0.492 |
| Restriction | 32(7) | 0.044 | 0.656 |
| Pressure to eat | 16(3) | 0.094 | 0.336 |
| Monitoring | 12(6) | -0.032 | 0.740 |

**\*Spearman's correlation test, p<0.05, significant**

Table 5 showed the children weight status at age 1 year. The mean Z score was -0.72 $\pm$ 0.99 with a mean weight of 8.56 $\pm$ 0.98kg which was within the normal weight category with a recorded proportion of 84.1%. There was significant association between household food security status and weight of children at age 1 year (p=0.01) (Table 6). Food secure household showed a higher proportion of having normal weight children (88.9%). This finding was in line with previous research by Agbadi et al. (2017)the provision of adequate child diet is threatened in the many households that sometimes experience having no food at all to eat (household food insecurity in four northern regions of Ghana which stated that food secure household may have opportunity to access resources to help overcome the problem of food insecurity. No matter what resources included financial support or food resources, that could probably help households to experience food secure. That is also very important as adequate diet support healthy child development. On the other hand, a local study conducted in Bachok, Kelantan documented that prevalence of underweight, stunting, and wasting in food insecure households (n=223) with 2 to 12 years old children were much higher than those in food secure households (Ali Naser et al., 2014). This indicated that food secure households normally had less nutritional problems of children (Ali

Naser et al., 2014; Kandeepan, Balakumar, & Arasaratnam, 2016)non-lactating mothers, aged 18 to 55 years with their youngest children aged 2 to 12 years, were purposively selected. The Radimer/Cornell hunger and food-insecurity instrument was administered and children's height and weight were measured. RESULTS About 16.1% of the households were food secure, while 83.9% experienced some kind of food insecurity. Out of food insecure category, 29.6% households were food insecure, 19.3% women were individual food insecure and 35.0% fell into the child hunger category. Education of the mother (P = 0.047.

Table 5: Children Weight Status at Age 1 Year (n=107)

| Weight-for-age | | Distribution | Mean $\pm$ SD |
|---|---|---|---|
| | | n (%) | |
| Average weight-for-age (Z-score) | | | -0.72 $\pm$ 0.99 |
| Weight-for-age classifications for children at age 1 year (WHO, 2008) | [a]Underweight | 13 (12.1) | |
| | **[b]Normal** | **90 (84.1)** | |
| | [c]Overweight | 4 (3.7) | |

[a] (Z-score < -2); [b] (Z-score -1<0<1); [c] (Z-score >1)

Table 6: Association between Household Food Security Status and Weight of Children

| Household Food Security Status | Children Weight Status | | Total | Chi-square (df) | p-value |
| --- | --- | --- | --- | --- | --- |
| | Normal weight (n=90) | Not normal weight (Underweight or Overweight) (n=17) | | | |
| Food Secure | 80 (88.9%) | 11 (64.7%) | 91 (85%) | 1 | **\*0.010** |
| Food Insecure | 10 (11.1%) | 6 (35.3%) | 16 (15%) | | |

*Chi-square test, p<0.05, significant

Several limitations should be considered when interpreting our study findings. One possible restriction might be caused by limited sample size and recruitment from only four health clinics in Terengganu using non-random sampling which might therefore limit the generalizability of the of the results to the wider population. Recruitment of larger samples from rural community or lower socioeconomic status may provide better evidence on the household food security status and its impacts on child feeding practise and children weight status.

## Conclusion

The present study evaluated household food security, child feeding practice, and children weight status among low income mothers in Terengganu. Most of the households were food secure and majority of the children were in normal weight at 1-year age. Household food security was significantly associated with weight status of children at 1-year age but not correlated with child feeding practice. Periodic assessment of the impact of household food security status on children's nutritional status involving larger underprivileged population were recommended for future research.

## Acknowledgements

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