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## ASSESSMENT OF FOOD INSECURITY AND FOOD COPING STRATEGIES AMONG FISHERMEN HOUSEHOLD DURING MONSOON IN TERENGGANU, MALAYSIA

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### ABSTRACT

Most fishermen's families have insufficient food, especially during the monsoon season. However, few studies have been done assessing their food insecurity and food coping strategies to sustain food availability. This cross-sectional study using convenience sampling was researcher administered to assess food insecurity (via Household Food Insecurity Access Scale - HFIAS) and food coping strategies (via Coping Strategies Index) among fishermen households during monsoon in Terengganu and to examine association between demographic, socioeconomic factors and household food insecurity level. This study was carried out among 80 respondents from fishermen households meeting eligible criterion and included married people aged 18-65 years old living in fisherman villages and *wakaf* beach areas in Kuala Nerus. The results showed that about 98.8% of the fishermen households in Terengganu were severely food insecure, and the remaining were moderately food insecure during the monsoon season. While for food coping strategies, 'reduce amount of food cooked for meals', 'using less expensive food', 'cook whatever food is available at home', and 'reduce daily/monthly spending' was the most highly adopted food coping strategies during monsoon season. There is a significant association found between household monthly income and food insecurity ( $\chi^2=2.85$   $p<0.05$ ). This may indicates that household income of the fishermen do influence their food insecurity status. The most obvious finding to emerge from this study is that most of the fishermen household is experiencing food insecure during the monsoon season. Thus, more studies need to be conducted to yield further evidence in regards to household food insecurity among fishermen in other states in Malaysia especially during monsoon season.

**Key words:** Food insecurity, food coping strategies, fishermen, Terengganu

### INTRODUCTION

Food insecurity is widely explained as a consequence of being poor. Poor people explain their poverty by referencing their anxiety about the future need for food, and their lack of sufficient food (Alam, 2016). In Malaysia, most food insecurity appears among low income families (Zalilah & Khor, 2008; Ahmed & Siwar, 2013) including the fishermen households. Naser *et al.* (2015) stated that probable apprehensions of food insecurity may well include intensified susceptibility to deprived wellbeing aftermaths in long term.

A study among fishermen household in Bangladesh reported that the percentage of food insecure was roughly 6.5%, while the proportion of fishermen children who were wasted was 8.1%, and the percentage of children not attaining normal growth throughout the past 6 months was 20.8% greater in the heavy rain season in Bangladesh (Hillbruner & Egan, 2008). Darling (2014) conducted a study among fishermen household in Kenya, East Africa found that less affluent households had poorer diet diversity and relied more on coping strategies than wealthier households. Hanazaki *et al.* (2013) conducted a study among mainly 350 fishermen households in Paraty, Brazil and found that 27% had experienced food shortage at some point but due to dearth road

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access, and not because of supply scarcity or exchange system catastrophe. This can be seen in Ponta Negra, Brazil the most isolated fishing community with the highest incidence of food shortages due to poor transportation accessibility. However, less studies have been done in assessing food insecurity among fishermen in Malaysia and their food coping strategies. This study is crucial since fishermen's family income is very dependent on fish. During the monsoon, the wind and waves are big enough to make it difficult for the fishermen go to the sea. So, in these conditions, family of the fisherman may have food insecurity and may use coping strategies to solve the solution. Coping is defined as a cognitive and behavioural attempt to manage internal external demands specifically which considered to be very heavy or exceed their resources (Istiqalayah & Neti, 2016). Zalilah and Khor (2008) reported that borrowing money to buy foods, receiving food from family members, relatives and neighbours, and reducing the number of meals seem to cushion the food insecure household experiencing from insufficiency. Skipping a meal is a communal coping strategy and that there are distinctions in reliance on low-priced food. Additional coping strategies that are employed in facing food insecurity include food broadening and auxiliary methods (for instance by substituting milk with water in morning cereals), eating of expired and almost expired foods, decreased meal size, meal variety, and meal frequency and swings to less affluent foods for several days (De Marco *et al.*, 2009).

Since few studies have been done in assessing fishermen household food insecurity and their food coping strategies in sustaining their food availability, this study aims to assess food insecurity and food coping strategies among fishermen household during monsoon in Kuala Nerus, Terengganu. The objectives are: (1) to determine food insecurity levels among fisherman's during monsoon in Kuala Nerus using Household Food Insecurity Access Scale (HFIAS); (2) to determine the food coping among fisherman during monsoon through Coping Strategies Index (CSI); and (3) to determine associations between demographic, socioeconomic and household food insecurity level among fishermen in Kuala Nerus.

## MATERIALS AND METHODS

### Subjects

This cross-sectional study involved 80 fishermen households that met the eligibility criteria of either a husband or wife at 18-65 years old. It was chosen because the respondents are responsible in making decision of food prepared at

home. Using the Cochran formula, the minimum sample size was calculated. Given the estimated prevalence of food insecurity of 29.6% in Kelantan (Naser *et al.*, 2015), 95% confidence level, and desired precision of 0.1, the sample size derived was 80.

### Sampling Plan

The type of sampling applied for the research is non-probability sampling. Nonprobability sampling is an applicable method for researchers that do not require representative of the population. Respondent sampling is done through purposive sampling. Purposive sampling is a method in which the investigator depend on on his or her own verdict while selecting sample of the population to partake in the study. The intrinsic predisposition of the technique affects to its competence, and the technique stays vigorous even when tried against random probability sampling (Tongco, 2007).

Therefore, several areas around Kuala Nerus beach areas, which included *Gong Badak, Tok Jembal, Mengabang Telipot, Seberang Takir, Teluk Ketapang* and *Batu Rakit*, were purposively chosen because the subjects were at easiest to participate for the study and the researcher did not contemplate choosing subjects that representative of whole residents of Kuala Nerus areas (Figure 1). The ethical application was approved by Human Ethic Board of Committees of Universiti Malaysia Terengganu for this research with reference number UMT/JKEPM/2017/11. This study was conducted from July until September 2017. All respondents signed the informed consent form prior to data collection.

### Research instrument

In this study, a questionnaire consisting of four sections was used. Section 1 contained a demographic profile consisting of seven questions. Section 2 covered socioeconomic factors with 3 questions, while Section 3, the Household Food Insecurity Access Scale (HFIAS), had 9 questions. Section 4, Food Coping strategies, consisted of 18 questions. The first section aims to assess the demographic status of the household. This includes age of mother/father, educational background of mother/father, household size, hometown area, family size, marital status, race, religion and educational level. The second section aims to measure the socio-economic status which includes monthly household income (RM/month), financial aid received and the availability of food during monsoon.

Section three determines the Household Food Insecurity Access Scale (HFIAS). By hypothesizing a family's food distribution approach, a nine-item Household Food Insecurity Access Scale (HFIAS) was constructed by the US Agency for International

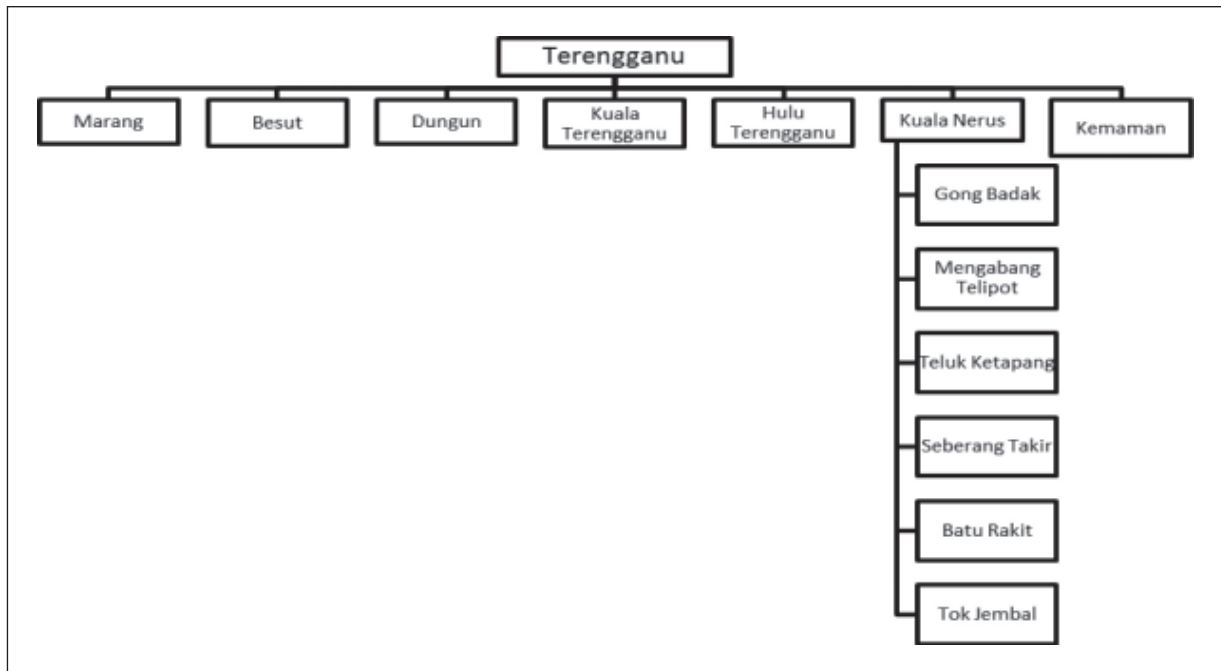


Fig. 1. Sampling framework.

Development (USAID)-funded Food and Nutrition Technical Assistance (FANTA). It does not comprise child-referenced questions and is grounded on the indication that the run-through of food insecurity causes that can be seized and measured through a survey and succinct in a scale (Coates *et al.*, 2007). All of the questions in Table 1 is inquired with a recall period of four weeks (30 days) during the monsoon occurrence. The respondent is asked an occurrence question if the situation in the question take place at all in the past four weeks (yes or no) of the monsoon occurrence. If the respondent answers “yes” to an occurrence question, a frequency-of-occurrence question is asked to determine whether the condition take place rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks of the monsoon occurrence. The questionnaire entails of nine occurrence questions that signify a commonly growing level of severity of food insecurity (access), and nine “frequency-of-occurrence” questions that are inquired to follow-up each occurrence question to identify how frequently the condition(s) occur, as shown in Table 1.

Three main things will be determined through HFIAS which are; 1- HFIAS total score (ranging from 0 to 27 points), 2- HFIAS category and, 3- HFIAS prevalence. All of these were each explained as step 1, step 2 and step 3 respectively.

Table 1. Summary of the question developed in HFIAS

Question	Summary of the questions
1	Worry about food
2	Unable to eat preferred food
3	Eat just one kind of foods
4	Eat food that they really do not want to eat
5	Eat a smaller meal
6	Eat fewer meals in a day
7	No food of any kind in the household
8	Go to sleep hungry
9	Go a whole day and night without eating

Source: Coates *et al.* (2007).

#### Step 1: HFIAS total score

The severity of food insecurity is acknowledge through a summation score of HFIAS responses and a consortium of severity of food insecurity obtained from the HFIAS scale. The summation score from HFIAS is the entirety of the frequency-of-occurrence during the past four weeks of monsoon occurrence for the nine food insecurity-related condition. The cut-off points of occurrence is as follows; rarely (once or twice in the past four weeks), sometimes (three to ten times in the past four weeks) and often (more than ten times in the past four weeks) and namely coded as 1, 2 and 3 correspondingly. The uppermost household score for a household is 27 where the household response

to all nine frequencies of occurrence questions as “often”, coded with response code of 3 ( $9 \times 3 = 27$  score). The slightest score is 0 where the household responded “no” to all occurrence questions, therefore frequency-of-occurrence questions were skipped by respondents, and later coded as 0 ( $9 \times 0 = 0$  score). The greater the score, the severe food insecurity in the household take place and vice versa.

#### *Step 2: HFIAS category*

Household Food Insecurity Access Scale (HFIAS) can be characterized into four categories from the nine-questions, which are Category 1 (food secure), Category 2 (mildly food insecurity), Category 3 (moderately food insecure), and Category 4 (severely food insecure). Households are categorized as progressively food insecure as they respond positively to more severe conditions and/or experience those conditions more frequently as shown below (Coates, 2004);

HFIAS category 1 (food secure) if [(Q1a=0 or Q1a=1) and Q2=0 and Q3=0 and Q4=0 and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]

HFIAS category 2 (mildly food insecure) if [(Q1a=2 or Q1a=3 or Q2a=1 or Q2a=2 or Q2a=3 or Q3a=1 or Q4a=1) and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]

HFIAS category 3 (moderately food insecure) if [(Q3a=2 or Q3a=3 or Q4a=2 or Q4a=3 or Q5a=1 or Q5a=2 or Q6a=1 or Q6a=2) and Q7=0 and Q8=0 and Q9=0]

HFIAS category 4 (Severely Food insecure) if [Q5a=3 or Q6a=3 or Q7a=1 or Q7a=2 or Q7a=3 or Q8a=1 or Q8a=2 or Q8a=3 or Q9a=1 or Q9a=2 or Q9a=3]

#### *Step 3: HFIAS prevalence*

The prevalence of difference levels of HFIAS is premeditated conferring to each class; i) food secure, ii) mildly food insecurity, iii) moderately food insecurity, and iv) severely food insecurity.

The fourth section dignified the Food coping strategies scale through Coping Strategies Index (CSI). CSI is a measure of how many days in the past week of the monsoon occurrence a household had to be dependent on the different coping strategies ranging from “never” (0) to “every day” (7). The modified CSI questionnaire was adopted from Maxwell and Cadwell (2008). This research used 18

items that measures CSI and the severity weight is based on a Kenyan study. The scoring scheme of coping strategies for each respondent is as follows:

Total for each individual strategy = Weighted score (CSI) frequency X Severity weight

#### **Data collection**

The data were collected between July and September 2017 through house visits to collect research information through researcher-administered interview. Respondents who met the criteria were enrolled in the study. If they agreed, they were required to sign the informed consent. The questions should be directed to the person in the household who is most involved with the food preparation and meals during the monsoon occurrence. Most of the questions require the respondent to answer on behalf of the household and all its members. The administration of the questionnaire requires approximately 20 minutes per household.

#### **Data analysis**

The data analyses were recorded and analyzed using SPSS. A normality test was used to check for normality distribution. Descriptive analysis was used to determine the demographic, socioeconomic profile, distribution of household food insecurity status and food coping strategies. Chi square and Fisher Exact test were applied to determine any significant association between demographic, socio-economic characteristics and household food insecurity status.

## **RESULTS AND DISCUSSION**

### **Socio-demographic profile of respondent**

A total of 80 household fisherman were approached. All consented to participate in the study, thus giving a response rate of 100%. Males were 62.5% of the sample and females were 37.5%. All respondents were Muslim. Approximately 50% had secondary education level. About 67.5% of household incomes ranged from RM700 - RM1099. Over half of fisherman household don't have any financial aid from government. Table 2 shows socio-demographic characteristics of households in Terengganu.

### **Distribution of total Household Food Insecurity (HFIAS) scores among fishermen household in Kuala Nerus**

HFIAS scores were calculated based on the distribution of the responses to the nine items. The household food insecurity scores ranged from 0 to

**Table 2.** Sociodemographic characteristic of households (n=80)

Variable	n (%)
<b>Gender</b>	
Male	50 (62.5)
Female	30 (37.5)
<b>Age (years)</b>	
18-25	3 (3.8)
26-35	8 (10)
36-45	16 (20)
46-55	27 (33.8)
55-65	26 (32.5)
<b>Educational Level</b>	
No primary education	1 (1.3)
Primary education	39 (48.8)
Secondary education	40 (50.0)
<b>Household size</b>	
1-2	21 (26.3)
3-4	54 (67.5)
>5	5 (6.3)
<b>Household monthly income</b>	
< RM699	21 (26.3)
700-1099	54 (67.5)
1100-1500	5 (6.3)
<b>Financial aid</b>	
Yes	36 (45.0)
No	44 (55.0)

27. The median (IQR) of HFIAS score in this study is 14(4.0) out of 27. This was not a relatively good phenomenon as the higher the score, the more food insecurity the household experienced. Ntwenya *et al.* (2015) reported in their study that the mean HFIAS score was the poorest during the rainy season among rural community in Tanzania.

### Prevalence of household food insecurity among fishermen household in Kuala Nerus

The prevalence of different level of HFIAS was calculated. From the four HFIAS categories, approximately 98.8% were reported for being severely food insecure, while only 1.3% respondent were reported being moderately food insecure during the monsoon occurrence. Hence, Table 3 below shows the prevalence of four HFIAS categories among fishermen.

**Table 3.** Distribution of fishermen household food insecurity during monsoon according to HFIAS categories (n=80)

HFIAS categories	n (%)
Food secure	0 (0.0)
Mildly food insecure	0 (0.0)
Moderately food insecure	1 (1.3)
Severely food insecure	79 (98.8)

It is somewhat surprising that the percentage of severely food insecure is high among the fishermen household. A possible explanation for this might be that the households were being categorized as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently during monsoon occurrence. It is important to bear in mind that once the respondents answered any of the HFIAS questions under HFIAS category 4 classification, they will immediately be considered as severely food insecure. Therefore, this data must be interpreted with caution because the understanding of severity among individuals may differ between studies. Another possible explanation is may be due to poor fishermen community in Terengganu. A study done by Farhadian *et al.* (2015) among Sabah poor community found that they were, at times, uncertain of having or unable to acquire enough food for all household members because they had insufficient money and other resources for food. In addition, when the monsoon comes, most fisherman cannot go to the sea. They do not have another job to earn for their family. In contrast to the fishermen in India, most of them spend their time mending their nets, fixing and oiling their boats, repairing their homes, and tending to jobs they often ignore during the other months during the monsoon occurrence. While they are engaged in such tasks, the women depend largely on the sale of dry fish that they had dried during summer (Rodericks, 2015). Farhadian *et al.* (2015) in his study found that among 102 poor rural community households in Sabah, 35.3% of the households were categorized as food secure, 28.4% as mildly food insecure, 27.5% as moderately food insecure and 8.8% as severely food insecure using the HFIAS categorization. Thus, Farhadian *et al.* (2015) study had lower percentage of food insecure compared to this finding. The likely cause for the differences between Farhadian and this study is that about 34.1% of the Sabah household had their household monthly income of more than RM1100 while only 6.3% of the fishermen household in this study had their monthly income more than RM1100.

### Coping Strategies Index (CSI) among fishermen household in Kuala Nerus

The median (IQR) of total score CSI is 92.5 (10.75). The results indicated that as CSI scores increased, households relied more often on the consumption coping strategies. Thus, fisherman in this study had applied more of these consumptions coping strategies. Besides, the higher the CSI score, the higher it reflects food insecurity among the households. In accordance with the fairly high CSI score, it may reflected some valid reasons like over-flooded areas, where the fishermen are unable to

grow some vegetables or crops as substitutes for their mainstream occupation. Another reason is the lack of knowledge and exposure perceived by the fishermen community in attaining alternative temporary jobs. Renzaho and Mellor (2010) highlighted that the housewives of fishermen in some places have their own strategies when monsoon such as sell the product of fish cracker and salted fish. They used to plan about this aspect, as if they consume their stored food in large amount then it will be a hard situation for them to sustain their families during monsoon season. In order to maintain themselves, they plan to have their collected food items once a day. Therefore, it seems that the fishermen household in this study can implement these type of strategies during monsoon occurrence.

The adopting coping strategy to minimize food insecurity at least seven days in a week is shown in Table 4. 'Reducing amount of food cooked for meals' was commonly practise daily followed by 'using less expensive food', 'cook whatever food is available at home', and 'reduce daily/monthly spending'. These were the most highly adopted food coping strategies during monsoon season. 'Borrowing money to buy food' and 'receiving foods from family members, relatives and friends' were the least adopted coping strategies.

In this present study, finding shows that fishermen households do used several of the food-related coping mechanisms during monsoon occurrence. Zalilah and Khor (2008) reported that 50% of the food insecure household used the coping strategies. Istiqlaliyah and Neti (2016) reported that 80 families involved in their study did applied the coping strategies which were categorized by 7 to 13 types of coping activities. Sulaiman *et al.* (2011) stated that the majority of households (68.1%) in their study were classified as food insecure. Additional informal coping strategies are employed by individuals and households attempting to maintain or augment the quality and quantity of their diets in the face of food insecurity, including food stretching and substitution techniques (such as using water in place of milk in breakfast cereals), consumption of expired and nearly expired foods, reduced meal size, meal diversity, and meal frequency and shifts to less expensive foods for several days (De Marco *et al.*, 2009). Alam (2016) reported that a small number of households borrowed food (6.3%), others bought food from shops on credit (20.8%) and others sent other household members elsewhere in the community (5.5%) to eat a meal. Thus, food coping strategies are vital in household poor families to minimize food insecurity.

**Table 4.** Coping strategies adopted to minimize food insecurity (n=80)

Coping Strategies	n (%)
Using less expensive food	
Never	0 (0.0)
Once a week	1 (1.3)
2-3 day/week	2 (2.5)
4-6 day/week	0 (0.0)
Daily	77 (96.3)
Eat smaller portion (quantity)	
Never	0 (0.0)
Once a week	1 (1.3)
2-3 day/week	1 (1.3)
4-6 day/week	41 (51.3)
Daily	37 (46.3)
Eat less than 3 times a day	
Never	1 (1.3)
Once a week	0 (0.0)
4-6 day/week	79 (98.8)
Daily	0 (0.0)
Borrow food, or rely on help from a friend or relative	
Never	33 (41.3)
Once a week	34 (42.5)
2-3 day/week	13 (16.3)
4-6 day/week	0 (0.0)
Daily	0 (0.0)
Borrow money to buy food	
Never	29 (36.3)
Once a week	51 (63.8)
4-6 day/week	0 (0.0)
Daily	0 (0.0)
Reduce food variation in meals	
Never	0 (0.0)
Once a week	0 (0.0)
2-3 day/week	1 (1.3)
4-6 day/week	79 (98.8)
Daily	0 (0.0)
Reduce intake of food taken outside home	
Never	0 (0.0)
Once a week	49 (61.3)
2-3 day/week	30 (37.5)
4-6 day/week	0 (0.0)
Daily	1 (1.3)
Reduce fruits and vegetables intakes	
Never	0 (0.0)
Once a week	77 (96.3)
2-3 day/week	1 (1.3)
4-6 day/week	2 (2.5)
Daily	0 (0.0)
Reduce amount of food cooked for meals	
Never	0 (0.0)
Once a week	0 (0.0)
4-6 day/week	0 (0.0)
Daily	80 (100)
Cook whatever food is available at home	
Never	0 (0.0)
Once a week	0 (0.0)
4-6 day/week	2 (2.5)
Daily	78 (97.5)

Table 4 continued...

Replacing the staple food (instant noodles)	
Never	0 (0.0)
Once a week	78 (97.5)
2-3 day/week	1 (1.3)
4-6 day/week	1 (1.3)
Daily	0 (0.0)
(For adult and child). Eat no food in any 24-hour period	
Never	80 (100)
Once a week	0 (0.0)
4-6 day/week	0 (0.0)
Daily	0 (0.0)
Receive food from family members/neighbors/friends	
Never	42 (53.8)
Once a week	0 (0.0)
4-6 day/week	58 (72.5)
Daily	0 (0.0)
Looking part time job	
Never	22 (27.5)
Once a week	0 (0.0)
4-6 day/week	58 (72.5)
Daily	0 (0.0)
Reduce daily/monthly spending	
Never	0 (0.0)
Once a week	0 (0.0)
4-6 day/week	32 (40.0)
Daily	48 (60.0)
Use saving	
Never	0 (0.0)
Once a week	0 (0.0)
4-6 day/week	74 (92.5)
Daily	6 (7.5)
Reduce spending on children education	
Never	13 (16.3)
Once a week	1 (1.3)
4-6 day/week	66 (82.5)
Daily	0 (0.0)

#### Association between socio-demographic status and category of household food insecurity access scale (HFIAS)

Table 5 shows the association between socio-demographic status and category of household food insecurity access scale (HFIAS) in Terengganu. For chi square test purposes, dummy for HFIAS score was recorded into two categories (low score and high score). A significant association was found between household monthly income with score of household food insecurity access scale (HFIAS) ( $\chi^2=2.85$   $p<0.05$ ). This result reflect those of Farhadian *et al.* (2015) who also found that household income showed a significant association with household food security status ( $\chi^2=34.792$ ,  $p<0.05$ ).

However, no significant association was found between education level and the severity of food insecurity. This indicated that a father or mother

with a lower education level will not influence to a higher HFIAS score. Besides that, there was no significant association between household size and household food insecurity status. This indicates that household size does not influence the HFIAS score in this study.

#### CONCLUSIONS

The present study evaluated household food insecurity among the fishermen household during monsoon in Kuala Nerus, Terengganu. This study has identified that about 98.8% are severely food insecure and 1.3% are moderately food insecure during monsoon occurrence. Food coping strategies include using less expensive food, reducing the amount of food cooked for meals, cooking whatever food is available at home, and reducing daily/monthly spending. One of the more significant findings to emerge from this study is that there was a significant association found between household income and household food insecurity access scale (HFIAS).

This study may help the Malaysian Government through the Department of Fisheries and Malaysian Fisheries Development Authority (LKIM) in conducting programs that are relevant for the fisherman in increasing their knowledge on their coping strategies during monsoon occurrence to lessen food insecurity. This may help to improve the food insecurity among fishermen household. Taken together, these results suggest that the government need to consider fishermen as a vulnerable group that needs help in intense.

The generalisability of these results is subject to certain limitation which is involving only fishermen household in Kuala Nerus. Notwithstanding the limitation, this study offers valuable insights into the fishermen household food insecurity during monsoon occurrence. More studies need to be done in determining food insecurity among fishermen household in other states.

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**Table 5.** Association between socio-demographic status and category of household food insecurity access scale (HFIAS) (n=80)

Variables	Low (0-13 score point) n (%)	High (14-27 score point) n (%)	P value
Gender			0.95 <sup>a</sup>
Male	22(62.9)	28(62.2)	
Female	13(37.1)	17(37.8)	
Educational Level			0.23 <sup>b</sup>
No primary education	1(2.9)	0(0.0)	
Primary education	14(40.0)	25(55.6)	
Secondary education	20(57.1)	20(44.4)	
Household size			0.08 <sup>a</sup>
1-2	13(37.1)	8(17.8)	
3-4	10(28.6)	22(48.9)	
>5	12(34.3)	15(33.3)	
Household monthly income			*0.02 <sup>a</sup>
< RM600	9(25.7)	12(26.7)	
700-1099	22(62.9)	32(71.1)	
1100-1500	4(11.4)	1(2.2)	
Financial aid			0.57 <sup>a</sup>
Yes	17(48.6)	26(57.8)	
No	18(51.4)	19(42.2)	

\* Significant level at p&lt;0.05

<sup>a</sup> Chi square test<sup>b</sup> Fisher exact test.

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