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Original Article

Influence of socio-economic and psychosocial factors on food insecurity and nutritional status of older adults in FELDA settlement in Malaysia

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ABSTRACT

Background/Purpose: Older adults are at high risk of food insecurity and malnutrition. However, the magnitude of food insecurity and malnutrition and their associations with socio-economic and psychosocial factors among older adults especially in rural areas of Malaysia are yet to be discovered. Therefore, this study aimed to determine the association between socio-economic and psychosocial factors with food insecurity and among older adults people in a rural area of Malaysia, i.e. an agricultural settlement under the Felda Land Development Authority (FELDA).

Methods: A total of 289 respondents were recruited with a mean age of 69.7 ± 6.0 years through random sampling. Household visits were conducted to get information on food insecurity, depressive symptoms, stress, social support and functional status using a standardized questionnaire and face-to-face interview. Anthropometric indicators including weight and height were measured.

Results: Results indicated that the prevalence of food insecurity was 27.7% (22.4% in men and 29% in women). Mean Body Mass Index (BMI) was 25.1 ± 4.7 kg/m2 with men having a significantly lower BMI (23.1 ± 3.7 kg/m2) and majority of the respondents having normal body weight (40.8%) followed by overweight (36.7%). Risk factors of food insecurity were depressive symptoms [Odd Ratio (OR)=11.132], stress from family (OR=2.470) and BMI (OR=0.911) (p <0.05 for all parameters). Malnutrition as assessed using BMI was influenced by age (ß coefficient=-0.205), being women (ß coefficient=0.182) presence of depressive symptoms (ß coefficient=0.154) and food insecurity (ß coefficient=-0.140).

Conclusions: In conclusion, about one third of the respondents experienced food insecurity. However, a substantial number of respondents were overweight. Psychosocial factors including stress and depressive symptoms increased the risk of food insecurity and malnutrition. There is a need to identify individuals at high risk of food insecurity and malnutrition and incorporate strategies and programmes to tackle these issues.

INTRODUCTION

Food security is an important element of health and well-being. According to Wolfe et al[1] - "that the deficit denoted by food insecurity and malnutrition is not only undesirable in its own right, but also a contributor to poor health and nutrition, especially in older adults". Furthermore, food insecurity will increase the inability and delayed recovery from diseases.[2] A study by Lee et al.[3] among older adults in the United States of America found that low-income, persons in decently occupied regions and Hispanic and African Americans were at high risk of food insecurity. The World Food Summit in 1996 stated that food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet dietary needs and food preference for an active and healthy life.[4] The USDA defines food insecurity as "the state of being without reliable access, sufficient quantity, affordable and nutritious food". Food insecurity is defined as limited access towards sufficient quantity, affordable and nutritious food.[5] Food insecurity is as low as 9.2% [6] among older adults in the United States of America (USA) and 21.7% among those in Turkey.[7] In Malaysia, food insecurity had been reported among children at a rate of 35% [8] and 58%.[9] However, the magnitudes of this problem among older adults are yet to be determined.

Food insecurity negatively affects the social and psychological well-being of the older adults, it also boosts the demand for care in hospitals and increases the healthcare cost.[10] Risk factors of food insecurity among older

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adults include health problems, ethnic or racial minority, physical limitation in daily activities[8], low income,[3,12,13] and poor mental health.[14] Older adults from low socio-economic status tend to choose foods that are cheaper.[15] Older adults are known to be at a high risk of malnutrition due to several physiological and psychological changes that occur with aging.[16] However, there are limited studies to assess the association between socio-economic and psychosocial factors with food insecurity and malnutrition in Malaysia. Thus, this study aimed to determine this association between socioeconomic and psychosocial with food insecurity and malnutrition as assessed using Body Mass Index (BMI) among older adults in Felda Land Development Authority (FELDA) settlement at Lubuk Merbau, the Northern Region of Malaysia.

METHODS

Data source and study design

This cross-sectional study was conducted among 289 older adults in an agricultural settlement (FELDA) at Lubuk Merbau, Kedah, and Northern Region of Malaysia. The settlement was selected because of its rural location and for being far from the nearest town, i.e. Padang Terap in the district of Kedah. The main sources of income of the FELDA settlers were rubber or palm tree plantations. The inclusion criterion was older adults aged 60 years and above, whilst the exclusion criteria were older adults with terminal illness, mute and deaf, and those who needed assistance for feeding. Respondents were systematic randomly selected from the list of 769 houses containing older adults as one of the member of the household, as obtained from the FELDA's office between March-May 2015.

A household visit was conducted and respondents were asked about demographic, socio-economic, health, psychosocial and food insecurity data by trained interviewers using a standardized questionnaire. The definition of 'head of household' is a man or woman who becomes head to family members of a household.[17] In particular, food insecurity was determined using the Food Security Tool For Elderly from Wolfe et al.[1] consisting of 10 questions. Respondents were categorized as food security (total score: 0-2.32) and food insecurity (total score: 2.33-10.0), food insecurity without hunger [(low)(total score 2.33-4.56)], food insecurity with hunger [(medium)(total score 4.57-6.53] and food insecurity with hunger [(severe)(total score 6.54-10.0)], using the scale suggested by Wolfe et al.[1] and Bickel et al.[18]

Depressive symptoms was assessed using the 15 items for Geriatric Depression Scale by Yasavage & Brink.[19] Depressive symptoms and stress from family or non-family was assessed using 12 items for Stress DUKE (DUSOC) by Parkerson et al.[20] Social support questionnaires from Medical Outcome Survey (MOS)[21] and DUKE (DUSOC)[20] were used to assess the social support received either from family or non-family members. Stress and social support from DUKE (DUSOC) questionnaires were translated using back to back translation from English to Malay prior to being used in this study and tested for reliability among a sample of 50

older adults aged 60 years and above recruited through convenience sampling during health programme at a selected district in Kedah. It was found that all the questionnaires had good reliability as assessed using Cronbach's alpha test (α) i.e. stress DUSOC (family α=0.84, non-family α=0.74), social support DUSOC (family α=0.52, non-family α=0.76.)]. In addition, Activities of Daily Living (ADL) by Katz[22] and Instrument Daily Activity (IADL) by Fillenbaum[23] were used to assess the functional status for older adults.

Further, weight and height were measured using digital weighing scale SECA 4106 (SECA, Germany) and stadiometer SECA 217 (SECA, Germany). The BMI was calculated using the formula weight (kg)/height^2 (m^2) and categories accordingly.[24]

Statistical Methods

The Statistical Package for Social Sciences (SPSS®) programmed version 22 was used to analyze the data. Descriptive statistics were used for the characteristic of the respondents in this study Normality was test were used for continuous data; chi-square test was used to determine the association between gender and socio-economic factors for categorical data; independent t-test was used for continuous data. The association between food insecurity and all socio-economic factors, psychosocial factors, BMI, ADL and IADL was analyzed using Pearson. Multiple regression analysis and binary logistic regression were conducted to determine the predictors and contribution of these factors to malnutrition as assessed using BMI and food insecurity, respectively.

Ethics Approval

Medical Research Ethic Committee from Universiti Kebangsaan Malaysia approved this study and informed consent was taken from all respondents (Project code: DPP-2015-115).

RESULTS

Out of 289 eligible respondents invited to participate, a total of 289 completed the study (response rate 100%). Most of the respondents were women 231 (79.9%) and only 58 (20.1%) were men, with mean age of 69.7 ± 6.0 years [(men 72.2 ± 5.5 years and women 69.0 ± 5.9 years) (p <0.001)]. As shown in Table 1, most of the respondents had received at least primary education (74.4%), were not working (76.5%), married (58.5%) and were dependent on others to purchase food (56.4%). Women were more likely to have lower education, not be married (widowed), not working and dependent on others to purchase food as compared to men (p <0.05 for all parameters). Length of education among men (4.78 ± 2.58 years) was longer than women (3.4 ± 2.9 years) (p <0.01). Most of the men were household head (98.3%) as compared to women [(41.6%), p <0.05 for all parameters]. Women had a significantly higher BMI (25.6 ± 4.8 kg/ms^2), as compared to men (23.1 ± 3.7 kg/ms^2) (p <0.05). Majority of the respondents were normal

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Table 1. Socio-demographic characteristic status, Body Mass Index (BMI), food insecurity, psychosocial status, functional status of respondents according to gender. [Expressed as mean ± sd and number (%)]

Characteristics	Men (n=58)	Women (n=231)	Total (n=289)
Age (years)	72.2 ± 5.5	69.0 ± 5.9*	69.7 ± 6.0
Total years of educations	4.8 ± 2.6	3.4 ± 2.9*	3.7 ± 2.9
Total Family members	3.1 ± 1.8	3.2 ± 1.9	3.2 ± 1.9
BMI	23.1 ± 3.7	25.6 ± 4.8*	25.1 ± 4.7
Total Income (RM)	838.4 ± 419.8	920.4 ± 639.8	903.9 ± 602.4
Marital Status			
Married	51 (87.9)	118 (51.1)**	169 (58.5)
No Partners (Widow, Divorced)	7 (12.1)	113 (48.9)	120 (41.5)
Educational Status			
Formal Education	52 (89.7)	163 (70.6)***	74 (74.4)
No formal education	6 (10.3)	68 (29.4)	215 (25.6)
Economic Status			
Working	24 (41.4)	44 (19.0)**	68 (23.5)
Not Working	34 (58.6)	187 (81.0)	221 (76.5)
Living Arrangement			
Alone	3 (5.2)	32 (13.9)	35 (12.1)
Living with others	55 (94.8)	199 (86.1)	254 (87.9)
Ability to buy own food			
Yes	45 (77.6)	81 (35.1)**	126 (43.6)
No	13 (22.4)	150 (64.9)	163 (56.4)
Head of Household			
Yes	57 (98.3)	96 (41.6)**	153 (52.9)
No	1 (1.7)	135 (58.4)	136 (47.2)
BMI Categories			
Underweight	9 (15.5)	13 (5.6)	22 (7.6)
Normal	27 (46.6)	91 (39.4)	118 (40.8)
Overweight	20 (34.5)	86 (37.2)	106 (36.7)
Obese	2 (3.4)	41 (17.7)	43 (14.9)
Social Support MOS			
Emotional/informational support	19.5 ± 5.9	21.7 ± 2.7**	21.2 ± 5.8
Tangible Support	16.1 ± 3.5	17.3 ± 2.8**	17.1 ± 3.0
Affectionate support	16.8 ± 5.9	18.1 ± 2.5**	17.8 ± 2.9
Positive Social interaction	16.2 ± 3.7	17.6 ± 2.7**	17.4 ± 2.9
Support from Family (DUSOC)			
No	1 (1.7)	2 (0.9)	3 (1.0)
Yes	57 (98.3)	229 (99.1)	86 (99.0)
Support from non family (DUSOC)			
No	7 (12.1)	10 (4.3)***	17 (5.9)
Yes	51 (87.9)	221 (95.7)	272 (94.1)
Depressive symptoms (GDS)			
No	48 (82.8)	193 (83.5)	241 (83.4)
Yes	10 (17.2)	38 (16.5)	48 (16.6)
Stress from family			
No	48 (82.8)	194 (84.0)	242 (83.7)
Yes	10 (17.2)	37 (16.0)	47 (16.3)
Stress from non family DUSOC			
No	47 (81.0)	198 (85.7)	245 (84.8)
Yes	11 (19.0)	33 (14.3)	44 (15.2)
Food security			
Food security	45 (77.6)	164 (71.0)	209 (72.3)
Food insecurity	13 (22.4)	67 (29.0)	80 (27.7)
Daily Activities (ADL)			
Independent	56 (96.6)	227 (98.3)	283 (97.9)
Dependent	2 (3.4)	4 (1.7)	6 (2.1)
Instrumental Daily Activities (IADL)			
Independent	48 (82.8)	170 (73.6)	218 (75.4)
Dependent	10 (17.2)	61 (26.4)	71 (24.6)

* p <0.01 significant difference with Independent t test, ** p<0.01, *** p<0.05 significant difference with chi-square test.

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Table 2. Correlation between socioeconomic, psychosocial status and functional status with BMI (results presented as r)

Characteristic	BMI
Age (Years)	-0.242*
Total Year Formal Education	0.002
Total Family Members	-0.074
Total Income	0.138**
Score GDS	0.015
Stress from family DUSOC	-0.018
Stress from non family DUSOC	-0.049
Social Support from family DUSOC	-0.025
Social support from non family	0.088
Emotional/informational support	0.090
Tangible Support	0.031
Affectionate support	0.076
Positive Social interaction	0.086
ADL	0.128**
IADL	0.108
Food insecurity	-0.117**

*p <0.01,** p <0.05, significant using Pearson correlation test.
GDS, Geriatric Depression Scale; ADL, Daily Living Activities; IADL, Instrument Daily Activities.

Table 4. Correlation between socioeconomic, psychosocial status and functional status and food insecurity

Characteristic	Food insecurity R
Age (Years)	0.063
Total Year Formal Education	-0.142**
Total Family Members	0.062
Total Income	-0.090
Score GDS	0.530*
Stress from family DUSOC	0.270*
Stress from non family DUSOC	0.132**
Social Support from family DUSOC	-0.158*
Social support from non family	-0.105
Emotional/informational support	-0.050
Tangible Support	-0.172*
Affectionate support	-0.204*
Positive Social interaction	-0.281*
ADL	-0.122**
IADL	-0.189*

* p <0.01,** p <0.05, significant with Pearson correlation.
GDS, Geriatric Depression Scale; ADL, Daily Living Activities; IADL, Instrument Daily Activities.

(40.8%), followed by overweight (36.7%) and obese (14.9%). Women received greater social support (assessed by MOS) as compared to men (p <0.05 for all parameters). A significantly higher percentage of women (95.7%) received social support from non-family members as compared to men (87.9%) (p <0.05). Prevalence of food insecurity was 27.7% with no difference between men (22.4%) and women (29.0%).

Univariate analysis indicated that BMI found to be positively correlated with total income (r=0.138, p <0.01) and ADL (r=0.128, p <0.05), and negatively associated with age (r=-0.242, p <0.05) and food insecurity (r=0.117, p <0.05) (Table 2). After adjustment of confounder including education and income, predictors of BMI were age (ß coefficient=-0.202), gender (ß coefficient=0.187), depressive symptom [(GDS score), (ß coefficient=0.132)] and food insecurity (ß coefficient=-0.153) and explained the 10.6% of the variance (Table 3).

Prevalence of food insecurity was 27.7% with no difference between men (22.4%) and women (29.0%). Univariate analysis indicated that positive correlation with a significance of p <0.01 between food insecurity with GDS (0.530), stress from family (0.270) and positive significant correlation with p <0.05 for stress from non-family (0.132)

Table 3. Predictors of BMI (n=283)

Risk factor	"Beta coefficient"	"Un-standardized Coefficients"	95% CI	P value
Age	-0.202	-0.152	-0.228-(0.66)	0.001
Women	0.187	2.072	0.806-3.338	0.001
GDS Score	0.132	0.246	-0.03-0.489	0.048
Food security	-0.153	-0.267	-0.495-(-0.038)	0.022

Model 7: R2=0.106, "Constant"=31.76. GDS, Geriatric Depression Scale.

(Table 4). There were significant negative correlations (p <0.01) were found between food insecurity with social support from family (-0.158), tangible support (-0.172), positive social interaction (-0.281), affectionate support (-0.204), and IADL (-0.189) and significant correlation with p <0.05 with ADL (-0.122) and total year of formal education (-0.142). As shown in Table 5, binary logistic regression analysis indicated that depressive symptom (GDS) (OR=11.132, 95% CI: 5.294-23.406), BMI (OR=0.911, 95% CI: 0.852-0.974) and stress from family (DUSOC) [OR=2.470, 95% CI: 1.185-5.150] were predictors of food insecurity and these factors contributed 31% of the variance in food insecurity.

DISCUSSION

The study found that the prevalence of food insecurity among older adults in a rural agricultural settlement in Malaysia was 27.7%. Our main outcome was higher than reported in other studies including among older adults in Turkey, (21.7%)[7], North Carolina (12%)[25] and Australia (2.8%).[26] This was expected as the present study was conducted among older adults in a rural area of Malaysia where the main source of income was agriculture. Although nearly a third of the respondents in this study experienced food insecurity, about 36.7% were overweight. This is in-line with the rising prevalence of overweight among Malaysian population regardless of locality.[27] Older adults with food insecurity prefer to buy process and cheaper food but high in fat and sugar instead of fruits, fresh vegetables and milk[28], leading to obesity. The occurrence of obesity among respondents in this study could also be

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Table 5. Determinant of food insecurity (n=289)

Risk factor	'Odd Ratio (OR)'	"95% CI"	P value
Score GDS	11.132	5.294-23.406	0.001
Men	2.016	0.913-4.449	0.083
BMI	0.911	0.852-0.974	0.006
Stress from family (DUSOC)	2.470	1.185-5.150	0.016

"R²" =0.285. GDS, Geriatric Depression Scale.

due to lifestyle and physiological changes resulting in the accumulation of fat due to physical inactivity and decline in metabolic rate with aging.[29]

Similar to the results reported by another study[30] among older adults in Sungai Tengi, Selangor, respondents in the present study also received high social support from family especially emotional support from family. Social support from non-family members was also satisfactory especially among women (95.7%) as compared to men (87.9%). On the contrary, a study by Chen at al.[31] among Chinese older adults reported that they only received 8.8% support from non-family members and 47.0% from family. Good social support plays an important role in ensuring if a person or a family member can take good care for the older adults. Lack of family support will influence on health, well-being and nutritional status of older adults.[32] However, this support may be changed over time due to changes in socio-demographic factors such as living arrangements.[33] Thus it is important for Malaysians to maintain cordial family relationships and community networking in order to ensure psychological well-being and satisfactory care for the elders. [34]

Depressive symptoms were detected in 16.6% of the respondents, lower than 20.3% which was reported by Noran et al.[35] among rural older adults in Malacca, Malaysia and institutionalized older adults (71.7%).[36] This could be due to the fact that respondents in the present study had a considerably satisfactory support particularly emotional support from family and also from non-family members. Depression in the older adults can be caused by a lack of involvement in with social activities and family support, older age, have a chronic illness and having difficulty falling asleep. [37]

This study found that psychosocial factors influence food insecurity and malnutrition. Depressive symptoms and stress from family increased the risk of food insecurity by 11.1 times and 2.5 times, respectively. This finding was in-line with other studies, which reported that depression and poor mental health increased the risk for food insecurity.[11,14,38, 39,40]

However, this study did not find any an association between economic factors and food insecurity as reported by Deeming[41] that found low income and receive financial government were among the risk factors for food insecurity. This could be due to the homogeneity of respondents who were mostly from low-income categories with a mean income of RM 903.9 ± 602.4 per month.

In addition to psychosocial factors, malnutrition (as indicated by low BMI) can also be associated with food insecurity as food insecurity can lower the BMI value by

10%. A study by Simsek et al.[7] in Turkey and Sharkey[42] in United State reported that food insecurity was risk factor for low BMI or malnutrition among the older adults. Famines caused by the continuous lack of food over a long period of time can cause food insecurity and malnutrition.[43]

This study found that older age, women, depressive symptoms and food insecurity were associated with lower BMI, as reported by Luxi et al.[44], Johansson et al.[45] and Sharkey.[42] A study by among older adults also found that food insecurity is closely related to malnutrition. A local study by Suzana et al.[46] among older adults in FELDA Sungai Tengi found that 19.8% of those at risk of malnutrition faced the risk due to decreased in appetite, lack of functional status and depression. It is important to highlight that food insecurity was closely related to malnutrition that urges for a holistic intervention not only in term of health and food availability, but also psychosocial factors. This study has a few limitations such as the sample including only one rural area and may not be representative of Malaysian older adults in general and the study being a cross sectional study where 'cause' and 'effect' cannot be truly be elucidated.

CONCLUSION

In conclusion, about one third of the respondents in the present study especially older adults who were underweight, depressed and suffered from stress from family, experienced food insecurity. Malnutrition as indicated by BMI was also associated with age, women, depressive symptoms and also food insecurity. None of the socio-economic factors were associated with food insecurity and BMI. This study provided baseline data for food insecurity among older adults in Malaysia that urges further holistic intervention including psychosocial efforts.

CONFLICT OF INTEREST STATEMENT

The authors' report had no conflict of interest.

ACKNOWLEDGEMENTS

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