

## Prevalence and determinants of Instrumental Activities of Daily Living (IADL) disability among community-dwelling elderly in a semi-urban setting in Peninsular Malaysia

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### ABSTRACT

**Introduction:** The ability to perform daily living activities among the elderly is important, as physical disability may lead to dependency and various public health implications. This study aimed to determine the prevalence of instrumental activities of daily living (IADL) disability and its association with socio-demographic characteristics, dietary intake, social participation, perceived-health-status and risk of falls. **Methods:** This cross-sectional study was conducted among community-based elderly in the Gombak District of Selangor. 258 respondents aged 60-88 years old (mean age 66±6.5 years) were recruited through multi-stage proportional sampling. Most of the respondents (88.4%) aged 60-74 years and 11.6% were ≥75 years. IADL disability was determined using an eight-item IADL scale. The presence of IADL disability was defined as needing help in at least one or more of eight-IADL activities. Dietary intake and fall risk were assessed using diet history questionnaire (DHQ) and 21-item fall risk index (FRI-21), respectively. **Results:** The prevalence of IADL disability among the respondents was 58.1%. A binary logistic regression analyses showed that the following factors predicted IADL disability: advanced age (≥75 years, OR=6.4; 95% CI: 1.3, 30.8), being unmarried (OR=2.5; 95% CI: 1.1, 5.9), unemployed/retired (OR=2.3; 95% CI: 1.2, 4.3), and at risk of falls (OR=2.5; 95% CI: 1.3, 6.1). **Conclusion:** Predictors such as marriage and employment highlight the importance of social support among elderly. In practical terms, this means that it is incumbent upon caregivers, family members, and the community to provide both physical and emotional support if the functional status of the elderly is to be improved.

**Keywords:** IADL disability, elderly, functional status, Malaysia

### INTRODUCTION

An increase in life expectancy, coupled with a widespread decline in fertility and mortality, has led to a recent rise in the population of the elderly on a global scale. For many developing countries, including Malaysia, this demographic

transition is becoming more apparent, although its pattern varies considerably between countries (Bloom, Canning & Finlay, 2010).

Physical disability is common among the elderly. Developed countries have reported its prevalence ranging 12.0-

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doi: <https://doi.org/10.31246/mjn-2018-0142>

15.0% (Ramsay *et al.*, 2008; den Ouden *et al.*, 2013). In contrast, the prevalence rate in developing countries appears to be slightly higher, at 29.0-48.0% (Chalise, Saito & Kai, 2008; Malhotra, Chan & Ostbye, 2010). Malaysia appears to have much higher prevalence of physical disability compared with more developed countries but is still within the range of that of developing countries (Hairi *et al.*, 2010). The elderly are at the greatest risk of becoming dependent, as they suffer difficulties and need assistance to carry out both basic activities of daily living (BADL) and instrumental activities of daily living (IADL). The IADL are key life tasks that seniors must manage to be safe & independent. They include cleaning and maintaining the house, managing money, moving within the community and preparing meals. IADL disability is defined as experiencing difficulty in carrying out activities that are essential to independent living.

Dependence is the main factor impacting the health and quality of life for the elderly, caregivers, and relatives (Millán-Calenti *et al.*, 2010). The implications of dependency may also lead to an increase in the use of health care services, admission to nursing homes, and hospitalisation (Zisberg *et al.*, 2015). As the number of dependent elderly is predicted to increase, this will impose an enormous and growing economic cost on society.

Much research has been conducted around the world on physical disability among the elderly, but the data from the developed countries may not be applicable to the Malaysian context. Recent studies on the specific IADL disabilities of the Malaysian elderly are limited, with the exception of the work of Momtaz, Hamid & Ibrahim (2012) and Suzana *et al.* (2013). The primary objective of this study was, therefore, to determine the prevalence of disability in IADLs among the elderly in a semi-

urban setting, in Peninsular Malaysia. This study also aimed to determine the specific factors associated with IADL disability within the study population.

## **MATERIALS AND METHODS**

### **Study design and sampling method**

This cross-sectional study was conducted in Mukim Batu, which is one of the sub-districts of Gombak District, in the state of Selangor, in Peninsular Malaysia. Mukim Batu is a semi-urban area situated approximately in the middle of Gombak. A multi-stage proportional sampling method was used for the selection of the study location. The Gombak district was selected as the proportion of the elderly was one of the highest among the other eight districts of Selangor. The Gombak District consists of four sub-districts. The sub-district of Mukim Batu was selected as it had the highest proportion of elderly compared to the others. All 16 villages in Mukim Batu were selected. The number of respondents recruited from each village was based on the proportion of elderly from each village. Prospective respondents then were identified in each village, from a comprehensive community list of names, of both genders, that was provided by Head of Mukim Batu. They were randomly selected using a 'Research Randomiser' web-based application, sorted according to each village. The community in Mukim Batu was informed about the data collection process through their respective heads of villages. House-to-house visits were made and only the elderly, who had been identified in specific household, were invited to participate in this study.

### **Participants**

A total of 258 elderly individuals were recruited from June to December 2013 based on the inclusion and exclusion criteria of this study: a person was

included if they had resided in the study location for >12 months, were Malaysian, aged  $\geq 60$  years, and able to communicate effectively. Subjects were excluded if they were reported by their family members that they had mental illnesses such as dementia/Alzheimer, terminally ill (end stage cancer/rehabilitation), bedridden, or suffered hearing difficulties or deafness. In the cases where the subject was unable to respond to the interviewer due to language barrier, the primary caregiver was asked to be a proxy respondent.

### **Data collection**

#### *Measurement of IADL disability*

The IADL questionnaire was used to assess the ability of the respondents to perform eight daily activities, as defined by Lawton & Brody (1969). These were: ability to use telephone; shopping; prepare meals; perform housekeeping chores; do the laundry; use of public transport; taking medication; and handling finances. Respondents were interviewed to obtain information about their ability to perform these eight daily activities. On the basis of their responses, the respondents were then classified into IADL disability Present or IADL disability Absent. For this study, the presence of IADL disability was defined as the need for help with at least one or more of the eight-item IADL activities (Millán-Calenti *et al.*, 2012). The reliability of IADL used in this study revealed a Cronbach's alpha value of 0.58.

#### *Socio-demographic characteristics*

A set of questionnaires was used to obtain general socio-demographic information about the respondents, which included gender, age, ethnicity, educational level, marital status, living arrangements, working status, and main economic resource. This information was obtained via face-to-face interviews.

#### *Dietary intake*

The amount of food items consumed by the respondents in the past week was recorded by a validated diet history questionnaire (DHQ), via interview, to establish their 'usual' weekly food consumption patterns. The DHQ has the advantage of requiring limited effort by the respondents and should provide detailed information about the food consumed and meal patterns over a longer period, provided that the data are collected by a trained interviewer (Shahar, Earland & Abdulrahman, 2000). The intake of nutrients (energy and protein) was compared with the Recommended Nutrient Intake (RNI) (NCCFN, 2017).

#### *Social participation*

Two self-reported items on social relation and participation were used to assess the social participation of the respondents:

- Social relations: visited their friends and/or relatives at least once a week with the possible responses of yes or no (Nogueira *et al.*, 2010).
- Social participation: taking part in and/or attending social functions at least once a week with the possible responses of yes or no (Nogueira *et al.*, 2010).

#### *Perceived health status*

Two self-rated items were used to assess the perceived health status of the respondents, including:

- Self-rated health: with the possible responses being: poor, neutral, good, and excellent (Nascimento *et al.*, 2012).
- Self-rated health relative to peers: perceived health relative to peers, with the possible responses being poor, neutral, good, and excellent (Nascimento *et al.*, 2012).

**Table 1.** Socio-demographic characteristics, dietary intake, social participation, perceived health status and fall risk of respondents ( $n=258$ ) by gender. Figures in parentheses represent the percentages

Characteristics	Male	Female	Total
	( $n=123$ )	( $n=135$ )	( $n=258$ )
Age			
60-74 years	104 (84.6)	124 (91.9)	228 (88.4)
$\geq 75$ years	19 (15.4)	11 (8.1)	30 (11.6)
( $M \pm SD$ )	66 $\pm$ 6.8	65 $\pm$ 6.1	66 $\pm$ 6.5
Ethnicity			
Malay	82 (66.7)	88 (65.2)	170 (65.9)
Chinese	22 (17.9)	29 (21.5)	51 (19.8)
Indian	19 (15.4)	18 (13.3)	37 (14.3)
Educational Level			
No formal education	2 (1.6)	13 (9.6)*	15 (5.8)
Primary education	57 (46.3)	71 (52.6)	128 (49.6)
Secondary education	51 (41.5)	45 (33.3)	96 (37.2)
Tertiary education	13 (10.6)	6 (4.4)	19 (7.4)
Marital status			
Single	6 (4.9)	1 (0.7)*	7 (2.7)
Married	108 (87.8)	93 (68.9)	201 (77.9)
Widowed/Divorced	9 (7.3)	41 (30.4)	50 (19.4)
Living arrangements			
Living alone	4 (3.3)	5 (3.7)	9 (3.5)
Living with others	119 (96.7)	130 (96.3)	249 (96.5)
Employment			
Unemployed	3 (2.4)	63 (46.6)*	66 (25.6)
Retired	68 (55.3)	43 (31.9)	111 (43.0)
Employed	52 (42.3)	29 (21.5)	81 (31.4)
Income resources			
Pension	48 (39.0)	15 (11.1)*	63 (24.4)
Salary	30 (24.4)	17 (12.6)	47 (18.2)
Children	23 (18.7)	61 (45.2)	84 (32.6)
Other (savings, social welfare)	22 (17.9)	42 (31.1)	64 (24.8)
Dietary intake			
<RNI energy <sup>†</sup>	72 (58.5)	91 (67.4)	163 (63.2)
Energy intake, kcal ( $M \pm SD$ )	1966 $\pm$ 543	1642 $\pm$ 505**	1796 $\pm$ 547
<RNI protein <sup>‡</sup>	67 (54.5)	70 (51.9)	137 (53.1)
Protein intake, g ( $M \pm SD$ )	57.99 $\pm$ 16.73	50.00 $\pm$ 16.41**	53.81 $\pm$ 17.01
Visiting friends and/or relatives			
Yes	117 (95.1)	115 (85.2)*	232 (89.9)
No	6 (4.9)	20 (14.8)	26 (10.1)
Participation in activity/social programs			
Yes	85 (69.1)	62 (45.9)*	147 (57.0)
No	38 (30.9)	73 (54.1)	111 (43.0)
Perceived of own health status			
Excellent/Good	111 (90.2)	115 (85.2)	226 (87.6)
Neutral/Poor	12 (9.8)	20 (14.8)	32 (12.4)
Perceived health in relation to peers			
Excellent/Good	116 (94.3)	126 (93.3)	242 (93.8)
Neutral/Poor	7 (5.7)	9 (6.7)	16 (6.2)

Characteristics	Male	Female	Total
	(n=123)	(n=135)	(n=258)
Fall risk			
Low (0-8)	105 (85.4)	93 (68.9)*	198 (76.7)
Medium (9-10)	7 (5.7)	17 (12.6)	24 (9.3)
High (11-21)	11 (8.9)	25 (18.5)	36 (14.0)
FRI-21 score ( $M\pm SD$ )	5.98 $\pm$ 2.98	7.47 $\pm$ 3.10**	6.76 $\pm$ 3.12

\* $p < 0.05$ , significant difference between gender (chi-squared test); \*\* $p < 0.05$ , significant difference between gender (independent  $t$ -test);

<sup>†</sup><RNI energy (Male <2010 kcal/day; Female <1780 kcal/day)

<sup>‡</sup><RNI protein (Male <59 g/day; Female <51 g/day)

### Risk of falls

This study used the validated 21-item Fall Risk Index (FRI-21) questionnaire to assess the risk of falls. This index encompassed physical, cognitive, emotional and social aspects of functioning, as well as environmental factors (Toba *et al.*, 2005). Each item was scored 1, when risk was present and 0 when risk was absent. The sum of all items ranged from 0-21, with higher scores indicating higher risk of falls. A cut-off of 9-10 points is useful for early detection of fall risk (Ishimoto *et al.*, 2012). The reliability of FRI-21 in this study indicated Cronbach's alpha value of 0.67.

### Data analysis

The Nutritionist Pro™ Diet Analysis (Axxya Systems, Woodinville, WA, USA) software with the Nutrient Composition of Malaysian Food Database (Tee *et al.*, 1997) was used to analyse the dietary intake of the respondents obtained from the DHQ. In addition to DHQ, data from the questionnaire were analysed using IBM's Statistical Package for the Social Sciences (SPSS) version 25.0. The independent  $t$ -test was used to test the differences of the mean of variables between gender and age group. The chi-square test was used to determine the significance of association ( $p < 0.05$ ) between IADL disability with demographic data, dietary intake,

perceived health status and risk of falls. However, if  $\geq 1$  cells had expected frequency of  $\leq 5$ , then the Fisher's exact test was used instead. Factors which were statistically associated ( $p < 0.05$ ) were analysed using a multivariate binary logistic regression using an enter method to identify the best correlates of IADL disability.

### Ethical approval

This study was approved by the University Research Ethics Committee of the Universiti Putra Malaysia (JKEUPM). Written informed consent was obtained from all participants or their family members prior to data collection.

### RESULTS

Out of the 277 eligible participants, 258 agreed to participate in this study, giving a response rate of 93.1%. The socio-demographic characteristics of the study population are shown in Table 1. The sample had a similar distribution of males (48.0%) and females (52.0%). The mean age of the respondents was 66 $\pm$ 6.5 years, ranging from 60-88 years. Most of the respondents (88.4%) were from the 'younger elderly' group between 60-74 years old and only 11.6% were from the 'older elderly' group ( $\geq 75$  years old). The respondents comprised representatives of three main ethnic groups in Malaysia: Malays (65.9%), Chinese (19.8%) and

**Table 2.** Prevalence of IADL disability of the respondents, *n* (%) and *M*±*SD*

8-item IADL disability	Male			Female			Total ( <i>n</i> =258)
	60-74 years old ( <i>n</i> =104)	≥75 years old ( <i>n</i> =19)	Subtotal ( <i>n</i> =123)	60-74 Years old ( <i>n</i> =124)	≥75 Years old ( <i>n</i> =11)	Subtotal ( <i>n</i> =135)	
Present disability	49 (47.1)	17 (89.5)*	66 (53.7)	73 (58.9)	11 (100.0)*	84 (62.2)	150 (58.1)
Absent disability	55 (52.9)	2 (10.5)	57 (46.3)	51 (41.1)	–	51 (37.8)	108 (41.9)
IADL score ( <i>M</i> ± <i>SD</i> )	7.14±1.15	5.47±1.50**	6.88±1.35	6.81±1.25	4.64±1.29**	6.64±1.39	6.76±1.37

\**p*<0.05, significant difference between age group (chi-squared test)

\*\**p*<0.05, significant difference between age group (independent *t*-test)

Indians (14.3%). Most of the respondents lived with others (96.5%) and only a few 3.5% lived alone. The majority of the females (62.2%) had received only a primary level education or none as against 47.9% of the men. Fewer women were in employment compared to men (21.0% versus 43.2%) and more were dependent on their children and others for financial resources compared to men (76.3% versus 36.6%). Women were also less likely than men to be married (68.9% versus 87.8%).

The mean energy intake of the respondents which were 1966±543 kcal/day and 1642±505 kcal/day for males and females, respectively did not achieve the Malaysian RNI. The mean intake for protein, being 57.99±16.73 g/day and 50.00±16.41 g/day for males and females, respectively was also lower than Malaysian RNI. Overall, more than half of the respondents consumed energy (63.2%) and protein (53.1%) below the RNI level. In regard to social participation, it was found that males were more likely to pay visits and participate in any activities compared to the female participants. Overall, most of the respondents perceived their own health status (87.6%) and their health in relation to their peers (93.8%) as being “excellent/

good”. The respondents reported a mean FRI-21 score of 6.76±3.12, with females having a significantly higher risk of falls (7.47±3.10) compared with males (5.98±2.98). Overall, 23.3% were identified having at risk of falls, with 31.1% of them being females, compared with 14.6% males.

The mean±SD for the IADL ability of the respondents was 6.76±1.37 (Table 2). It appears, from their lower IADL scores, that females had poorer functional status compared to males although there was no significant difference between the genders. In contrast, the results showed that there was a significant difference in the mean of IADL score between age groups in both genders (*p* <0.001); respondents from the younger elderly group had higher IADL scores compared to those from the older group. More than half (58.1%) of the respondents were unable to execute at least one IADL and this was almost doubled for the older elderly (male=89.5%; female=100.0%) compared to the younger elderly (male=47.1%; female=58.9%).

Bivariate analysis showed a significant association between several factors and IADL disability. These factors were: age group, ethnicity, educational level, marital status, employment

**Table 3.** Distribution of socio-demographic characteristics, dietary intake, social participation, perceived health status and fall risk by IADL disability, *n* (%)

<i>Independent Variables</i>	<i>Present IADL Disability (n=150)</i>	<i>Absent IADL Disability (n=108)</i>	$\chi^2$ value	<i>p-value</i>
Age group				
60-74 years old	122 (53.5)	106 (46.5)	17.28*	0.000
≥75 years old	28 (93.3)	2 (6.7)		
Gender				
Male	66 (53.7)	57 (46.3)	1.94	0.164
Female	84 (62.2)	51 (37.8)		
Ethnicity				
Chinese	22 (43.1)	29 (56.9)	6.05**	0.049
Malay	104 (61.2)	66 (38.8)		
Indian	24 (64.9)	13 (35.1)		
Educational Level				
Formal education	137 (56.4)	106 (43.6)	5.35*	0.028
No formal education	13 (86.7)	2 (13.3)		
Marital status				
Married	103 (51.2)	98 (48.8)	17.78**	0.000
Single/Widowed/Divorced	47 (82.5)	10 (17.5)		
Living Arrangements				
Living with others	144 (57.8)	105 (42.2)	0.28	0.738
Living alone	6 (66.7)	3 (33.3)		
Employment				
Employed	30 (37.0)	51 (63.0)	21.60**	0.000
Unemployed/Retired	120 (67.8)	57 (32.2)		
Dietary Intake				
≥RNI energy (kcal)	42 (44.2)	53 (55.8)	11.99**	0.000
<RNI Energy (kcal)	108 (66.3)	55 (33.7)		
≥RNI protein (g)	61 (50.4)	60 (49.6)	5.59**	0.018
<RNI protein (g)	89 (65.0)	48 (35.0)		
Visiting friends and/or relatives				
Yes	125 (53.9)	107 (46.1)	17.17*	0.000
No	25 (96.2)	1 (3.8)		
Taking part in activity/social programs				
Yes	66 (44.9)	81 (55.1)	24.62**	0.000
No	84 (75.7)	27 (24.3)		
Perception of own health status				
Excellent/Good	123 (54.4)	103 (45.6)	10.33**	0.000
Neutral/Poor	27 (84.4)	5 (15.6)		
Perceived health in relation to peers				
Excellent/Good	136 (56.2)	106 (43.8)	6.04*	0.017
Neutral/Poor	14 (87.5)	2 (12.5)		
Fall risk				
No risk	99 (50.0)	99 (50.0)	23.74**	0.000
At risk	51 (85.0)	9 (15.0)		

\* $p < 0.05$ , significant difference between age group (Fisher's exact test)\*\* $p < 0.05$ , significant difference between age group (chi-squared test)

**Table 4.** Binary logistic regression analysis for factors predicting IADL disability (n=150)

<i>Variables</i>	<i>Frequency (n=150)</i>	<i>Adjusted OR (95% CI)</i>	<i>p-value</i>
Age group			
60-74 years old	122	1.000	0.020*
≥75 years old	28	6.4 (1.3, 30.8)	
Ethnicity			
Chinese	22	1.000	0.363
Malay	104	1.4 (0.7, 3.0)	0.315
Indian	24	2.1 (0.7, 5.8)	0.171
Educational Level			
Formal Education	137	1.000	0.546
No formal education	13	1.8 (0.3, 10.9)	
Marital status			
Married	103	1.000	0.038*
Single/Widowed/Divorced	47	2.5 (1.1, 5.9)	
Employment			
Employed	30	1.000	0.011*
Unemployed/Retired	120	2.3 (1.2, 4.3)	
Dietary Intake			
≥RNI Energy (kcal)	42	1.000	0.185
<RNI Energy (kcal)	108	1.5 (0.8, 2.7)	
≥RNI Protein (g)	61	1.00	
<RNI Protein (g)	89	1.1 (0.5, 2.3)	0.902
Visiting friends and/or relatives			
Yes	125	1.000	0.109
No	25	5.7 (0.7, 48.0)	
Taking part in activity/social programs			
Yes	66	1.000	0.062
No	84	1.8 (0.3, 5.8)	
Perceived of own health status			
Excellent/Good	123	1.000	0.678
Neutral/Poor	27	1.4 (0.3, 6.0)	
Perceived health in relation to peers			
Excellent/Good	136	1.000	0.988
Neutral/Poor	14	1.0 (0.1, 7.5)	
Fall risk			
No risk	99	1.000	0.049*
At risk	51	2.5 (1.3, 6.1)	

\* $p < 0.05$ , represents statistical significance

status, energy and protein intake, social relations, social participation, self-rated health, and fall risk. Detailed findings are shown in Table 3. The respondents of advanced age group (≥75 years), who were unmarried, and unemployed, had energy and protein intakes of less than RNI values were associated with IADL disability. From a multivariate binary

logistic regression analysis (Table 4), the significant determinants of IADL disability for this study were found to be advanced age (≥75 years old, OR=6.4; 95% CI: 1.3, 30.8), being unmarried (OR=2.5; 95% CI: 1.1, 5.9), unemployed/retired (OR=2.3; 95% CI: 1.2, 4.3), and at risk of falls (OR=2.5; 95% CI: 1.3, 6.1).

## DISCUSSION

This study contributes to the literature on the prevalence of self-reported physical disability using IADL, which is one of important predictors for a good quality of life (Onunkwor *et al.*, 2016). Malaysia is experiencing a dramatic increase in elderly population (Bloom *et al.*, 2010) and studies have highlighted that social support (Feng *et al.*, 2013), sufficient dietary intake, absence of depression and cognitive impairment (Vanoh *et al.*, 2017) are among the contributory factors for a healthy physical functioning of elderly (Sathasivam *et al.*, 2015). Although numerous studies on physical disability have been undertaken worldwide, variations in physical disability assessment (e.g. different instrument and scoring methods) across these studies make any direct comparisons difficult. With this limitation, it is reasonable that this study should only be matched with local studies such as those of Nur' Asyura *et al.* (2010), Momtaz *et al.* (2012), and Suzana *et al.* (2013). This is in addition to only a few foreign studies such as Chalise *et al.* (2008), Coustasse *et al.* (2008), Ramsay *et al.* (2008), and Millán-Calenti *et al.* (2010) all of which also defined disability as the inability to perform at least one of the IADL items.

In this study, the prevalence of IADL disability among the respondents was 58.1%. This finding is comparable with the previous local study of Nur'Asyura *et al.* (2010) among community-dwelling elderly in the rural areas of Selangor and the state of Negeri Sembilan (located south of Selangor), where the prevalence of IADL disability among the respondents was about fifty percent (49.8%). More recently, Suzana and colleagues (2012) reported that almost half of their free-living respondents (43.0%) from a Federal Land Development Authority (FELDA) agricultural settlement were

found to be physically dependent. In stark contrast to these figures, an earlier local study reported that the prevalence of IADL disability among the free-living elderly was only 13.0% (Shahar *et al.*, 2007). It was noted, then, that there are different ranges of prevalence for IADL disability among the Malaysian elderly. These findings should be interpreted cautiously since there is the possibility of a different number of IADL items used, sample sizes, and settings of the sample studied.

The prevalence of IADL disability in the results of the present study appears to be higher than that in most other countries. Using the same IADL instrument and scoring method, Coustasse *et al.* (2008) reported that 12.8% of the elderly in the United States were disabled in terms of IADL, while a study in Britain reported a 15.0% rate of IADLs (Ramsay *et al.*, 2008). Interestingly, some Asian countries also reported a similar lower prevalence of IADL disability, in contrast to this study, including Nepal (29.2%) and Sri Lanka (32.3%) (Chalise *et al.*, 2008; Malhotra *et al.*, 2010). However, there are several studies which also offer quite similar findings to our study. For instance, studies in Spain and Taiwan reported 53.5% and 48.1% respectively (Hsu & Jhan, 2008; Millán-Calenti *et al.*, 2010). The wide disparity between the ranges of prevalence between the countries might be explained by the fact that IADL is influenced by societal, environmental, and cultural factors, such as readiness to adapt and accepting the "sick role" or learned dependency. The high prevalence of IADL disability in this study could be attributed to two IADL items: the ability to use public transport and shopping for groceries, both of which require the elderly to leave their housing areas. This could be due to other external factors such as the accessibility to own transportation, safety issues and the

lack of provision of support from their close family members or neighbours. In Malaysia, the prevalence of a deeply rooted traditional family culture makes it incumbent on younger family members to take care of the elderly. Unsurprisingly then, most of the respondents (96.5%) in this study do not live alone but with others (Hairi *et al.*, 2010). It may be concluded that Malaysian elderly tend, as a rule, to be dependent on others or at least are ready to seek assistance. It is also possible that though they claimed to be unable to perform such daily tasks, they were, in fact, not usually allowed to do so by those around them.

The different prevalence rates of IADL disability in these studies is most likely due to the different physical disability scales, items, and scoring methods, that were used. However, the general findings regarding predictors of disability were quite similar. Many studies have shown the significant predictors of IADL disability are old age, being unmarried, unemployment, and at risk of falls (Coustasse *et al.*, 2008; Hsu & Jhan, 2008; Hairi *et al.*, 2010; Lund, Nilsson & Avlund, 2010; d'Orsi, Xavier & Ramos, 2011; Ishimoto *et al.*, 2012; Nascimento *et al.*, 2012). The present study confirms the majority of the predictors that were reported and extends their findings.

In this study, age was found to be a significant risk factor for IADL disability; with increasing age, the odds of reporting disability also increased. Typically, older people are more fragile, are highly susceptible to chronic diseases, and usually after their 70's show a greater loss of muscle mass which would result in difficulties in performing routine activities (Danielewicz, Barbosa & Del Duca, 2014). The importance of marriage as a factor influencing daily activities was also observed among respondents in this study. It is reasonable to assume that marriage might influence one's overall health status through the social support

provided by the spouse, and thereby have a preventative effect on functional disability among elderly people (Pandey, 2011; Chao *et al.*, 2013). Marriage is one of the central sources of social support, and greater social interaction may encourage the elderly to remain physically active, and thus decrease their risk of developing disabilities (Hays *et al.*, 2001).

In this study, being unemployed when elderly was a significant predictor of disability in terms of IADLs. Being unemployed is often associated with low income and poverty, which might lead to a lower standard of living, an unhealthy lifestyle and diet, less frequent use of healthcare services, which may therefore promote a higher risk of diseases (Hairi *et al.*, 2010). The working environment provides a form of social support and interaction with colleagues, which in turn keep the working elderly active and help maintain their functional status (d'Orsi *et al.*, 2011). Thus, it was unsurprising that a study among the Indian elderly found that the likelihood of disability among economically disadvantaged elderly people was higher than those having average to above average incomes (Pandey, 2011). In this study, being at risk of falls was shown to strongly increase the risk of IADL disability among the respondents. As would be expected, post-fall injury or fracture might result in a loss of confidence and reduce activity levels, leading to functional decline. At present, there is still a lack of knowledge about the possible association between fall risk and IADL disability and this is an area for further research.

This study had some limitations. Firstly, the study design was cross-sectional, consequently only showing descriptive relationships, and no conclusions on causality could be drawn. Then, the methodology that used was limited to self-reported questionnaires,

which might lead to under- or over-reporting. Misclassification bias can be expected making it more difficult to detect if real associations are present. A performance-based physical disability assessment is recommended for future studies to determine the magnitude of the physical disability. Therefore, cause and effect relationships as well as the magnitude of the contributions of some associations that have been reported need to be further investigated with larger sample sizes using longitudinal, randomised, controlled study design, in various populations across the region.

## CONCLUSION

This study reported a substantial prevalence of IADL disability among the elderly respondents, consistent with the predictors of IADL disability found in some previous studies. It can be strongly concluded, that predictors such as marriage and employment highlight the importance of social support for the elderly, in the Malaysian context. From a wider perspective, the importance of caregivers, family members, and community for providing their support physically and emotionally is necessary if the functional status of the elderly is to be improved.

## Acknowledgements

The researchers are grateful to the elderly subjects, caregivers, field workers and others involved in this study.

## Authors' contributions

MFM, conceptualised and designed the study, led the data collection and prepared the draft of the manuscript; ZI, conceptualised and designed the study, provided advice on the data analysis and its interpretation, and reviewed the manuscript; SNAA, provided advice on the data analysis and interpretation, and reviewed the manuscript; CYM provided advice on the data analysis, interpretation of the findings and reviewed the manuscript.

## Conflict of interest

None of the authors declared a conflict of interest.

## References

- Bloom D, Canning D & Finlay J (2010). Population aging and economic growth in Asia. *Econ Consequences Demogr Chang East Asia* 19(8):61-89.
- Chalise HN, Saito T & Kai I (2008). Functional disability in activities of daily living and instrumental activities of daily living among Nepalese Newar elderly. *Public Health* 122(4):394-396.
- Chao J, Li Y, Xu H, Yu Q, Wang Y & Liu P (2013). Health status and associated factors among the community-dwelling elderly in China. *Arch Gerontol Geriatr* 56(1):199-204.
- Coustasse A, Bae S, Arvidson CJ & Singh KP (2008). Disparities in self-reported activities of daily living and instrumental activities of daily living disability among Asian American subgroups in the United States: Results from the National Health Interview Survey 2001-2003. *Disability and Health Journal* 1(3):150-156.
- Danielewicz AL, Barbosa AR & Del Duca GF (2014). Nutritional status, physical performance and functional capacity in an elderly population in southern Brazil. *Rev Assoc Med Bras* 60(3):242-248.
- den Ouden MEM, Schuurmans MJ, Brand JS, Arts IEMA, Mueller-Schotte S & van der Schouw YT (2013). Physical functioning is related to both an impaired physical ability and ADL disability: a ten year follow-up study in middle-aged and older persons. *Maturitas* 74(1):89-94.
- d'Orsi E, Xavier AJ & Ramos LR (2011). Work, social support and leisure protect the elderly from functional loss: EPIDOSO study. *Rev Saude Publica* 45:685-692.
- Feng Q, Zhen Z, Gu D, Wu B, Duncan PW & Purser JL (2013). Trends in ADL and IADL disability in community-dwelling older adults in Shanghai, China, 1998-2008. *The journals of gerontology. Series B, Psychological sciences and social sciences*, 68(3):476-485. doi:10.1093/geronb/gbt012.
- Hairi NN, Bulgiba A, Cumming RG, Naganathan V & Mudra I (2010). Prevalence and correlates of physical disability and functional limitation among community dwelling older people in rural Malaysia, a middle income country. *BMC Public Health* 10(1):492.
- Hays JC, Steffens DC, Flint EP, Bosworth HB & George LK (2001). Does social support buffer functional decline in elderly patients with unipolar depression? *Am J Psychiatry* 158(11):1850-1855.

- Hsu H & Jhan LJ (2008). Risk factors of falling among the elderly in Taiwan: a longitudinal study. *Taiwan Geriatrics Gerontology* 3(2):141-154.
- Ishimoto Y, Wada T, Kasahara Y, Kimura Y, Fukutomi E, Chen W, Hirosaki M, Nakatsuka M, Fujisawa M, Sakamoto R, Ishine M, Okumiya K, Otsuka K & Matsubayashi K (2012). Fall Risk Index predicts functional decline regardless of fall experiences among community-dwelling elderly. *Geriatr Gerontol Int* 12(4):659-666.
- Lawton MP & Brody EM (1969). Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist* 9(3):179-186.
- Lund R, Nilsson CJ & Avlund K (2010). Can the higher risk of disability onset among older people who live alone be alleviated by strong social relations? A longitudinal study of non-disabled men and women. *Age Ageing* 39(3):319-326.
- Malhotra R, Chan A & Ostbye T (2010). Prevalence and correlates of clinically significant depressive symptoms among elderly people in Sri Lanka: findings from a national survey. *Int Psychogeriatr* 22(2):227-236.
- Millán-Calenti JC, Tubio J, Pita-Fernández S, González-Abraldes I, Lorenzo T, Fernández-Arruty T & Maseda A (2010). Prevalence of functional disability in activities of daily living (ADL), instrumental activities of daily living (IADL) and associated factors, as predictors of morbidity and mortality. *Arch Gerontol Geriatr* 50(3):306-310.
- Millán-Calenti JC, Tubio J, Pita-Fernández S, Rochette S, Lorenzo T & Maseda A (2012). Cognitive impairment as predictor of functional dependence in an elderly sample. *Arch Gerontol Geriatr* 54(1):197-201.
- Momtaz YA, Hamid TA & Ibrahim R (2012). Unmet needs among disabled elderly Malaysians. *Soc Sci Med* 75(5):859-863.
- Nascimento C de M, Ribeiro AQ, Cotta RMM, Acurcio Fde A, Peixoto SV, Priore SE & Franceschini Sdo C (2012). Factors associated with functional ability in Brazilian elderly. *Arch Gerontol Geriatr* 54(2):e89-e94.
- NCCFN (2017). *Recommended Nutrient Intakes for Malaysia. A Report of the Technical Working Group on Nutritional Guidelines*. National Coordinating Committee on Food and Nutrition, Ministry of Health, Putrajaya.
- Nogueira SL, Ribeiro RCL, Rosado LEFPL, Franceschini SCC, Ribeiro AQ & Pereira ET (2010). Fatores determinantes da capacidade funcional em idosos longevos. *Brazilian J Phys Ther* 14(4):322-329.
- Nur'Asyura Adznam S, Shahar S, Rahman SA, Yusof NA, Arshad F, Yassin Z, Salleh M, Samah AA & Sakian NI (2010). An action research on promotion of healthy ageing and risk reduction of chronic disease: A need assessment study among rural elderly Malays, care givers and health professionals. *J Nutr Health Aging* 13(10):925-930.
- Onunkwor OF, Al-Dubai SAR, George PP, Arokiasamy J, Yadav H, Barua A & Shuaibu HO (2016). A cross-sectional study on quality of life among the elderly in non-governmental organizations' elderly homes in Kuala Lumpur. *Health and quality of life outcomes* 14:6-6. doi:10.1186/s12955-016-0408-8.
- Pandey MK (2011). Poverty and disability among Indian elderly: evidence from household survey. *J Disabil Policy Stud* 23(1):39-49.
- Ramsay SE, Whincup PH, Morris RW, Lennon LT & Wannamethee SG (2008). Extent of social inequalities in disability in the elderly: results from a population-based study of British men. *Ann Epidemiol* 18(12):896-903.
- Sathasivam J, Kamaruzzaman SB, Hairi F, Ng CW & Chinna K (2015). Frail elders in an urban district setting in Malaysia: multidimensional frailty and its correlates. *Asia Public Journal of Public Health* 27(8\_suppl):52S-61S. doi:10.1177/1010539515583332.
- Shahar S, Earland J & Abdulrahman S (2000). Validation of a dietary history questionnaire against a 7-D Weighed record for estimating nutrient intake among rural elderly Malays. *Malays J Nutr* 6(1):33-44.
- Shahar S, Ibrahim Z, Fatah ARA, Rahman SA, Yusoff NA, Arshad F, Yassin Z & Adznam SN (2007). A multidimensional assessment of nutritional and health status of rural elderly Malays. *Asia Pac J Clin Nutr* 16(2):346-353.
- Suzana S, Kee CC, Jamaludin AR, Noor Safiza MN, Khor GL, Jamaiyah H, Geeta A, Ahmad Ali Z, Rahmah R, Ruzita AT & Ahmad Fauzi Y (2012). The Third National Health and Morbidity Survey: prevalence of obesity, and abdominal obesity among the Malaysian elderly population. *Asia Pac J Public Health* 24(2):318-29.

- Suzana S, Boon PC, Chan PP & Normah CD (2013). Malnutrition risk and its association with appetite, functional and psychosocial status among elderly Malays in an agricultural settlement. *Malays J Nutr* 19(1):65-75.
- Tee ES, Ismail MN, Nasir MA & Khatijah I (1997). Nutrient Composition of Malaysian Foods. 4th Ed. Malaysian Food Composition Database Programme, Institute for Medical Research, Kuala Lumpur.
- Toba K, Okochi J, Takahashi T, Matsubayashi K, Nishinaga M, Yamada S, Takahashi R, Nishijima R, Kobayashi Y, Machida A, Akishita M & Sasaki H (2005). Development of a portable fall risk index for elderly people living in the community. *Nippon Ronen Igakkai Zasshi Japanese J Geriatr* 42(3):346-352.
- Vanoh D, Shahar S, Din NC, Omar A, Vyrn CA, Razali R, Ibrahim R & Hamid TA (2017). Predictors of poor cognitive status among older Malaysian adults: baseline findings from the LRGS TUA cohort study. *Aging Clinical Experimental Research* 29(2):173-182. doi:10.1007/s40520-016-0553-2.
- Zisberg A, Shadmi E, Gur-Yaish N, Tonkikh O & Sinoff G (2015). Hospital-associated functional decline: the role of hospitalization processes beyond individual risk factors. *J Am Geriatr Soc* 63(1):55-62.