

## FACTORS INFLUENCING INSTRUMENTAL ACTIVITIES OF DAILY LIVING (IADL) DISABILITY AMONG ELDERLY ATTENDING HEALTH CLINICS IN KELANTAN

NUR RAIHAN ISMAIL<sup>1</sup>, ANEES ABDUL HAMID<sup>2</sup>, ASRENEE AB RAZAK<sup>3</sup>  
and NOOR AMAN HAMID<sup>1</sup>

<sup>1</sup>*Department of Community Medicine, School of Medical Sciences,  
Universiti Sains Malaysia, Kubang Kerian, Malaysia*

<sup>2</sup>*Primary Health Care Unit, Kelantan State Health Department, Malaysia*

<sup>3</sup>*Department of Psychiatry, School of Medical Sciences, Health Campus,  
Universiti Sains Malaysia, Malaysia*

\*E-mail: na.hamid@usm.my

Accepted 4 November 2021, Published online 30 November 2021

### ABSTRACT

Instrumental activities of daily living (IADL) is a construct that describes the functional ability to perform complex activities, requiring physical and mental capability that allows an elderly to live independently. Studies on IADL in Malaysia are still lacking. Thus, this study aimed to determine the factors influencing IADL disability among the elderly attending health clinics in Kelantan. A cross-sectional study was conducted using a guided questionnaire consisting of sociodemographic characteristics, health-related conditions, Lawton IADL scale, Elderly Cognitive Assessment Questionnaire (ECAQ), Geriatric Depression Scale (GDS), and Duke Social Support Index (DSSI). Multiple logistic regression (MLR) was performed to assess factors influencing IADL disability. Disabled IADL status was defined as having difficulty performing at least one out of eight activities on the Lawton IADL scale. A sample of 248 elderly from 12 health clinics in Kelantan was included, 36.3% of them had disabled IADL status. In the final MLR model, factors influencing IADL disability were, age group 70 years old and above (Adj. OR 3.52; 95% CI: 1.85, 6.69,  $p$ -value<0.001), being unmarried/single (Adj. OR 2.37; 95% CI: 1.25, 4.49,  $p$ -value=0.008), no formal education (Adj. OR 4.03; 95% CI: 1.64, 9.88,  $p$ -value=0.002), low level of income (Adj. OR 2.37; 95% CI: 1.11, 5.07,  $p$ -value=0.026) and those who reported fair or poor self-rated health status (Adj. OR 2.53; 95% CI: 1.31, 4.89,  $p$ -value=0.006). Therefore, recognition of these factors is critical to promote a better health policy and to provide appropriate care for the elderly in the country.

**Key words:** Aging, disability, factors, IADL, Lawton scale

### INTRODUCTION

The world's population today is heading towards an aging society. Between 2015 and 2050, the proportion of the world's population over 60 years old is estimated to double from 12% to 22% (World Health Organization, 2018). In Malaysia, the number of people aged 60 years and above has increased progressively since the 1970s. It is projected that by 2030, there will be 5.8 million Malaysian, making up about 15 percent of the total population (Wan Ibrahim *et al.*, 2017). Population aging is associated with it a set of public health issues, notably the development of chronic diseases and their com-

plications. This results in a higher disability rate due to the burden of health risks across a lifespan of disease, injury, and chronic illness (United Nations, 2019). Disability is defined as a dynamic interaction between persons with impairments, attitudinal and environmental barriers that hinder their full and effective participation in society (World Health Organization, 2011).

In healthcare, the conceptual measurement for functional status is divided into Activities of daily living (ADL) and Instrumental Activities of daily living (IADL). While ADL measures the basic daily activities related to self-care such as bathing and grooming; IADL measures more complex activities, which may not necessarily be performed daily, that allow a person to live independently in their

\* To whom correspondence should be addressed.

community (Institute for Public Health, 2018). The reported IADL disability rates varied between 34% and 82% (Loh *et al.*, 2005; Veerapu *et al.*, 2013; Subramaniyan & Arun, 2016; Institute for Public Health, 2018). This may be due to the different contexts of the study population and measurement tools. IADL disability has been associated with an increase in age (Arias-Merino *et al.*, 2012; Connolly *et al.*, 2017), being unmarried or having no partner (Arias-Merino *et al.*, 2012; Liang *et al.*, 2017), elderly living arrangement (Otero *et al.*, 2003; Connolly *et al.*, 2017), educational level (Graciani *et al.*, 2004; Arias-Merino *et al.*, 2012; Palacios-Cena *et al.*, 2012) and individual monthly income (Woo *et al.*, 2000; Otero *et al.*, 2003).

In more recent studies, health-related factors such as number of chronic diseases (Connolly *et al.*, 2017; Ćwirlej-Sozańska *et al.*, 2018), number of medications use (Jyrkkä *et al.*, 2011; Peron *et al.*, 2011), poor cognitive function (Graciani *et al.*, 2004; Connolly *et al.*, 2017) and depression (Storeng *et al.*, 2018; Kong *et al.*, 2019) have also been identified as factors associated with IADL disability. Self-rated health status (Graciani *et al.*, 2004; Palacios-Cena *et al.*, 2012; Francisco *et al.*, 2018) and social support (Ismail *et al.*, 2016; Lino *et al.*, 2019) are associated with IADL disability. Lifestyle factors such as smoking, alcohol consumption, and being physically inactive are associated with declined IADL status (Wang *et al.*, 2002; Moore *et al.*, 2003; Karlamangla *et al.*, 2009; Ćwirlej-Sozańska *et al.*, 2018; Storeng *et al.*, 2018). Studies on IADL in Malaysia is limited in addition to small scale population-based study. To inform policy on the elderly in Malaysia, a large population-based study is needed to produce up-to-date evidence. In this study, we aimed to determine factors influencing IADL disability among the elderly attending health clinics in Kelantan. We hope by recognizing specific factors influencing IADL disability would intensify elderly care by targeting individuals at risk of, or suffering, functional decline.

## MATERIALS AND METHODS

### Study design

This was a cross-sectional study conducted in the state of Kelantan which is situated in the northeast of Peninsular Malaysia. Health facilities were built to serve the people in this state, including 10 hospitals and 92 primary health clinics. Four districts with high elderly patient volume were chosen to be involved in this study which are Kota Bharu, Tumpat, Pasir Mas, and Bachok districts.

### Sample

The inclusion criteria of the participants are community-dwelling elderly aged >60 years old and

able to communicate in Malay or English. The exclusion criteria are those with an acute medical condition (i.e. trauma, post-fall, recent heart attack, etc.), elderly living in long-term care, and those who could not respond to the interview, including elderly with severe cognitive impairment (ECAQ<4) or overt dementia. An a priori sample size calculation was conducted with a sample size of 248 elderly was estimated to be sufficient to address the objective.

A multistage sampling method was used in this study. The study samples were derived from 12 selected health clinics in four districts mentioned above. The proportionate sampling was then applied to obtain the sample of elderly from each clinic followed by systematic sampling of the elderly attending the clinics on the day itself. An interviewer-guided questionnaire consisting of sociodemographic characteristics, health-related conditions, Lawton IADL scale, Elderly Cognitive Assessment Questionnaire (ECAQ), Geriatric Depression Scale (GDS), and Duke Social Support Index (DSSI) was carried out. Disabled IADL status was defined as having difficulty performing at least one out of eight activities on the Lawton IADL scale. For the outcome, disabled IADL status was defined as those with Lawton scores  $\leq 7$  while non-disabled IADL status was defined as having Lawton scores of eight (Lawton *et al.*, 1969; Kadar *et al.*, 2018). Lawton IADL scale was introduced by Lawton *et al.* (1969), translated into Malay, and validated by Kadar *et al.* (2018) with Cronbach's Alpha of 0.84. Permission to use the Malay version of the Lawton IADL scale was obtained from the Oxford University Press which owns the copyright. ECAQ was developed by Kua and Ko (1992), translated into a Malay version in the following year by the same author (Kua, 1993). It is a reliable and valid scale that shows a sensitivity of 85.3%, specificity of 91.5%, a positive predictive value of 82.8%. It is an open-access questionnaire. ECAQ score of <5 indicates probable dementia or cognitive impairment and the respondents will be excluded from the study (Graciani *et al.*, 2004; Mellouli *et al.*, 2017). For those with an ECAQ score of  $\geq 5$ , were further divided into two groups; normal (ECAQ  $\geq 7$ ) and impaired (ECAQ 5-6). Depression was measured by Malay version GDS-14. It was validated by Teh and Hasanah (2004) with Cronbach's alpha of 0.84. The elderly with a score of  $\geq 5$  were labeled as having depressive symptoms. Social support is measured by shortened 11-item version of DSSI (Ismail *et al.*, 2016). This scale was introduced by Koenig *et al.* (1993) and was translated into Malay and validated by Ismail *et al.* (2016) with Cronbach's alpha of 0.79. It consists of 11 items on the two subscales of social interaction (4 items) and subjective support (7 items). A higher score ( $\geq 27$ ) in DSSI indicates a high social support level (Strodl & Kenardy, 2008; Ismail *et al.*, 2016).

### Statistical analysis

Data entry and analysis were carried out using the SPSS version 22.0 software. The demographic and clinical characteristics were tabulated for descriptive characteristics where numerical data were presented as mean (SD) and categorical data were presented as frequency (%). Logistic regression models were used to analyze the association between the factors with the IADL status. A preliminary main effect model was obtained after using auto-forward selection. The single dichotomous outcome of IADL status was coded as 0 for non-disabled and 1 for disabled status. The variables explored were age, sex, marital status, living arrangement, educational status, individual monthly income, number of chronic diseases, number of medications, self-rated health status, cognitive function, depressive symptoms, level of social support, smoking status, alcohol intake, and physical activity. All the variables were analyzed as categorical variables. Age was categorized as “60-69” and “ $\geq 70$ ” years, sex was characterized as “male” and “female” and marital status was recategorized as “married” and “unmarried”. The single, divorced, and widowed status groups were categorized into the unmarried group because of the small sample size. Living arrangement was divided into “living alone” or “living with others”. Individual monthly income was divided into two categories; “ $< \text{RM}1,000$ ” and “ $\geq \text{RM}1,000$ ” (Institute for Public Health, 2018), and educational status was divided into three groups of “no formal education”, “primary education” and “secondary and above education”. For health-related factors, the number of chronic diseases was divided into “none”, “one chronic disease” and “more than one” while the number of medications was divided into two groups; “ $< 5$ ” and “ $\geq 5$ ” (Connolly *et al.*, 2017). Self-rated health status was based on the participant’s responses and it was recorded as either ‘Good’ or ‘Fair/Poor’ (Connolly *et al.*, 2017). Cognitive function was classified into “normal” and “impaired” (Mellouli *et al.*, 2017) while the presence of depressive symptoms was recorded into “yes” and “no” (Ismail *et al.*, 2016). The social support level was divided into “low” and “high” support (Ismail *et al.*, 2016). Smoking status and alcohol intake were characterized into “yes” and “no”. Physical activity was classified into “active” and “inactive” (Ćwirlej-Sozańska *et al.*, 2018). All variables were first assessed at univariate level, variables with a *p*-value of less than 0.25 or of importance from the literature were selected for multiple logistic regression. The final model was established where the adjusted odds ratio (Adj. OR) was estimated with a 95% confidence interval. Statistical significance was set at *p*-value  $< 0.05$  (two-tailed).

### Ethics approval

Ethics approval was obtained from Human Research and Ethics Committee (HREC), Universiti Sains Malaysia USM/JEPeM/19110810 and Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (NMRR-19-3288-51819 IIR).

## RESULTS

### Sample characteristics

A sample of 248 elderly from 12 health clinics in Kelantan was included in the study. About 36.3% of them had disabled IADL status and 63.7% had no disability in IADL. Table 1 shows the sociodemographic characteristics of elderly with disabled and non-disabled IADL status attending health clinics in Kelantan. The mean age was 69.04 (SD 6.43) years. The majority of the patients were aged 60-69 years old (59.7%). There were 32.2% males and 67.8% of females in the disabled IADL group. About 60% of the elderly were married and 88% were living with others, either with partners, children, or family members. Almost 80% of elderly attending health clinics had at least primary education level and 63.7% had an individual income of  $< \text{RM}1000$ . Almost 88% of the elderly with more than one chronic disease had disabled IADL status. Of those who reported fair and poor self-rated health status, 73.3% of them had disabled IADL status. Only 9.3% had impaired cognitive function and 8.5% had depressive symptoms. Among the elderly with low social support, half of them had IADL disability. Approximately 89% of the elderly were non-smokers and only 9.7% were physically active.

### Factors associated with IADL disability

Simple logistic regression showed all socio-demographic and health-related factors as significant factors with all the *p*-values less than 0.25 except for the number of chronic diseases and alcohol intake. Both factors were not significant, therefore was not included in the multiple logistic regression analysis. In the final multiple logistic regression model, only age group, marital status, educational level, individual monthly income, and self-rated health status remained statistically significant; after adjusting for other factors. Table 2 shows the results for univariate and multivariate logistic regression analysis of factors associated with IADL disability.

Elderly aged 70 years old and above had 3.52 times the odds of having IADL disability compared to the younger age group (Adj. OR 3.52; 95% CI: 1.85, 6.69, *p*-value  $< 0.001$ ). Those who were unmarried showed 2.37 times the odds of having disabled IADL status compared to married (Adj. OR 2.37; 95% CI:

**Table 1.** Sociodemographic characteristics of elderly with disabled and non-disabled IADL status attending health clinics in Kelantan (*n*=248)

Sociodemographic Characteristics	Total, <i>n</i> (%)	Mean (SD)	IADL Status, <i>n</i> (%)	
			Disabled	Non-disabled
<b>Age</b>		69.04 (6.43)		
60-69	148 (59.7)		32 (35.6)	116 (73.4)
≥70	100 (40.3)		42 (26.6)	58 (64.4)
<b>Sex</b>				
Male	100 (40.3)		29 (32.2)	71 (44.9)
Female	148 (59.7)		61 (67.8)	87 (55.1)
<b>Marital Status</b>				
Married	149 (60.1)		37 (41.1)	112 (70.9)
Unmarried	99 (39.9)		53 (58.9)	46 (29.1)
<b>Living arrangement</b>				
Living alone	30 (12.1)		16 (17.8)	14 (8.9)
Living with others	218 (87.9)		74 (82.2)	144 (91.1)
<b>Education level</b>				
Secondary and above	116 (46.8)		20 (22.2)	96 (60.8)
Primary education	81 (32.7)		33 (36.7)	48 (30.4)
No formal education	51 (20.6)		37 (41.1)	14 (8.9)
<b>Individual monthly income</b>				
≥RM1,000	90 (36.3)		14 (15.6)	76 (48.1)
<RM1,000	158 (63.7)		76 (84.4)	82 (51.9)
<b>Number of chronic diseases</b>				
None	7 (2.8)		1 (1.1)	6 (3.8)
One chronic disease	38 (15.3)		1 (1.1)	28 (17.7)
More than one	203 (81.9)		x79 (87.8)	124 (78.5)
<b>Number of medications</b>				
<5	145 (58.5)		47 (52.2)	98 (62.0)
≥5	103 (41.5)		43 (47.8)	60 (38.0)
<b>Self-rated health status</b>				
Good	106 (42.7)		24 (26.7)	82 (51.9)
Fair/Poor	142 (57.3)		66 (73.3)	76 (48.1)
<b>Cognitive function</b>				
Normal (ECAQ ≥7)	225 (90.7)		71 (78.9)	154 (97.5)
Impaired (ECAQ 5-6)	23 (9.3)		19 (21.1)	4 (2.5)
<b>Depressive symptoms</b>				
No	227 (91.5)		78 (86.7)	149 (94.3)
Yes	21 (8.5)		12 (13.3)	9 (5.7)
<b>Social support level</b>				
High	166 (66.9)		44 (48.9)	122 (77.2)
Low	82 (33.1)		46 (51.1)	36 (22.8)
<b>Smoking</b>				
No	220 (88.7)		77 (85.6)	143 (90.5)
Yes	28 (11.3)		13 (14.4)	15 (9.5)
<b>Alcohol intake</b>				
No	245 (98.8)		90 (100.0)	155 (98.1)
Yes	3 (1.2)		0 (0.0)	3 (1.9)
<b>Physical activity</b>				
Active	24 (9.7)		4 (4.4)	20 (12.7)
Inactive	224 (90.3)		86 (95.6)	138 (87.3)

**Table 2.** Univariate and multivariate logistic regression analysis of factors associated with disabled IADL status among elderly attending health clinics in Kelantan ( $n=248$ )

Variables	<i>n</i> (%)	Crude OR* (95% CI)	<i>p</i> -value	Adjusted OR† (95% CI)	<i>p</i> -Value
<b>Age</b>					
60-69	32 (35.6)	1		1	
≥70	42 (26.6)	5.01 (2.87, 8.74)	<b>&lt;0.001</b>	3.52 (1.85, 6.69)	<b>&lt;0.001</b>
<b>Sex</b>					
Male	29 (32.2)	1			
Female	61 (67.8)	1.72 (0.99, 2.95)	<b>0.051</b>		
<b>Marital Status</b>					
Married	37 (41.1)	1		1	
Unmarried	53 (58.9)	3.49 (2.03, 5.99)	<b>&lt;0.001</b>	2.37 (1.25, 4.49)	<b>0.008</b>
<b>Living arrangement</b>					
Living alone	16 (17.8)	1			
Living with others	74 (82.2)	0.45 (0.21, 0.97)	<b>0.042</b>		
<b>Education level</b>					
Secondary and above	20 (22.2)	1		1	
Primary education	33 (36.7)	3.30 (1.72, 6.35)	<b>&lt;0.001</b>	1.67 (0.79, 3.49)	<b>0.174</b>
No formal education	37 (41.1)	12.69 (5.81, 27.71)	<b>&lt;0.001</b>	4.03 (1.64, 9.88)	<b>0.002</b>
<b>Individual monthly income</b>					
≥RM1,000	14 (15.6)	1		1	
<RM1,000	76 (84.4)	5.03 (2.63, 9.64)	<b>&lt;0.001</b>	2.37 (1.11, 5.07)	<b>0.026</b>
<b>Number of chronic diseases</b>					
None	1 (1.1)	1			
One chronic disease	10 (11.1)	2.14 (0.23, 20.06)	0.504		
More than one	79 (87.8)	3.82 (0.45, 32.35)	0.218		
<b>Number of medications</b>					
<5	47 (52.2)	1			
≥5	43 (47.8)	1.49 (0.89, 2.52)	0.133		
<b>Self-rated health status</b>					
Good	24 (26.7)	1		1	
Fair/Poor	66 (73.3)	2.97 (1.69, 5.20)	<b>&lt;0.001</b>	2.53 (1.31, 4.89)	<b>0.006</b>
<b>Cognitive function</b>					
Normal (ECAQ ≥7)	71 (78.9)	1			
Impaired (ECAQ 5-6)	19 (21.1)	10.30 (3.38, 31.39)	<b>&lt;0.001</b>		
<b>Depressive symptoms</b>					
No	78 (86.7)	1			
Yes	12 (13.3)	2.55 (1.03, 6.31)	<b>0.043</b>		
<b>Social support level</b>					
High	44 (48.9)	1			
Low	46 (51.1)	3.54 (2.03, 6.18)	<b>&lt;0.001</b>		
<b>Smoking</b>					
No	77 (85.6)	1			
Yes	13 (14.4)	1.61 (0.73, 3.56)	0.239		
<b>Alcohol intake</b>					
No	90 (100.0)	1			
Yes	0 (0.0)	0.00 (0.00, 0.00)	0.999		
<b>Physical activity</b>					
Active	4 (4.4)	1			
Inactive	86 (95.6)	3.12 (1.03, 9.42)	<b>0.044</b>		

\* Crude OR using Univariate Logistic Regression analysis.

† Adjusted OR using Multivariate Logistic Regression analysis.

1.25, 4.49,  $p$ -value=0.008). The elderly with no formal education were 4 times more likely to have disabled IADL status compared to those with secondary and above educational status (Adj. OR 4.03; 95% CI: 1.64, 9.88,  $p$ -value=0.002). Those with an individual monthly income of <RM1000 had 2.37 odd of having IADL disability compared to a person with an individual monthly income of >RM1000 (Adj. OR 2.37; 95% CI: 1.11, 5.07,  $p$ -value=0.026). Elderly who reported fair/poor self-rated health status was two and a half time more likely to be IADL disabled compared to those who reported good health status (Adj. OR 2.53; 95% CI: 1.31, 4.89,  $p$ -value=0.006).

## DISCUSSION

Our study showed about one-third of the elderly had disabled IADL status. In Malaysia, the National Health and Morbidity Survey Elderly 2018 reported 42.9% of our elderly were IADL dependent (Institute for Public Health, 2018), much higher than what was found in this study. Other local studies were comparable to findings from this study, the reported rates were 32.7% (Ismail *et al.*, 2016) and 33.5 % (Loh *et al.*, 2005). However, the findings from this study may have been under-estimated as the sampling was done among elderly who attended health clinics while those with IADL disability might be the ones who have difficulties attending the health services.

This study aimed to determine factors associated with IADL disability among the elderly attending health clinics in Kelantan. There was a significant association between the older age group of the elderly and IADL disability. Aging is a natural process whereby individuals have been exposed to various ill-health issues-particularly cancer, neuro-degeneration, and cardiovascular disease, hence lead to a greater risk of disability (Niccoli & Partridge, 2012). A study finding by Ćwirlej-Sozańska *et al.* (2018), reported increasing age was poorly related to the independence in IADL. They found an almost two-fold increase in experiencing IADL difficulty for those who were 76 years old and above when compared to the younger elderly. Similar to a study conducted in Mexico which showed older age group elderly were 3.52 times more likely to have IADL disabled status as compared to elderly in the younger age group.

Marital status was found to influence IADL disability among the elderly. Almost 60% of those with unmarried status had disabled IADL status. The results also showed that unmarried elderly were twice more likely to have IADL disability compared to those who were married. Studies conducted in China and Mexico reported IADL dependency was significantly associated with being unmarried or had no partner (Arias-Merino *et al.*, 2012; Liang *et al.*, 2017). A

possible explanation is that being unmarried or single is related to poor social and family support, thus lead to limitation in performing IADL functions (Feng *et al.*, 2013).

Educational level was a significant factor influencing IADL disability after adjusting for other variables. The result was supported by few studies which also explained the disabled IADL status was strongly influenced by the level of educational status (Graciani *et al.*, 2004; Arias-Merino *et al.*, 2012; Palacios-Cena *et al.*, 2012). Those who were illiterate or did not attain formal education had almost six times at risk of becoming disabled in IADL status as compared to those who had secondary and tertiary educational status. IADL requires a higher level of cognitive function thus older adults with illiteracy or low educational level usually had problems managing finance or performing other more complex cognitive functions. Without adequate knowledge and literacy, they may encounter difficulty in managing their medications or even finding and dialing phone numbers from a handphone (Park & Lee, 2017; Carmona-Torres *et al.*, 2019). Lacking formal education could also create barriers in communication, which later would affect engagement in IADL functions at home or in the community (Brigola *et al.*, 2019).

Elderly with an individual monthly income of <RM1000 were 2.37 times more likely to have disabled IADL status compared to the elderly with higher income. This is particularly critical as the elderly face a decrease in income in the course of retirement (Otero *et al.*, 2003). Those who live in financial insecurity have a much harder time assessing health care services than those who are more fortunate (Woo *et al.*, 2000). The elderly with less income may not have the financial means to afford technology or services to overcome their disability. had a higher chance of getting disabled because they could not have a better comfortable life. The condition will subsequently affect their well-being and trigger depressive symptoms, leading to an acceleration of IADL disability (Knesebeck *et al.*, 2003).

There was a significant association between self-rated health status and IADL disability in this study. Self-rated health status has been documented as a reliable and sensitive predictor for functional disability and mortality in the aging population (Bailis *et al.*, 2003; Spencer *et al.*, 2009). It has been widely used in many health surveys globally (Meurer *et al.*, 2001; Meng *et al.*, 2014). Poor self-rated health status was significantly higher among individuals with a lower feeling of happiness. This may reflect the poor well-being of the elderly and their subjective vitality (Borim *et al.*, 2014). An earlier study also identified most of the respondents who reported poor health status were those who belong to the older age group,

did not have formal education, and were from low socioeconomic status (Phaswana-Mafuya *et al.*, 2013).

### Strengths and limitations

This study is the first that explored factors influencing IADL among elderly attending health clinics in Kelantan. This study also has several shortcomings. Since this study used a guided questionnaire, it carries the risk of interviewer and respondent bias. Interviewers can introduce errors into a questionnaire either during running the interview or helping the respondents in different ways to answer the provided questions. Respondent bias can occur as a result of participants' unwillingness to provide accurate or honest answers to this study. Moreover, healthcare access bias may also exist as the study sample only involved the elderly who attended the clinics and missed out on those in the community who did not have a chance to attend the clinics.

### CONCLUSION

We identified that one-third of the elderly attending health clinics in Kelantan had disabled IADL status. In this study, factors influencing IADL disability among elderly attending health clinics were older age group, being unmarried, no formal education, low level of income, and those who reported fair or poor self-rated health status. Exposure to socioeconomic adversity has contributed to progressive health issues among the elderly. Given the identified factors influencing IADL disability, health policies should aim at reducing the burden of health-related conditions that accompany old age. This can be achieved through early identification and better management of those with disabling conditions. Moreover, given the importance of the social context and living conditions in contributing to IADL disability, assistance should be offered to the disabled elderly. After all, recognition of these factors is critical to promote a better health policy and to provide appropriate care for the elderly in the country.

### ACKNOWLEDGEMENTS

We would like to acknowledge the Ministry of Health Malaysia for allowing us to conduct this research in their health clinics (Ref: NMRR-19-3288-51819 IIR). Our gratitude to all the staff from Primary Health Care Unit, Kelantan State Health Department, and health clinics involved in this study.

### REFERENCES

- Arias-Merino, E.D., Mendoza-Ruvalcaba, N.M., Ortiz, G.G., Velazquez-Brizuela, I.E., Meda-Lara, R.M. & Cueva-Contreras, J. 2012. Physical function and associated factors in community-dwelling elderly people in Jalisco, Mexico. *Arch Gerontol Geriatr*, **54(3)**: e271-e278.
- Bailis, D.S., Segall, A. & Chipperfield, J.G. 2003. Two views of self-rated general health status. *Social Science & Medicine*, **56(2)**: 203-217.
- Borim, F.S.A., Neri, A.L., Francisco, P.M.S.B. & de Avezedo Barros, M.B. 2014. Dimensions of self-rated health in older adults. *Revista de Saúde Pública*, **48(5)**: 714-722.
- Brigola, A.G., Alexandre, T.d.S., Inouye, K., Yassuda, M.S., Pavarini, S.C.I. & Mioshi, E. 2019. Limited formal education is strongly associated with lower cognitive status, functional disability and frailty status in older adults. *Dementia & Neuropsychologia*, **13**: 216-224.
- Carmona-Torres, J.M., Rodríguez-Borrego, M.A., Laredo-Aguilera, J.A., López-Soto, P.J., Santacruz-Salas, E. & Cobo-Cuenca, A.I. 2019. Disability for basic and instrumental activities of daily living in older individuals. *PLoS One*, **14(7)**: e0220157-e0220157.
- Connolly, D., Garvey, J. & McKee, G. 2017. Factors associated with ADL/IADL disability in community dwelling older adults in the Irish longitudinal study on ageing (TILDA). *Disabil Rehabil*, **39(8)**: 809-816.
- Ćwirlej-Sozańska, A.B., Sozański, B., Wiśniowska-Szurlej, A. & Wilmowska-Pietruszyńska, A. 2018. An assessment of factors related to disability in ADL and IADL in elderly inhabitants of rural areas of south-eastern Poland. *Annals of Agricultural and Environmental Medicine*, **25(3)**: 504-511.
- Feng, Q., Zhen, Z., Gu, D., Wu, B., Duncan, P.W. & Purser, J.L. 2013. Trends in ADL and IADL disability in community-dwelling older adults in Shanghai, China, 1998–2008. *The Journals of Gerontology: Series B*, **68(3)**: 476-485.
- Francisco, P.M.S.B., Marques, P.d.P., Borim, F.S.A., Torres, S.F. & Neri, A.L. 2018. Disability relating to instrumental activities of daily living in the elderly with rheumatic diseases. *Revista Brasileira de Geriatria e Gerontologia*, **21(5)**: 570-578.
- Graciani, A., Banegas, J.R., López-García, E. & Rodríguez-Artalejo, F. 2004. Prevalence of disability and associated social and health-related factors among the elderly in Spain: a population-based study. *Maturitas*, **48(4)**: 381-392.

- Institute for Public Health. 2018. National Health & Morbidity Survey 2018 : Elderly Health. 1st Ed. Vol. 2. Ministry of Health Malaysia, Selangor.
- Ismail, N., Hairi, F. & Choo, W.Y. 2016. Pattern and Risk Factors of Functional Limitation and Physical Disability Among Community-Dwelling Elderly in Kuala Pilah, Malaysia: A 12-Month Follow-Up Study. University Malaya, Kuala Lumpur.
- Jyrkkä, J., Enlund, H., Lavikainen, P., Sulkava, R. & Hartikainen, S. 2011. Association of polypharmacy with nutritional status, functional ability and cognitive capacity over a three-year period in an elderly population. *Pharmacoepidemiology and Drug Safety*, **20(5)**: 514-522.
- Kadar, M., Ibrahim, S., Razaob, N.A., Chai, S.C. & Harun, D. 2018. Validity and reliability of a Malay version of the Lawton instrumental activities of daily living scale among the Malay speaking elderly in Malaysia. *Australian Occupational Therapy Journal*, **65(1)**, 63-68.
- Karlamangla, A.S., Sarkisian, C.A., Kado, D.M., Dedes, H., Liao, D.H., Kim, S., Reuben, B.D., Greendale, G.A. & Moore, A.A. 2009. Light to moderate alcohol consumption and disability: variable benefits by health status. *American Journal of Epidemiology*, **169(1)**: 96-104.
- Knesebeck, O.v.d., Lüschen, G., Cockerham, W.C. & Siegrist, J. 2003. Socioeconomic status and health among the aged in the United States and Germany: A comparative cross-sectional study. *Social Science & Medicine*, **57(9)**: 1643-1652.
- Koenig, H.G., Westlund, R.E., George, L.K., Hughes, D.C., Blazer, D.G. & Hybels, C. 1993. Abbreviating the Duke Social Support Index for use in chronically ill elderly individuals. *Psychosomatics*, **34(1)**: 61-69.
- Kong, D., Solomon, P. & Dong, X. 2019. Depressive symptoms and onset of functional disability over 2 years: A prospective cohort study. *Journal of the American Geriatrics Society*, **67(S3)**: S538-S544.
- Kua, E.H. 1993. Dementia in elderly Malays – preliminary findings of a community survey. *Singapore Medical Journal*, **34(1)**: 26-28.
- Kua, E.H. & Ko, S.M. 1992. A questionnaire to screen for cognitive impairment among elderly people in developing countries. *Acta Psychiatrica Scandinavica*, **85(2)**: 119-122.
- Lawton, M., Brody, E. & Médecin, U. 1969. Instrumental activities of daily living (IADL). *The Gerontologist*, **9**: 179-186.
- Liang, Y., Welmer, A.-K., Möller, J. & Qiu, C. 2017. Trends in disability of instrumental activities of daily living among older Chinese adults, 1997-2006: Population based study. *BMJ Open*, **7(8)**: e016996-e016996.
- Lino, V.T.S., Rodrigues, N.C.P., Andrade, M.K.d.N., Reis, I.N.d.C., Lopes, L.A.E. & Atie, S. 2019. Association between visual problems, insufficient emotional support and urinary incontinence with disability in elderly people living in a poor district in Rio de Janeiro, Brazil: A six-year follow-up study. *PLoS One*, **14(5)**: e0217456.
- Loh, K.Y., Khairani, O. & Norlaili, T. 2005. The prevalence of functional impairment among elderly aged 60 years and above attending Klinik Kkesihatan Batu 9 Ulu Langat, Selangor. *The Medical Journal of Malaysia*, **60(2)**: 188-193.
- Mellouli, M., Sahli, J., Limam, M., Toumi, J., El Ghardallou, M., Ajmi, T., Mtiraoui, A. & Zedini, C. 2017. Prevalence and associated factors of functional disability in activities of daily living and instrumental activities among institutionalized Tunisian elderly. *Advances in Research*, **11(3)**: 1-10.
- Meng, Q., Xie, Z. & Zhang, T. 2014. A single-item self-rated health measure correlates with objective health status in the elderly: a survey in suburban beijing. *Frontiers in Public Health*, **2**: 27-27.
- Meurer, L., Layde, P. & Guse, C. 2001. Self-rated health status: A new vital sign for primary care?. *WMJ*, **100(7)**: 35-39.
- Moore, A.A., Endo, J.O. & Carter, M.K. 2003. Is there a relationship between excessive drinking and functional impairment in older persons?. *Journal of the American Geriatrics Society*, **51(1)**: 44-49.
- Niccoli, T. & Partridge, L. 2012. Ageing as a risk factor for disease. *Current Biology*, **22(17)**: 741-752.
- Otero, Á., de Yébenes, M.J.G., Rodríguez-Laso, Á. & Zunzunegui, M.V. 2003. Unmet home care needs among community-dwelling elderly people in Spain. *Aging Clinical and Experimental Research*, **15(3)**: 234-242.
- Palacios-Cena, D., Jimenez-Garcia, R., Hernandez-Barrera, V., Alonso-Blanco, C., Carrasco-Garrido, P. & Fernandez-de-Las-Penas, C. 2012. Has the prevalence of disability increased over the past decade (2000-2007) in elderly people? A Spanish population-based survey. *Journal of the American Medical Directors Association*, **13(2)**: 136-142.
- Park, J. & Lee, Y.J. 2017. Patterns of instrumental activities of daily living and association with predictors among community-dwelling older women: A latent class analysis. *BMC Geriatr*, **17(1)**, 158-158.
- Peron, E.P., Gray, S.L. & Hanlon, J.T. 2011. Medication use and functional status decline in older adults: A narrative review. *The American Journal of Geriatric Pharmacotherapy*, **9(6)**: 378-391.



- Phaswana-Mafuya, N., Peltzer, K., Chirinda, W., Kose, Z., Hoosain, E., Ramlagan, S., Tabane, C. & Davids, A. 2013. Self-rated health and associated factors among older South Africans: evidence from the study on global ageing and adult health. *Global Health Action*, **6(1)**: 19880-19880.
- Spencer, S.M., Schulz, R., Rooks, R.N., Albert, S.M., Thorpe, R.J., Jr, Brenes, G.A., Harris, T.B., Koster, A., Satterfield, S., Ayonayon, H.N. & Newman, A.B. 2009. Racial differences in self-rated health at similar levels of physical functioning: An examination of health pessimism in the health, aging, and body composition study. *The Journals of Gerontology: Series B*, **64B(1)**: 87-94.
- Storeng, S.H., Sund, E.R. & Krokstad, S. 2018. Factors associated with basic and instrumental activities of daily living in elderly participants of a population-based survey: the Nord-Trøndelag Health Study, Norway. *BMJ Open*, **8(3)**: e018942.
- Strodl, E. & Kenardy, J. 2008. The 5-item mental health index predicts the initial diagnosis of nonfatal stroke in older women. *J Womens Health (Larchmt)*, **17(6)**: 979-986.
- Teh, E.E. & Hasanah, C.I. 2004. Validation of Malay version of geriatric depression scale among elderly inpatients. *Priory Medical Journals*.
- United Nations. 2019. Ageing and disability. URL <https://www.un.org/development/desa/disabilities/disability-and-ageing.html> (accessed mm.dd.yy)
- Veerapu, N., Praveenkumar, B., Subramanian, P. & Arun, G. 2016. Functional dependence among elderly people in a rural community of Andhra Pradesh, South India. *International Journal of Community Medicine and Public Health*, **3(7)**: 1835-1840.
- Wan Ibrahim, W.M.S., Mohamad Ashi, S.H., Othman, N.H., Mohd Zukri, S.F., Anwar, R., Miskiman, N. & Abdul Shukor, F.A.-Z. 2017. Population and demographics ageing. URL [https://www.dosm.gov.my/v1/uploads/files/6\\_Newsletter/Ageing.pdf](https://www.dosm.gov.my/v1/uploads/files/6_Newsletter/Ageing.pdf) (accessed mm.dd.yy).
- Wang, L., van Belle, G., Kukull, W.B. & Larson, E.B. 2002. Predictors of functional change: a longitudinal study of nondemented people aged 65 and older. *Journal of the American Geriatrics Society*, **50(9)**: 1525-1534.
- Woo, J., Ho, S.C. & Yu, A.L.M. 2000. The influence of income on morbidity, mortality and dependency in elderly Hong Kong Chinese. *Archives of Gerontology and Geriatrics*, **30(1)**: 55-61.
- World Health Organization. 2011. World Report on Disability 2011. World Health Organization, Geneva.
- World Health Organization. 2018. Ageing and health. URL <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health> (accessed mm.dd.yy)
- Zayas, L.E., Wisniewski, A.M. & Kennedy, T. 2013. Instrumental activity of daily living limitations and supports in a clinic population of low income Puerto Rican elderly adults with chronic diseases. *Journal of the American Geriatrics Society*, **61(10)**: 1789-1795.

