

Contributions of socio-demographic and psychosocial characteristics, functional status and physical activity level on prevalence of depressive symptoms among rural elderly in Johor state

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ABSTRACT

Introduction: Depression and depressive symptom are common among the elderly. This study aimed to determine the influence of multiple factors and their correlations on the prevalence of depressive symptoms among elderly residents in selected FELDA schemes in Johor state. **Methods:** A total of 269 respondents were recruited through systematic sampling. Face-to-face interviews were conducted to obtain information on socio-demographic and psychosocial characteristics using pre-tested validated questionnaires; For functional status, the Lawton-IADL Scale was used to assess independent living skills; the Short Physical Performance Battery (SPPB) questionnaire was used to assess physical performance; cognitive function was assessed by the Hodkinson Abbreviated Mental Test (HAMT); physical activity level was determined using the Rapid Assessment of Physical Activity (RAPA); and depressive symptoms were assessed by the Geriatric Depression Scale-15. **Results:** Mean age of the respondents was 69.5±5.2 years. Prevalence of depressive symptoms was determined as 3.7%. Almost half (47.6%) were unable to perform one or more Lawton-IADL items, 30.9% had low physical performance, 15.6% had abnormal cognitive function and only 30.6% were physically active. There were significant correlations between the socio-demographic characteristics (age and monthly income; $r=-0.135$ and $r_s=-0.133$ respectively; $p<0.05$), functional status and physical performance; $r=-0.171$ and $r_s=-0.194$ respectively; $p<0.01$), and prevalence of depressive symptoms. Low physical performance contributed towards having depressive symptoms ($\beta=-0.183$; $p<0.05$). **Conclusion:** A relatively low prevalence of depressive symptoms was found among the elderly living in FELDA schemes in Johor. Low levels of physical performance was contributed towards prevalence of depressive symptoms among the elderly.

Keywords: Socio-demographic, psychosocial, functional, physical activity, GDS-15

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INTRODUCTION

Worldwide, a total of 322 million people live with depression, out of which 27.0% live in South-East Asia (WHO, 2017). Among the South East Asian countries, the prevalence of depressive symptoms in Malaysia is the lowest at 16.5% (Vanoh *et al.*, 2016), when compared to Thailand with 28.5% (Haseen & Prasartkul, 2011) and Indonesia with 43.8% (Gustriyanti, Thongpat & Maneerat, 2017).

According to the American Psychiatric Association (2017), an individual is considered to have depressive symptoms when feeling sad or having depressed mood, loss of interest or pleasure in activities once enjoyed, changed in appetite, trouble sleeping or sleeping too much, loss of energy or increased fatigue, increase in purposeless physical activity, feeling worthless or guilty, difficulty thinking, concentrating or making decisions and thoughts of death or suicide. These symptoms can be varied from mild to severe. Segal, Qualls & Smyer (2011) stated that psychosocial factors can trigger the onset of depression among the elderly. The common psychosocial factors that become a depression stressor are related to marital status (death of spouse or get divorce), and social integration or social involvement (Segal *et al.*, 2011). In China, high levels of depression among empty-nest elderly in the rural area of Yong Zhou was not only associated with lower income and negative coping style, but also with less social support and an increasing feeling of isolation and loneliness (Xie *et al.*, 2010).

Physical activity level is also associated with depressive symptoms. A higher level of physical activity in the elderly is correlated with less prevalence of depressive symptoms (Salguero *et al.*, 2010). The authors also stated that people who exercise three or more times a week for 20 mins possess a better

health-related quality of life. They found a reduction in depressive symptoms in more active institutionalised and community-dwelling elderly. Lee, Suzana & Chin (2011) also reported that elderly who exercise less have a higher risk of having depressive symptoms.

One of the urbanisation development programmes of the government of Malaysia is the Federal Land Development Authority (FELDA) schemes. There are 323 FELDA schemes in the country, most of which are located in Peninsular Malaysia. Urbanization is associated with economic, demographic, social and psychological effects (Noreen Noor, Wan Haslin Aziah & Nur Adilah, 2012). Chen, Chen & Pierre (2017) stated that urbanization might cause the psychological distress and mental disorders and will worsen the diseases. This study was conducted to determine the prevalence of depressive symptoms, and the contribution of socio-demographic and psychosocial factors, functional status and physical activity level as well as their correlations with depressive symptoms among elderly residents living in selected FELDA schemes in Johor state.

MATERIALS AND METHODS

This was a cross-sectional study in three FELDA schemes in Johor. Johor state was selected by simple random sampling, and three FELDA schemes namely, FELDA Bukit Batu, FELDA Air Tawar 4 and FELDA Air Tawar 5 were selected using the probability proportionate to size (PPS) sampling method (Aday & Cornelius, 2006). The number of subjects in each FELDA was calculated based on the proportion method. The name lists in each selected FELDA scheme were obtained from FELDA administrator and the subjects were chosen based on the systematic sampling method. A total of 269 respondents were recruited.

Malaysian elderly who were aged 60 years and above, and able to communicate in Malay were included in this study. Elderly who were bedridden, blind and had stayed in the scheme for less than six months were excluded. This study was approved by the Research Ethics Committee of Research Management Centre (RMC), Universiti Putra Malaysia and FELDA Head Quarters. Data collection was conducted from September 2014 to March 2015.

Instruments and data collection

Data were collected through face-to-face interviews based on a set of pre-tested questionnaires. The respondents were briefed about the study before written consent was obtained. Socio-demographic background (sex, age, education level, monthly income and financial dependency) and psychosocial characteristics (marital status and living arrangements) were adapted from the questionnaire used by Siti Nur 'Asyura *et al.* (2009). For functional status, the Lawton-IADL Scale was used to assess the independent living skills and to identify how the person functions at the present time. A score of 7 or less indicates that disability of respondents to do one or more items in the scale (Hesseberg *et al.*, 2013). The Cronbach's α value to test the reliability of the questionnaire was 0.80 (Tengku Aizan *et al.*, 2013).

The Short Physical Performance Battery (SPPB) (Guralnik *et al.*, 1994) questionnaire was used to assess the physical performance of the respondents. A total score of 0-6 indicates low physical performance, 7-9 (intermediate performance) and 10-12 (high performance) (Cruz-Jentoft *et al.*, 2010). The Cronbach's α value to test-retest reliability of the questionnaire was 0.89 (Freire *et al.*, 2012). The Hodkinson Abbreviated Mental Test (HAMT) was used to assess the cognitive function of the respondents. An abnormal cognitive

function was set at scores of 7 or less (Swain & Nightingale, 1997). In this study, the Cronbach's α value to test the reliability of the questionnaire is 0.72. The Geriatric Depression Scale-15 (Sheikh & Yesavage, 1986) was used to assess the depressive symptoms with scores ranging from 5 to 15 suggesting the presence of depressive symptoms. Nyunt *et al.* (2009) stated that the Cronbach's α value to test the reliability of the questionnaire was 0.80.

The Rapid Assessment of Physical Activity (RAPA) was used to assess the physical activity level. This test consists of Part 1 (physical activity level) and Part 2 (flexibility). In this study, only Part 1 was assessed which refer to the objective in which to assess the physical activity level of the respondents. The scoring based on the number of questions in which 1 indicates that the subject is sedentary, 2 (under-active), 3 (under-active regular light activities), 4-5 (under-active regular) and 6-7 (active).

Pre-testing of the questionnaires was undertaken on 28 elderly in FELDA Taib Andak who fulfilled the inclusion and exclusion criteria. The instruments were modified based on the feedback from the pre-test.

Statistical analysis

The data obtained from the real data collection session were analysed using IBM SPSS Statistics version 22.0 (IBM Corp., USA). The categorical data of socio-demographic characteristics, functional status characteristics, physical activity level and depressive symptoms (using the GDS-15 score) were analysed for descriptive statistics. The Chi-square test was performed for determining association between two categorical data, while the Pearson product moment correlation and Spearman rank order correlation test was used to determine the correlation between continuous data. Multiple linear regression was used

to determine the factors contributing to depressive symptoms among the respondents. The significant level was set at $p < 0.05$.

RESULTS

The mean age of the respondents comprising 130 men and 139 women, was 69.5 ± 2 years. The majority of the respondents were married (77.0%). Almost all the respondents were living with their spouse or other family members. Most of them (86.2%) had formal education (primary/secondary school), with more men having received formal education, compared to women (Table 1). Overall, the mean monthly income was $\text{RM}1673.99 \pm 870.95^\dagger$, with men having a higher income than women. About two-thirds of the respondents considered themselves as financially independent especially among the men. The female respondents reported receiving money from their spouse, children and other family members.

For the functional status characteristics, Table 1 shows that about half of the respondents were completely dependent on performing activities of daily living. More men were independent in performing items in the Lawton-IADL scale compared to women. Based on the score on the SPPB questionnaire for physical performance, a total of 30.9% of respondents had low performance and 23.4% had high performance. The same pattern is seen more noticeably among the women. For cognitive function status, 15.6% of the respondents were classified as having an abnormal cognitive function. In term of the physical activity level, a majority of the respondents were classified as underactive. Only 30.6% were classified as active based on the scoring in RAPA questionnaire. Overall, the prevalence of depressive symptoms among the respondents was 3.7%, with 3.1% and

4.3% in men and women, respectively.

Table 2 indicates the association between the socio-demographic characteristics (sex, educational level and financial dependency), psychosocial characteristics (marital status and living arrangement) and the presence of depressive symptoms. No significant associations were found between these variables.

The correlation between the socio-demographic characteristics (age and monthly income), functional status (daily living activity dependency, physical performance and cognitive function) and physical activity level with GDS-15 score are shown in Table 3. Age ($r = -0.135$) and monthly income ($r = -0.133$) were found to have a significant negative correlation with the GDS-15 score ($p < 0.05$). The Lawton-IADL and SPPB score also indicated a significant correlation with the GDS-15 score in a negative direction with $r = -0.171$ and $r_s = -0.194$, respectively ($p < 0.01$). This suggests that the higher the Lawton-IADL score, the lower the GDS-15 score and vice versa. This pattern was similar for the SPPB score. No significant correlation was recorded between the RAPA score and GDS-15 score ($r = -0.120$), and between HAMT score ($r = -0.041$) with GDS-15 score.

The model of factors contributing towards depressive symptoms among the respondents is shown in Table 4. Physical performance contributed 18.3% towards depressive symptoms while monthly income contributed 12.5% towards depressive symptoms. In general, the model is useful to predict the contributing factor towards depressive symptoms by 5.2%.

DISCUSSION

A higher prevalence of the men possessed a formal education and were financially independent compared to the women. Norisma Aiza, Jariah & Zumilah (2015)

[†]1 MYR (RM) was equivalent to 0.25 US Dollar (USD) at the time of data collection

Table 1. Descriptive findings of the socio-demographic characteristics, psychosocial characteristics, functional status characteristics, physical activity level and the prevalence of depressive symptoms according to sex^{†, ‡}

Characteristics	Men (n=130)	Women (n=139)	Total (n=269)
Socio-demographic characteristics			
Age group			
60-74 years old	96 (73.8)	123 (88.5)	219 (81.4)
≥75 years old	34 (26.2)	16 (11.5)	50 (18.6)
Education level			
No/informal education	7 (5.4)	30 (21.6)	37 (13.8)
Formal education	123 (94.6)*	109 (78.4)	232 (86.2)
Monthly income (RM); mean±SD	2063.11±894.55*	1310.07±670.12	1673.99±870.95
Financial dependency			
Dependent	4 (3.1)	65 (46.8)	69 (25.7)
Independent	126 (96.9)*	74 (53.2)	200 (74.3)
Psychosocial characteristics			
Marital status			
Unmarried	7 (5.4)	55 (39.6)	62 (23.0)
Married	123 (94.6)*	84 (60.4)	207 (77.0)
Living arrangement			
Alone	0 (0.0)	8 (5.8)	8 (3.0)
With others	130 (100.0)*	131 (94.2)	261 (97.0)
Functional status characteristics			
IADL			
Dependent	40 (30.8)	88 (63.3)	128 (47.6)
Independent	90 (69.2)*	51 (36.7)	141 (52.4)*
Physical performance			
Low performance	36 (27.7)	47 (33.8)	83 (30.9)
Intermediate performance	54 (41.5)	69 (49.6)	123 (45.7)
High performance	40 (30.8)	23 (16.6)	63 (23.4)
Cognitive function			
Abnormal	16 (12.3)	26 (18.7)	42 (15.6)
Normal	114 (87.7)	113 (81.3)	227 (84.4)
Physical activity level			
Sedentary	2 (1.5)	1 (0.7)	3 (1.1)
Underactive	15 (11.5)	9 (6.5)	24 (8.9)
Underactive-regular light	13 (10.0)	21 (15.1)	34 (12.6)
Underactive-regular	57 (43.9)	69 (49.6)	126 (46.8)
Active	43 (33.1)	39 (28.1)	82 (30.6)
Depressive symptoms			
Presence	4 (3.1)	6 (4.3)	10 (3.7)
Absence	126 (96.9)	133 (95.7)	259 (96.3)

[†]Pearson Chi-square test was used to determine the association between socio-demographic, psychosocial, functional status, physical activity level and depressive symptoms with sex

[‡]Independent sample *t*-test was used to determine differences in mean of monthly income with sex

**p*-value is significant at the 0.05 level (2-tailed)

Table 2. Association between socio-demographic and psychosocial characteristics with depressive symptoms[†]

Characteristics	Total (n=269)		Chi-square value (df)	p-value
	Absence of DS (GDS <5; n=259)	Presence of DS (GDS ≥5; n=10)		
Socio-demographic characteristics				
Sex				
Men	126 (96.9)	4 (3.1)	0.591	0.42
Women	133 (95.7)	6 (4.3)		
Educational level				
No/informal education	36 (97.3)	1 (2.7)	0.123	0.59
Formal education	223 (96.1)	9 (3.9)		
Financial dependency				
Yes	194 (97.0)	6 (3.0)	1.120	0.24
No	65 (94.2)	4 (5.8)		
Psychosocial characteristics				
Marital status				
Unmarried	60 (96.8)	2 (3.2)	0.054	0.58
Married	199 (96.1)	8 (7.7)		
Living arrangement				
Alone	60 (96.8)	0 (0.0)	0.318	0.74
Live with others	199 (96.1)	10 (3.8)		

[†]Pearson Chi-square test was used to determine association between socio-demographic and psychosocial characteristics with depressive symptoms

reported that that as older women did not receive any income, they were more vulnerable to poverty in their old age.

More men were married compared to women and all of them were staying with others. This was in line with the study by Lim & Kua (2011) who found that elderly women were more likely to live alone compare to elderly men. Some of the respondents lived alone as their children had migrated to the city for work and they did not feel comfortable living with their children in the city.

The prevalence of depressive symptoms among the respondents in this study was lower compared to that reported by Rashid *et al.* (2012), Norhayati *et al.* (2013) and Vanoh *et al.* (2016), based on the same instrument (GDS-15). The lower prevalence of depressive symptoms in this study might be due to the absence of factors that can contribute towards the occurrence of depressive symptoms. Most of the

respondents reported that they did not have any problems, they appeared happy, and not worried about life issues.

No associations between sex, education level, financial dependency, marital status and living arrangements with occurrence of depressive symptoms, and this is comparable to the result of Rajkumar *et al.* (2009). The negative correlation between age and depressive symptoms which indicates younger elderly were associated with the presence of depressive symptoms, may suggest that the younger age elderly may be more unsatisfied with their life conditions. The current economic issues such as an increase in living costs requires them to work, which in turn, might have an impact on their life as they feel stressed and pressured. More studies should be undertaken to confirm this finding.

Monthly income in this study was significantly correlated with having depressive symptoms. Some respondents

Table 3. Correlation between the socio-demographic characteristics, functional status and physical activity level with the GDS-15

Characteristics	Total (n=269)	
	r-value / rho-value	p-value
Socio-demographic characteristics		
Age	-0.135	0.027*
Monthly Income	-0.133	0.029*
Functional status characteristics		
Instrumental activity of daily living	-0.171	0.005**
Physical performance	-0.194	0.001**
Cognitive function	-0.041	0.499
Physical activity level		
Rapid assessment of physical activity	-0.120	0.050

†Pearson product moment correlation test was used to determine correlation between age, IADL score, HAMT score and RAPA score with GDS-15 score

*Spearman rank order correlation test was used to determine the correlation between the monthly income and the SPPB score with the GDS-15 score

*p-value is significant at the 0.05 level (2-tailed)

**p-value is significant at the 0.01 level (2-tailed)

Table 4. Contributory factors of depressive symptoms among the respondents

Model	F	Unstandardized Coefficients		Standardized Coefficients	R ²	ΔR ²	Sig. (p-value)	Durbin-Watson (d) value	Collinearity Statistics	
		B	Std. Error	β					Tolerance	VIF
	7.234				0.052		0.001	2.069		
(Constant)		2.260	0.340				0.000			
Physical Performance		-0.116	0.038	-0.183		0.036	0.002		0.997	1.003
Monthly Income		0.00	0.000	-0.125		0.015	0.038		0.997	1.003

reportedly faced financial problems as the salary was not sufficient to support their family expenses, and they had to take up extra work, such as being factory security guards of taxi drivers. Studies by Rashid *et al.* (2012) and Yaka *et al.* (2014) also reported that elderly who were unemployed or had low income faced a higher risk of having depressive symptoms. .

Our study is in line with Garber *et al.* (2010) in finding significant association between physical function among community-dwelling elderly and several physical and mental health-related factors. The elderly with positive

depressive symptoms had a significantly higher prevalence of functional limitations. Since falling is strongly associated with depressive symptoms, the respondents who move slower due to the fear of falling tend to have positive depressive symptoms (Santos *et al.*, 2012).

The study by Ciucurel & Iconaru (2012) who found that exercise reduced the reactivity to stress and optimise the respondents in coping with stress, while sedentarism acts as a depression risk factor. Endorphins hormones released during exercise act as analgesic and sedative that can alleviate the symptoms

of depression (Tan & Yadav, 2012). In the FELDA setting, there is an integrated weekly exercise programme organised by the FELDA management and the Ministry of Health Malaysia, called the 10,000 steps (*10,000 Langkah*). In this programme, the participants are required to walk 10,000 steps based on the route given. In addition, there are also '*gotong-royong*' activities involving the settlers in each block cleaning up their block own area. According to the respondents in this study, most of them joined these activities as it is a platform to meet friends besides getting physically active.

Our findings highlight the importance of physical performance as the contributing factor towards depressive symptoms. This result is in line with the study by Santos *et al.* (2012), reported that as an individual became older, they often experience a decrease in the activity related to motor performance, such as balancing, mobility and gait, and also tend to move slower due to risk of falling and both of which are strongly associated with depressive symptoms.

CONCLUSION

This study found a relatively low prevalence (3.7%) of depressive symptoms among elderly living in selected FELDA schemes in Johor. Residents of the FELDA settings are supported by community social activities and with access to health care services. Only a few factors were found to impinge on the occurrence of depressive symptoms in the study population. These include socio-economic factors (lower income), functional status (with disabilities) and low physical performance.

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Authors' contributions

Nur Aqlili Riana H conceptualized and designed the study, led the data collection, data analysis, prepared and reviewed the manuscript; Siti Nur 'Asyura A conceptualized and designed the study, advised on data analysis, data interpretation, assisted and reviewed manuscript; Mohd Nasir MT advised on study methodology and advised on data analysis; Chan YM conceptualized and designed the study, advised on data collection, data analysis and interpretation and reviewed the manuscript; Zuriati I conceptualized and designed the study and Syafinas A assisted in data collection, data analysis and interpretation.

Conflict of interest

There is no conflict of interest to declare in this paper.

References

- American Psychiatric Association (2017). *What Is Depression*. American Psychiatric Association. From <https://www.psychiatry.org/patients-families/depression/what-is-depression>. [Retrieved June 25 2018].
- Chen J, Chen S & Pierre FL (2017). Urbanization and Mental Health in China: Linking the 2010 Population Census with Cross-Sectional Survey, *International Journal of Environmental Research and Public Health* 2015(12):9012-9024
- Ciucurel C & Iconaru EI (2012). The Importance of Sedentaryism In The Development Of Depression In Elderly People. *Procedia Social and Behavioral Sciences* 33:722-726.
- Freire AN, Guerra RO, Alvarado B, Guralnik JM & Zunzunegui MV (2012). Validity and Reliability of the Short Physical Performance Battery in Two Diverse Older Adult Populations in Quebec and Brazil. *Journal of Aging and Health* 863-878.
- Garber CE, Greaney ML, Riebe D, Nigg CR, Burbank PA & Clark PG (2010). Physical and mental health-related correlates of physical function in community dwelling older adults: a cross sectional study. *BMC Geriatrics* 10(6):1-10.
- Gustryanti K, Thongpat S & Maneerat S (2017). Factors Relating To Depression Among Older People Living In Cimahi, West Java Province, Indonesia. *Belitung Nursing Journal* 3(1):14-22.

- Haseen F & Prasartkul P (2011). Predictors of depression among older people living in rural areas of Thailand. *Bangladesh Medical Research Council Bulletin* 37:51-56.
- Hesseberg K, Bentzen H, Ranhoff AH, Engedal K & Bergland A (2013). Disability in Instrumental Activities of Daily Living in Elderly Patients with Mild Cognitive Impairment and Alzheimer's Disease. *Dementia and Geriatric Cognitive Disorders* 36:146-153.
- Lee LK, Suzana S & Chin A-V (2012). Predicting Comorbidities, Nutritional Status and Neuropsychological Performance of Depressed and Nondepressed Geriatric Communities: A Comparative Study. *International Journal of Gerontology* 6:278-284.
- Lim LL & Kua EH (2011). Living Alone, Loneliness and Psychological Well-being of Older Persons in Singapore. *Current Gerontology and Geriatrics Research* 2011:1-9. doi:10.1155/2011/673181.
- Malaysia Department of Statistics (2012). *Population Statistics*. Department of Statistics Malaysia, Putrajaya.
- Institute for Public Health (2015). *National Health & Morbidity Survey 2015 (NHMS 2015). Vol II: Non-Communicable Diseases, Risk Factors & Other Health Problems*. Institute for Public Health, Ministry of Health Malaysia, Kuala Lumpur.
- Norhayati I, Normah CD, Mahadir A, Shazli EG, Zaini S, Suzana S, Ahmad Rohi G & Rosdinom R (2013). Relationship Between Social Support and Depression, and Quality Of Life Of The Elderly In A Rural Community in Malaysia. *Asia-Pacific Psychiatry* 5(S1):59-66.
- Noreen Noor AA, Wan Haslin Aziah WH & Nur Adilah S (2012). The effects of urbanization towards social and cultural changes among Malaysian Settlers in the Federal Land Development Schemes (FELDA), Johor Darul Takzim. *Procedia-Social and Behavioral Sciences* 68:910-920.
- Nyunt MS, Fones C, Niti M & Ng TP (2009). Criterion-based validity and reliability of the Geriatric Depression Screening Scale (GDS-15) in a large validation sample of community-living Asian older adults. *Aging and Mental Health* 13(3):376-382.
- Rajkumar AP, Thangadurai P, Senthilkumar P, Gayathri K, Prince M & Jacob KS (2009). Nature, prevalence and factors associated with depression. *International Psychogeriatrics* 21(2):372-378.
- Rashid A, Azizah M & Rohana S (2012). Depression Among The Elderly Malays Living In Rural Malaysia. *Internet Journal of Public Health* 1(2):1-4.
- Santos KT, Fernandes MH, Reis LA, Coqueiro RS & Rocha SV (2012). Depressive Symptoms and Motor Performance In The Elderly: A Population Based Study. *Revista Brasileira de Fisioterapia* 16(4):295-300.
- Salguero A, Martinez-Garcia R, Molinero O & Marquez S (2010). Physical Activity, Quality Of Life And Symptoms Of Depression In Community-Dwelling And Institutionalized Older Adults. *Archives of Gerontology and Geriatrics* 53:152-157.
- Segal DL, Qualls SH & Smyer MA (2011). *Aging and Mental Health 2nd Edition*. John Wiley & Sons Ltd Publication, United Kingdom.
- Siti Nur 'Asyura A, Suzana S, Suriah AR, Noor Aini MY, Fatimah A, Zaitun Y, Mohmad S, Asnarulkhadi AS & Noor Ibrahim S (2009). 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. *The Journal of Nutrition, Health & Aging* 13(10):925-930.
- Tan KL & Yadav H (2012) Depression among the urban poor in Peninsular Malaysia: A community based cross-sectional study. *Journal of Health Psychology* 18(1):121-127.
- Tengku Aizan H, Yadollah A M, Rahimah I, Mariani M, Asnarulkhadi AS, Nurizan Y & Siti Farra Zillah A (2013). Development and psychometric properties of the Malaysian elder abuse scale. *Open Journal of Psychiatry* 3(2013):283-289.
- Vanoh D, Suzana S, Hanis Mastura Y & Tengku Aizan H (2016). Prevalence and Determinants of Depressive Disorders among Community-dwelling Older Adults: Findings from the Towards Useful Aging Study. *International Journal of Gerontology* 10(2016):81-85.
- World Health Organization (2017). *Depression and Other Common Mental Disorders: Global Health Estimates*. WHO, Geneva.
- Xie LQ, Zhang JP, Peng F & Jiao NN (2010). Prevalence and Related Influencing Factors of Depressive Symptoms For Empty-Nest Elderly Living In The Rural Area of YongZhou, China. *Archives of Gerontology and Geriatrics* 50(1):24-29.
- Yaka E, Keskinoglu P, Ucku R, Yener GG & Tunca Z (2014). Prevalence and Risk Factors of Depression Among Community Dwelling Elderly. *Archives of Gerontology and Geriatrics* 59(1):150-154.