

ISRG JOURNAL OF HUMANITIES AND CULTURAL STUDIES (ISRGJHCS)



ISRG PUBLISHERS

Abbreviated Key Title: ISRG J Humanit Cult Stud

ISSN: 3048-5436 (Online)

Journal homepage: <https://isrgpublishers.com/gjhc/>

Volume – II Issue- VI (November-December) 2025

Frequency: Bimonthly

Physical Fitness and Depression Among Older People: The Differences Between Elderly Women Living in Community and Institutionalized

Karthiga Murugan^{1*}, Ng. Li Theng², Jeniza Jamaludin³, Normy Rafida Abdul Rahman⁴

^{1, 2} Department of Physiotherapy, Faculty of Health Sciences, Asia Metropolitan University, Johor, Malaysia

³ School of Management, Asia e University, Selangor, Malaysia

⁴ Centre for Postgraduate Studies, Asia Metropolitan University, Selangor, Malaysia

| Received: 20.12.2025 | Accepted: 22.12.2025 | Published: 23.12.2025

*Corresponding author: Karthiga Murugan

Department of Physiotherapy, Faculty of Health Sciences, Asia Metropolitan University, Johor, Malaysia

Abstract

Reduced fitness strength is one of the risk factors of depression occurred in elderly. The prevalence of depression in the nursing home population is very high compared to community-dwelling population. The aim of this study is to measure physical fitness performance of elderly women living in community compared to elderly women living in institutionalized, depression rate of elderly women living in community compared to elderly women living in institutionalized, and the relationship between physical fitness and depression among the community-dwelling elderly women and institutionalized elderly women. A total of 71 female aged 60 years above participated, 58 from the community, 8 from elderly home, and 5 from nursing home. Cross-sectional and correlation study were designed. Senior fitness test and Geriatric Depression Scale (GDS)-Short Form were used. Statistical analysis was conducted using Kolmogorov-Smirnoff test ($p>0.05$), Independent Sample T-tests ($p<0.05$), and Spearman correlation. Results of the study showed that the institutionalized elderly women have poorer physical fitness performance compared to community-dwelling elderly women, while depression rate of elderly women in community are lower than the depression rate of elderly women in the institution. The elderly women in community-dwelling group GDS are negatively correlated with chair sit and reach test, whilst elderly women in institutionalized group GDS is negatively correlated with 30-sec arm curl. It was concluded that greater upper limb strength reduce depression in institutionalized elderly women and greater lower limb flexibility reduce depression in community-dwelling elderly women. In summary, depression rate of institutionalized elderly women was proved to be higher than the community-dwelling elderly women.

Keywords: Depression, Physical Fitness, Community-dwelling, Nursing Home, Elderly Home

1.0 INTRODUCTION

Malaysia is experiencing rapid population ageing and influenced by the worldwide population ageing, increased attention has been given to the study of elderly in Malaysia (Wan Ibrahim WA., I Komang Astina, & Budiyanto, 2015; Wan Ibrahim WA., 2018). The Department of Statistic Malaysia estimated that the aging population will increase up to 14.5 percent in 2040 from 5 percent in 2010 (B. Roziana and S. Suhaila, 2018). By next year, the estimated old age population (65 years and above) is 7.2 percent (Department of Statistic Malaysia, 2016). Aging is associated with increasing rate of depression due to various risk factors such as lower education status, functional limitation, reduced fitness strength, neurotic disorder and chronic diseases like hypertension and osteoarthritis (Vanoh et al., 2016). World Health Organization (WHO) in 2017 has stated that the limitation to carry out existing activities of everyday life can impact the quality of life. Another researcher stated that elderly depression is a worldwide issue which often affects the quality of life (Miedzianowski, 2015). In addition, Onunkwor et al. (2016) reported that physical domain of quality of life scored highest in World Health Organization Quality of Life Instrument-Brief Version (WHOQOL-BREF), which suggests that the basic criteria for admission into elderly homes is the ability to perform daily activities independently.

The studies by Tajvar et al. (2008) and Vitorini et al. (2012) reported the lower scores in physical domain compared to others domain such as social domain, psychological and environmental. This is probably due to the studies conducted in nursing home prevailed that the individuals tend to have poorer physical function (Dorota Trybusinska and Agnieszka Saracen, 2019). In addition, previous studies claimed that the community-dwelling elderly has better quality of life compared to the institutionalized elderly (Chang et al., 2010; Matthew et al., 2009). In 2000, a longitudinal study examined the impact of period of depression on physical fitness in community-dwelling older adults (Penninx et al., 2000). It reported that the chronicity of depression led to physical decline over time. However, another important finding was the remitted depressed older adults did not decline in physical function substantially compared to non-depressed older adults (B.W. Penninx et al., 2000). Therefore, it can be suggested that early detection and intervention was the key to prevent subsequent physical decline. Meanwhile, another report showed that low motor performance affects the depressive symptoms in both manners (Jeste, Deep and Vahia, 2010). Similarly, Park & Kim (2011) holds the view that elderly who have engaged in vigorous and regular exercise will have improvement on both physical and mental health. In a recent study conducted by JB. Jamaludin (2023), it was emphasized that institutions must increasingly take into account the psychological dimensions of individual development, including work-life balance, to promote the wellbeing of adults.

Depression is a prevalent psychological disorder which affects more than 300 million people worldwide in all ages (WHO, Depression, 2017). It is a primary cause to global disability, and also appears to associate with many general diseases in the world (WHO, Factsheets: Depression). In 2017, depression was been decided to be the topic for the World Health Day which campaigned by the World Health Organization (WHO, 2017). According to the National Institute of Mental and WHO, in within two weeks, depression is typified by the following symptoms: a loss of energy; a change in appetite and/or weight; a sleeping disturbance; a persistent sad, anxious, or "empty" mood;

diminished concentration; indecisiveness; restlessness, irritability; feelings of worthlessness, guilt, or hopelessness; thoughts of self-harm or suicide; loss of interest or pleasure in hobbies and activities; persistent physical symptoms (Buck, 2008; WHO, 2017).

2.0 MATERIALS AND METHODS

2.1 Participants

A total of 71 female aged above 60 years and older, living in Taman Bukit Jalil, Taman Gembira, and Jalan Klang Lama were participated in this study. All potential participants underwent a comprehensive explanation of the proposed study, its benefit and expected time commitment. Medical information was asked from participants. The subjects were excluded if they were using assistive device, having chest pain or discomfort, recent myocardial infarction, severe musculoskeletal conditions and neurologic conditions as to ensure safety of their participation in this study.

2.2 Instruments

Physical fitness test

The physical fitness test comprised of 6 tests which was validated and invented by Roberta E. Rikli and C. Jessie Jones (RE & CJ, 2001). The senior fitness test included body-mass index, 2-minute step test, 30-sec chair stand test, 30-sec arm curl test, chair sit and reach test, back scratch test, 8-foot up and go test and handgrip strength. A normative scores ranges for elderly whom aged between sixty to ninety-four was provided according to the reported literature (Rikli & Jones, 1999).

Geriatric Depression Scale-Short form (English Version)

Geriatric depression scale in short form version consisted of 15 questions which can be completed within five to seven minutes similar to the scale reported in literature (Yesavage & Sheikh, 2008). GDS-15 presented 92% sensitivity and 89% specificity (Sheikh & Yesavage, 1986), and it was developed from GDS-Long form to detect depression among elderly according to (Yesavage & Sheikh, 2008). This test was also sensitive to elderly whom have mild to moderate dementia and physical illnesses as reported in literature (Yesavage & Sheikh, 2008).

2.3 Statistical Analysis

Data analysis was carried out by using statistical software, IBM Statistical Package for the Social Sciences (SPSS) version 22. Descriptive statistics was applied. The quantitative variables were expressed as mean \pm standard deviation (SD) and pie chart with the estimation of the 95% Confidence Interval (CI). Kolmogorov-Smirnov test ($p>0.05$), Independent Sample T-tests ($p<0.05$), and Spearman correlation were also conducted.

3.0 RESULTS AND DISCUSSIONS

3.1 Physical Fitness Test

The scores of physical fitness test is likely to be different between elderly women living in community with elderly women living in institutionalized. The institutionalized elderly women are likely to have poorer physical fitness performance compared to community-dwelling elderly women. The distributions of scores is depicted in Table 1.

Table 1: Distributions of Scores Physical Fitness Test

BMI Categories	Elderly in Community	Elderly in Institutionalized
Severe	2%	16%
Moderate Thinness	2%	15%
Mild Thinness	5%	23%
Normal	71%	46%
Chair sit and reach test score		
Below average	9%	83%
Normal	19%	12%
Above average	72%	5%
Back scratch test score		
Below average	73%	92%
Normal	25%	8%
Above Average	2%	-
2-min step test score		
Below average	3%	56%
Normal	5%	42%
Above Average	92%	2%
30-sec chair stand test score		
Below average	14%	64%
Normal	84%	36%
Above Average	2%	-
30-sec arm curl test score		
Below average	2%	11%
Normal	28%	67%
Above Average	70%	22%

The data obtained from Table 1 showed that percentage of fitness score among the two respective groups. The physical fitness components included were body mass index, lower limb flexibility, upper limb flexibility, aerobic endurance level, lower limb strength, upper limb strength and agility. It was shown that the institutionalized elderly women have poorer physical fitness performance compared to community-dwelling elderly women. This was possibly due to (reason on why elderly woman has poorer physical performance). This phenomenon was also supported by the one that reported in the literature that stated that [ref]. On the other hand, the community-dwelling elderly women have higher fitness level than the institutionalized elderly women. The higher fitness level was suggested due to However, further research works are required in order to understand closely the connections between how

physical fitness affects depression in these two groups: community-dwelling elderly and institutionalized elderly women. This was consistent with the study done by Q *et al.*, (2017) which suggested community-dwelling elderly have better lower body strength, dynamic balance and aerobic endurance in comparison to institutionalized elderly of the same age group. (can add more discussion on data on Table 1, find the highest one for example, 92% 2 mins steps score, possibly can discuss why it the highest)

3.2 Geriatric Depression

The depression rate of elderly women in community are lower than the depression rate of elderly women in the institution as can be shown in Table 2. The finding shows that in general depression rate of institutionalized elderly women was proved to be higher than the community-dwelling elderly women. The results of this study shown that the depression rate of institutionalized elderly women was proved to be higher than the community-dwelling elderly women, which are 15 percent and 9 percent respectively. Scores of depression rate of the two elderly group are depicted in Table 2.

Table 2: Depression Rate of Elderly in Community and Elderly in Institutionalized

Depression Rate	Elderly in Community	Elderly in Institutionalized
Depression	9%	15%
Normal	91%	85%

It is shown that the prevalence rate of depression in community-dwelling elderly found in this study was very much lower compared to other countries, such as 44.4% in Mansoura district at Egypt (El-Gilany *et al.* 2018), 46.6% in Zagazig district at Egypt (Abdo & Eassa, 2017) and the 48.5% percent in Spain [ref] (Guallar-Castillón *et al.* 2006). On the contrary, a number of findings presented by other studies shown a lower prevalence rate of elderly depression, which is 31.4% in Egypt (Shehatah *et al.* 2009), followed by 21.2 percent in Taiwan (Chong *et al.* 2001), 19 percent in Butterworth, Malaysia (Mohd Sidik *et al.* 2003), 14.4 percent in rural India (Pilania *et al.* 2017), 7.6% percent in rural Selangor at Malaysia (Sidik *et al.* 2004), 6.0% percent in rural China (Chen *et al.* 2005) (revised the sentences as short as can). Macdonald (1997) found that the prevalence of depression in community-dwelling elderly is 30 percent greater than the elderly lives in residential home. However, Dessoiki *et al.* (2009) reported that elderly lives in geriatric home has higher depression rate compared to those in geriatric clubs, which are 89.7 % and 56.7 % respectively. In a study which set out to determine the prevalence of undetected cognitive impairment and depression in residents of an elderly care home, Al-Jawad *et al.* (2007) found that the overall prevalence of depression is 67 percent in a state run elderly care home in Malaysia. However, Al-Jawad *et al.* (2007) identified that 3.2 percent is major depression and 53.8 percent is account for minor depression among the overall prevalence rate. Their study also reported that males and the Indian population has higher rate of depression. These studies provide important insights into great variation in the prevalence of depression rate among elderly due to the types of study design, sampling technique, socio-demographic factors and outcome measurement tools used by researchers.

3.3 Relationship between Physical Fitness and Depression

There was a significant negatively correlation between GDS score and the chair sit and reach test in community-dwelling elderly

women, which is -0.283, with $p=0.031$. Other than that, there was a significant negatively correlation between GDS score and the 30-sec arm curl test, which is -0.668, with $p=0.049$ (Table 3). This study presented that the major findings of GDS which is negatively correlated with all the physical performance factors, except 2-min step and 8-foot up and go test used to assess the aerobic endurance and agility of elderly. However, except chair sit and reach, for example to measure the lower limb flexibility, all of the data does not have significant differences ($p>0.05$).

Table 3: Correlation between GDS-SF and physical fitness factors

Physical fitness factor	GDS-SF (Elderly in Community)	GDS-SF (Elderly in Institutionalized)
2-min step	0.044	-0.178
30-sec chair stand	-0.219	0.432
30-sec arm curl	-0.219	-0.668***
Chair sit and reach	-0.283***	0.202
Back scratch	-0.164	-0.093
8-foot up and go	0.049	-0.214
Grip strength	-0.100	0.427
Body mass index	-0.218	-0.089

GDS-SF, Short form of Geriatric Depression Scale

*** $p<0.05$.

Many previous studies also presented findings that consistent with this study. Y. C. Lee (2015) for example, asserted that physical performance factors such as 6-min walk test, 30-sec chair stand test, 30-sec arm curl test, chair sit and reach test, 8-foot up and go test and grip strength, were strongly associated with depression. In addition, Gerber et al. (2013) also found that the higher the cardiorespiratory level, the lower the depression level, which in agreement with the previous studies. Another literature (Singh et al, reported that the elderly has increased strength and decreased in depression level after completion of ~~done~~ some physical activity. It was also found out that the significant and negative association between depression and functional physical fitness including strength, cardiorespiratory endurance, agility, and dynamic balance.

Moreover, this presented findings shown there was a negative correlation with insignificant difference between BMI and depression, which are consistent with the findings that reported in the literature (Y. C. Lee (2015) and I.-H. Lee et al. (2014). However, the findings were in contrast with the one that reported in literature which reported that Zhi et al. (2017), that elderly women who have BMI more than 28 kg/m^2 , higher waist circumference and waist-hip ratio will have lower risk of depression. In this study, GDS is negatively correlated with 30-sec arm curl, showing the correlation coefficient of -0.283, and with $p=0.049$. Other than that, GDS is also negatively correlated with 2-min step, back scratch, 8-foot up and go and body mass index but without significant difference.

The results also shown that GDS is positively correlated with 30-sec chair stand, chair sit and reach and grip strength. But it does not provide enough evidence as the data has p-value more than 0.05. According to a study by Lok et al. (2017), the elderly who

have depression and lives in nursing home were found to have improved quality of life and decreased in depressive symptoms after 10-week physical activity program. A study conducted by Kvæl et al. (2017) reported that the nursing home residents who have depression tend to have poorer physical performance, such as balance function and lower limb strength. The study used Berg Balance Scale (BBS) ($p=0.03$) to measure agility and 30-sec chair stand test ($p=0.02$) to measure lower limb strength. There was significant association between lower limb strength and depression, which is consistent with our result. Therefore, it was concluded that increasing upper limb strength in institutionalized elderly women and increasing lower limb flexibility in community-dwelling elderly women can prevent depression.

4.0 CONCLUSION

Malaysia is experiencing the rapid population ageing, there are older persons who are living in community with their family members, while other older persons, because of they do not have any relatives, may be living in special institutional settings such as nursing homes or old folks' homes. The purpose of this study is to compare the physical fitness performance of old women living in the community to that of elderly women residing in institutions. This study also aims to compare the depression rates of community-dwelling elderly women to those of institutionalised elderly women, as well as to investigate the association between physical fitness and depression among community-dwelling elderly women and institutionalised elderly women. The objective of this study is to conduct a comparative analysis of the physical fitness performance of elderly women residing in the community and those living in institutional settings. Additionally, this study seeks to compare the rates of depression among community-dwelling elderly women and institutionalized elderly women, while also exploring the potential correlation between physical fitness and depression among senior women. A total of 71 female participants aged 60 years and above were chosen, where 58 of them were from the community, 8 from elderly home, and 5 from nursing homes, and there were chosen through convenience sampling. Results of the study shown that the institutionalized elderly women have poorer physical fitness performance compared to community-dwelling elderly women due to Results of the study also show that depression rate of elderly women in community are lower than the depression rate of elderly women in the institution due to In other words, depression rate of institutionalized elderly women was proved to be higher than that of the community-dwelling elderly women because Elderly women living in community-dwelling group, GDS is negatively correlated with chair sit and reach test, whilst elderly women in institutionalized group, GDS is negatively correlated with 30-sec arm curl (conclude the reason)

REFERENCES

1. Abdo, N., & Eassa, S. (2017). Prevalence of Depression among Elderly and Evaluation of Interventional Counseling Session in Zagazig District -Egypt, (February).
2. Al-Jawad, M., Rashid, A. K., & Narayan, K. A. (2007). Prevalence of undetected cognitive impairment and depression in residents of an elderly care home. *Medical Journal of Malaysia*, 62(5), 375–379.
3. Buck, A. (2008). Depression: What you need to know. *Practice Nurse*, 36(10), 16–19.

4. Chen, R., Li, W., Zhi, H., & et, a. (2005). Depression in older people in rural China. *Archives of Internal medicine*, 165, 2019-25.
5. Chong, M., Tsang, H., Chen, C., & et, a. (2001, January). Community study of depression in old age in Taiwan: prevalence, life events and socio-demographic correlates. *British Journal of Psychiatry*, 178, 29-35.
6. Department Of Statistic Malaysia (DOSM). (2016). Department of Statistics Malaysia Press Release Population Projection (Revised), Malaysia , 2010-2040. *Department of Statistics Malaysia, Population Projection (Revised), Malaysia, 2010-2040*, (November).
7. Dessoki, H., Sharbawy, E. El., & Tahlawy, E. (2009). Depression among elderly in Beni Suef city (upper Egypt). *European Psychiatry*, 28, 1. [https://doi.org/10.1016/S0924-9338\(13\)75742-0](https://doi.org/10.1016/S0924-9338(13)75742-0)
8. El-Gilany, A. H., Elkhawaga, G. O., & Sarraf, B. B. (2018). Depression and its associated factors among elderly: A community-based study in Egypt. *Archives of Gerontology and Geriatrics*, 77(November 2017), 103–107. <https://doi.org/10.1016/j.archger.2018.04.011>
9. Eurostat statistic explained. (n.d.). Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Old-age-dependency_ratio
10. Gerber, M., Lindwall, M., Lindegård, A., Börjesson, M., & Jonsdottir, I. H. (2013). Cardiorespiratory fitness protects against stress-related symptoms of burnout and depression. *Patient Education and Counseling*, 93(1), 146–152. <https://doi.org/10.1016/j.pec.2013.03.021>
11. Guallar-Castillón, P., del Mar Magariños-Losada, M., Montoto-Otero, C., Tabuena, A. I., Rodríguez-Pascual, C., Olcoz-Chiva, M., ... Rodríguez-Artalejo, F. (2006). Prevalence of Depression and Associated Medical and Psychosocial Factors in Elderly Hospitalized Patients With Heart Failure in Spain. *Revista Española de Cardiología (English Edition)*, 59(8), 770–778. [https://doi.org/https://doi.org/10.1016/S1885-5857\(07\)60042-5](https://doi.org/https://doi.org/10.1016/S1885-5857(07)60042-5)
12. Kvæl, L. A. H., Bergland, A., & Telenius, E. W. (2017). Associations between physical function and depression in nursing home residents with mild and moderate dementia: A cross-sectional study. *BMJ Open*, 7(7), 1–11. <https://doi.org/10.1136/bmjopen-2017-016875>
13. Lee, I.-H., Jin, Y.-Y., Cho, J.-K., Yoon, J.-H., & Kang, H.-S. (2014). Association between Depression and Physical Fitness, Body Fatness and Serum Vitamin D in Elderly Population. *The Korean Journal of Obesity*, 23(2), 125. <https://doi.org/10.7570/kjo.2014.23.2.125>
14. Lee, Y. C. (2015). A study of the relationship between depression symptom and physical performance in elderly women. *Journal of Exercise Rehabilitation*, 11(6), 367–371. <https://doi.org/10.12965/jer.150257>
15. Lok, N., Lok, S., & Canbaz, M. (2017). The effect of physical activity on depressive symptoms and quality of life among elderly nursing home residents: Randomized controlled trial. *Archives of Gerontology and Geriatrics*, 70, 92–98. <https://doi.org/10.1016/j.archger.2017.01.008>
16. Macdonald, A. J. (1997). ABC of mental health. Mental health in old age. *BMJ (Clinical Research Ed.)*, 315(7105), 413–417. <https://doi.org/10.1136/bmj.315.7105.413>
17. Miedzianowski, S. (2015). Depression and quality of life in older adults. *CSA Journal*, 63, 11-15.
18. Mohd Sidik, S., Afiah, M. Z. N., & Shah, S. A. (2003). Factors associated with depression among elderly patients in a primary health care clinic in Malaysia. *Asia Pacific Family Medicine*, 2(3), 148–152. <https://doi.org/10.1046/j.1444-1683.2003.00080.x>
19. Onunkwor, O. F., Al-Dubai, S. A. R., George, P. P., Arokiasamy, J., Yadav, H., Barua, A., & Shuaibu, H. O. (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(1), 1–10. <https://doi.org/10.1186/s12955-016-0408-8>
20. Penninx, B. W., Deeg, D. J., Van Eijk, J. T., Beekman, A. T., & Guralnik, J. M. (2000). Changes in depression and physical decline in older adults: A longitudinal perspective. *Journal of Affective Disorders*, 61(1–2), 1–12. [https://doi.org/10.1016/S0165-0327\(00\)00152-X](https://doi.org/10.1016/S0165-0327(00)00152-X)
21. Pilania, M., Bairwa, M., Khurana, H., & Kumar, N. (2017). Prevalence and predictors of depression in community-dwelling elderly in rural Haryana, India. *Indian J community med*, 42, 13-8.
22. Q, N., M, S., & Annamma, V. (2017). Physical Fitness in Community Dwelling Elderly and Institutionalized Elderly Using Senior Fitness Test (Sft). *Int J Physiother. Vol*, 4(3), 152–159.
23. RE, R., & CJ, J. (2001). Senior fitness test manual. *Champaign: Human Kinetics*.
24. Rikli, R. E., & Jones, C. J. (1999). Functional fitness normative scores for community-residing older adults, ages 60-94. *Journal of Aging and Physical Activity*. <https://doi.org/10.1123/japa.7.2.162>
25. Shehatah, A., El-Okda, E., & Rabie, M. (2009). Prevalence of depression and association of cognitive impairment in elderly in suburban community in Egypt. *Current Psychiatry*, 16(2), 192-199.
26. Sheikh, J. L., & Yesavage, J. A. (1986). Geriatric depression scale (GDS): Recent evidence and development of a shorter version. *Clinical Gerontologist* 5, 165-173.
27. Sidik, S., Rampal, L., & Afifi, M. (2004). Physical and mental health problems of the elderly in a rural community of Sepang, Selangor. *Malaysian Journal of Medical Sciences*, 11(1), 52-59.
28. Singh, N. A., Stavrinou, T. M., Scarbek, Y., Galambos, G., Liber, C., & Singh, M. A. F. (2005). A Randomized Controlled Trial of High Versus Low Intensity Weight Training Versus General Practitioner Care for Clinical Depression in Older Adults. *Journal of Gerontology*, 60A(6), 768–776. <https://doi.org/10.1093/gerona/60.6.768>
29. Tajvar, M., Arab, M., & Montazeri, A. (2008). Determinants of health-related Quality of Life in elderly

in Tehran, Iran. *BMC Public Health*, 8, 1–8. <https://doi.org/10.1186/1471-2458-8-323>

30. Vanoh, D., Shahar, S., Yahya, H. M., & Hamid, T. A. (2016). Prevalence and determinants of depressive disorders among community-dwelling older adults: Findings from the towards useful aging study. *International Journal of Gerontology*, 10(2), 81–85. <https://doi.org/10.1016/j.ijge.2016.02.001>

31. Wan Ibrahim WA., I Komang Astina, & Budiyanto. (2015). Demographic Transition and Population Ageing. *Mediterranean Journal of Social Science*, Vol. 6, 3, S2 (May): 213 – 218

32. Wan Ibrahim WA. (2018). Population aging and old age in Malaysia: the changing role of the family and major challenges ahead, in Thomas Klassen, Masa Higo, N. S. Dhirathiti & Thesesa W. Devasahayam. (eds.). *Ageing in Asia-Pacific: Interdisciplinary and comparative perspectives*. London: Routledge Taylor and Francis

33. WHO. (2017). *Depression*. Retrieved from http://www.who.int/mental_health/management/depression/en/

34. WHO. (n.d.). *Factsheets: Depression*. Retrieved from <http://www.who.int/en/news-room/factsheets/detail/depression>

35. WHO. (n.d.). *Depression*. Retrieved from World Health Organization: www.who.int/mental_health/management/depression/definition

36. World Health Organisation (WHO). (2017). WHO | Depression. Retrieved September 28, 2018, from http://www.who.int/mental_health/management/depression/en/

37. Yesavage, J. a., & Sheikh, J. I. (2008). 9 / Geriatric Depression Scale (GDS). *Clinical Gerontologist*, 5(1–2), 165–173. <https://doi.org/10.1300/J018v05n01>

38. Zhi, T., Wang, Q., Liu, Z., Zhu, Y., Wang, Y., Shi, R., ... Jiang, X. (2017). Body mass index, waist circumference and waist-hip ratio are associated with depressive symptoms in older Chinese women: results from the Rugao Longevity and Ageing Study (RuLAS). *Aging & Mental Health*, 21(5), 518–523. <https://doi.org/10.1080/13607863.2015.1124837>