

## Prevalence and determinants of depression among community-dwelling older adults with chronic diseases

Zamzaliza Abdul Mulud, Norfidah Mohamad

Centre for Nursing Studies, Faculty of Health Sciences, Universiti Teknologi MARA, Selangor, Malaysia

### Article Info

#### Article history:

Received Jun 22, 2022

Revised Feb 17, 2023

Accepted Mar 8, 2023

#### Keywords:

Aged

Chronic disease

Depression

Multimorbidity

### ABSTRACT

The older population continues to grow globally, and data related to the prevalence of depressive symptoms among this population in Malaysia is scarce. Thus, this study aimed to determine the prevalence and determinants of depression symptoms among community-dwelling older adults in Malaysia. A cross-sectional study was conducted among 220 outpatients with chronic diseases. The level of depression was operationalized using the Malay version of the Geriatric Depression Scale. The prevalence of depression among community-dwelling older adults was 16.4%. Female (OR=8.86, 95% CI=1.10–7.53,  $p=0.03$ ), Chinese ethnic group (OR=4.73, 95% CI= 1.04–21.48,  $p=0.04$ ), multimorbidity (OR=3.36, 95% CI=1.07–12.60,  $p=0.04$ ) and presence of pain (OR=6.67, 95% CI=2.41–18.45,  $p<0.01$ ) were associated to depressive symptoms. However, higher resilience was associated with lower risk of depressive symptoms in this population (OR=0.88, 95% CI=0.88–0.93,  $p<0.01$ ). The prevalence of depressive symptoms among older adults with chronic diseases is higher than in previous data. Early identification of depression in this population is crucial for effective chronic disease management.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



### Corresponding Author:

Zamzaliza Abdul Mulud

Centre for Nursing Studies, Faculty of Health Sciences, Universiti Teknologi MARA

Puncak Alam Campus, Selangor, Malaysia

Email: zamzaliza@uitm.edu.my

## 1. INTRODUCTION

Worldwide, geriatric populations have rapidly increased. Improved longevity is contributed by various factors such as better health care services, a healthy lifestyle and psychosocial circumstances [1]. Globally, the number of older adults has increased from 6% in 1990 to 9% in 2019 and is expected to rise to 16% in 2050 [2]. The Department of Statistics Malaysia reported a similar trend related to the percentage of older adults (65 years and above) that rose significantly from 7.0% in 2020 to 7.4% in 2021 [3]. Currently, there are 2.4 million older adults [3] in Malaysia, and without a doubt, the prevalence of chronic illness is higher in this population than in other age groups.

Chronic diseases can be defined as any conditions that last one year or more, require continuous medical management, affect patients' activities of daily living and subsequently decrease one's quality of life [4]. Although there is disagreement on what conditions can be classified as chronic diseases, most authors agreed that heart disease, stroke, cancer, type 2 diabetes mellitus, obesity, arthritis, asthma and chronic obstructive pulmonary disease are considered chronic conditions [5], [6]. In the United States, almost 60% of adults have at least one chronic condition, and four out of ten were diagnosed with two or more chronic conditions or multimorbidity [4]. In Malaysia, eight of the ten leading causes of death are non-communicable diseases such as ischemic heart disease, chronic obstructive pulmonary diseases (COPD), chronic kidney

diseases, stroke, cancers and diabetes mellitus [7]. A longitudinal study in Malaysia reported that 18.8% of older adults developed chronic diseases after a year of follow-up, and 40.9% with one condition developed multimorbidity within the same period [8]. Past research has shown that chronic diseases and multimorbidity affect the health care system in every country. Increased health care expenditure, high utilization and requirement for physicians and specialists, a rise in medication prescription and frequent visits to the emergency department are most commonly associated with chronic disease conditions [9]. However, the presence of chronic diseases also affected patients' psychological well-being tremendously. The prevalence of depression among patients with chronic diseases ranges from 9.3% to 33.9% [6], [10]. However, this data represents depression and chronic diseases from all age groups. As chronic conditions are more prevalent in older adults, investigating depression among this population is necessary.

Depression among the elderly has a negative impact on quality of life, worsens functional impairments, and contributes to poorer treatment adherence, which is one of the causes that prolongs recovery from disease. Furthermore, depression increases mortality risk by four to five times that of populations without depression [11]. The presence of depression in the older adult population is multifaceted and multifactorial. Chronic pain in a chronic condition such as rheumatoid arthritis is associated with depression [12]. Other factors contributing to depression in chronic conditions include multimorbidity [13], female gender, and younger [14]. However, there is a lack of data that represents the depression in chronic disease in the Asian population. The differences in cultural backgrounds and ethnic groups' expression of depression limit the generalization of the Western data in Asian countries. In addition, there is a new interest in research that emphasizes a psychotherapeutic approach to dealing with depression through resilience levels among the elderly. A high resilience later in life is linked with optimal outcomes, such as decreased depression. It could reduce the mortality risk rate, improve self-perception of ageing, and increase the quality of life and lifestyle behaviours [15].

Currently, there is limited national data regarding the prevalence and factors contributing to depression among older adults with chronic diseases in Malaysia. As the prevalence of chronic conditions is high among older adults, information related to depression is crucial for effective disease management and improved quality of life. Past studies focused on depression in a specific population, such as chronic back pain, rheumatoid arthritis and diabetes mellitus but not general chronic diseases [11]–[13], [16]. Thus, this study aimed to determine the prevalence and determinants of depression among community-dwelling older adults with chronic diseases. The following research questions were formulated to guide this study; i) what is the prevalence of depression among community-dwelling older adults with chronic diseases? ii) are there any significant differences between sociodemographic characteristics, multimorbidity, pain and depression? iii) what are the predictors of depression in community-dwelling older adults with chronic diseases?

## **2. RESEARCH METHOD**

### **2.1. Study design**

A quantitative, cross-sectional study design was used to determine the prevalence and determinants of depression among older adults with chronic diseases. The patients attending a follow-up clinic in a teaching hospital in Selangor, Malaysia and fulfilling the inclusion criteria were invited to this study. In this study setting, two primary care clinics provide services to the outpatients in the surrounding areas. Chronic diseases included cardiovascular diseases, hypertension, type 2 diabetes mellitus, dyslipidaemia and cancer, arthritis, kidney disease, asthma and COPD, diagnosed by a physician [5], [6], [17].

### **2.2. Sample size and sampling**

We used Fisher's sample size formula for the prevalence study [18]. With a 95% confidence level, a prevalence of 19.2%, as reported in a previous study in Malaysia [19], and a margin of error of 0.05, the required sample size was 209. However, we managed to collect data from 220 participants throughout the data collection period. The selected samples were older adults aged 60 and above with at least one chronic disease diagnosed by a physician for more than a year. Those with a possible cognitive impairment (mini-mental state examination score less than 24) were excluded. A simple random sampling was used to select the participants. A list of patients attending a follow-up clinic was obtained beforehand, and selected patients were approached and invited to this study.

### **2.3. Instruments**

A self-administered questionnaire which consists of three parts was utilized in this study. Sociodemographic characteristics such as age, race, gender, marital status, educational levels and employment status were included. Chronic disease data such as the presence of pain, duration and number of chronic diseases were also measured. Then, the number of chronic diseases was converted into the dichotomous response of "no multimorbidity" and "multimorbidity" (more than two conditions).

The Malay version of the geriatric depression scale (GDS) or M-GDS-15 was used to measure depressive symptoms [20]. Participants were asked to respond "Yes" or "No" for each statement that applied

to them over the past week. This shorter-scale version, which is GDS-15, was developed for easier use and better acceptability and Teh and Hasanah [20] translated it to Malay for the local population. A score of 0 to 5 was accepted as a normal emotion, while a score of more than 5 suggested depression. Cut off point of 5 was selected based on the review of 32 studies related to the GDS scoring [21]. The reliability of the Malay GDS-15 was high in this current study, with a Cronbach alpha value of 0.84.

Resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC) [22], a 5-point Likert-type scale, from 0='never' to 4='almost always' based on the degree of each statement applied to them over the last month. All items scored using the 5-points will be summed up, and the higher the scores indicate higher resilience. The scale is rated based on how the subject has felt over the past month, and the total score ranges from 0 to 100, with higher scores reflecting greater resilience [22]. The CD-RISC has satisfactory validity and reliability with Cronbach's alpha of 0.89.

#### 2.4. Data collection procedure

Based on the inclusion criteria, only participants 60 years old and above with at least one chronic illness were invited to participate in this study. Basic screening of the mini-mental state examination (MMSE) was performed beforehand to ensure the participants did not have a possible cognitive impairment. After the researcher explained, participants who agreed were asked to sign an informed consent form and complete the questionnaire.

#### 2.5. Data analysis

Data obtained from this study were analyzed and summarized using the SPSS program version 25.0. Prevalence was calculated by dividing the number of participants with depression with a total sample of 220 and time by 100. Frequency and percentage distribution were used for sociodemographic and depression. Bivariate analysis Chi-square test was used to identify the difference in the proportions of depression with their sociodemographic characteristics (age, gender, race, marital status, educational level, employment status) and chronic disease data. Finally, the final logistic regression analysis included variables with a p-value <0.25 in bivariate analysis to identify the significant predictors for depression. For all statistical analyses, a significant value was set at p-value <0.05.

#### 2.6. Ethical consideration

The Ethics Committee Universiti Teknologi MARA (600-IRMI (5/1/6) granted the ethical approval for this study. All participants were assured that participation in this study was voluntary and refusal would not limit their access to the services. We ensured the confidentiality of their responses and anonymous presentation of findings.

### 3. RESULTS

#### 3.1. Sociodemographic characteristics of older adults with chronic disease

A sum of 220 questionnaires was distributed to older adults with chronic diseases who met the inclusion criteria at two primary care clinics with a 100% response rate. The result shows in Table 1 that the majority of the participants, 182 (82.7%), were between the ages of 60-69. Almost two-thirds were male patients (55.9%) from Malay ethnic groups (87.7%). Most participants were married (95.5%), and more than half (55.5%) had secondary educational levels. 62.3% of participants were still working. The prevalence of multimorbidity among older adults was 71.8%, where 158 of all participants reported having more or more chronic conditions. The average year for the duration of illness was 5.47 years (SD=3.06), and 14.5% of participants reported having pain.

Table 1. Sociodemographic characteristics of older adults with chronic disease (n=220)

	Frequency	Percentage		Frequency	Percentage
Age			Educational level		
60-69	182	82.7	None	2	0.9
70-79	34	15.5	Primary school	13	5.9
80 and above	4	1.8	Secondary school	122	55.5
Gender			College/university	83	37.7
Male	123	55.9	Employment status		
Female	97	44.1	Working	83	37.7
Ethnic group			Not working/retired	137	62.3
Malay	193	87.7	Multimorbidity		
Chinese	16	7.3	Yes	158	71.8
Indian	11	5.0	No	62	28.2
Marital status			Duration of chronic disease (Mean, SD)	5.47	3.06
Married	210	95.5	Presence of pain		
Single/Divorced/Widowed	10	4.5	No	188	85.5
			Mild to moderate	32	14.5

### 3.2. Prevalence of depression among older adults with chronic disease

The first research question of this study was to determine the prevalence of depression among community-dwelling older adults with chronic diseases. From the analysis, 36 participants scored an M-GDS of 5 or more, indicating the presence of depression. Therefore, the prevalence of depression among older adults with chronic conditions was 16.4%. In relation to gender, the prevalence of depression is higher in females (20.6%) compared to males (13.00%). Those with multimorbidity also report a high prevalence of depression with 19.62% compared to those without multimorbidity. A high prevalence of depression can be observed in older adults suffering from pain with 46.88% compared to those without pain (11.17%).

### 3.3. Sociodemographic factors contributed to depression among older adults with chronic disease

Chi-square analysis was conducted to determine the differences in sociodemographic factors and depression. Table 2 displays the results of the Chi-square test among variables. There were no significant differences in levels of depression among males and females also among different age categories. Significant differences in levels of depression can be observed in ethnic groups ( $\chi^2=8.47$ ,  $p=0.01$ ) and employment status ( $\chi^2=6.12$ ,  $p=0.009$ ). There were also significant differences in the level of depression in multimorbidity ( $\chi^2=4.35$ ,  $p=0.03$ ) and the presence of pain ( $\chi^2=25.47$ ,  $p<0.001$ ).

### 3.4. Predictors for depression among community-dwelling older adults with chronic diseases

A logistic regression model was used to predict the factors contributing to depression among older adults with chronic diseases as shown in Table 3. Three sociodemographic characteristics (age, gender and ethnic group) with a p-value less than 0.25 were included. Other variables such as multimorbidity, presence of pain, duration of illness and resilience were included in the final regression model. The result shows that the gender and ethnic groups predicted depression. Females were eight times higher than males who reported depression (OR=8.86, 95% CI=1.10–7.53,  $p=0.03$ ), and Chinese participants were four times higher than Malay to have depression (OR=4.73, 95% CI= 1.04–21.48,  $p=0.04$ ). Disease factors such as multimorbidity (OR=3.36, 95% CI=1.07–12.60,  $p=0.04$ ) and presence of mild to moderate pain (OR=6.67, 95% CI=2.41–18.45,  $p<0.01$ ) were associated to depressive symptoms. Patients with multimorbidity were found three times higher than those without multimorbidity to have depression. Pain also predicted depression, where those with pain reported depression six times higher than participants without pain. Higher resilience was associated with lower risk of depressive symptoms in this population (OR=0.88, 95% CI=0.88–0.93,  $p<0.01$ ). However, age and duration of illness were not significantly predict depression.

Table 2. Summary of the bivariate test results of sociodemographic characteristics with depression

Variables	Frequency	Depression		$\chi^2$	p-value
		No	Yes		
Age					
60–69	182	153	29	3.40	0.18
70–79	34	29	5		
80 and above	4	2	2		
Gender					
Male	123	107	16	2.30	0.14
Female	97	77	20		
Ethnic group					
Malay	193	166	27	8.47	0.01*
Chinese	16	12	4		
Indian	11	6	5		
Marital status					
Married	210	175	35	0.31	0.90
Single/Divorced/Widowed	10	9	1		
Educational level					
None	2	2	0	4.02	0.26
Primary school	13	13	0		
Secondary school	122	103	19		
College/University	83	66	17		
Employment status					
Working	83	76	7	6.12	0.01*
Not working/retired	137	108	29		
Multimorbidity					
Yes	158	127	31	4.35	0.03*
No	62	57	5		
Presence of pain					
No pain	188	167	21	25.47	<0.01*
Mild to moderate	32	17	15		

Table 3. Results of logistic regression for factors associated with depression among older adults with chronic disease

Variables	Frequency	OR	95% CI	p-value
Age				
60–69	182	ref		
70–79	34	0.48	0.11-1.53	0.18
80 and above	4	1.06	0.08-13.61	0.96
Gender				
Male	123	ref		
Female	97	8.86	1.10-7.53	0.03*
Race				
Malay	193	ref		
Chinese	16	4.73	1.04-21.48	0.04*
Indian	11	2.13	0.48-9.39	0.32
Multimorbidity				
No	158	ref		
Yes	62	3.66	1.07-12.60	0.04*
Presence of pain				
No pain	188	ref		
Mild to moderate	32	6.67	2.41-18.45	<0.01*
Duration of illness		1.14	0.98-1.32	0.08
Resilience		0.88	0.88-0.93	<0.01*

#### 4. DISCUSSION

An increase in age is commonly associated with a higher risk of developing chronic diseases or morbidity, affecting one's functional ability to perform basic activities of daily living (ADLs) independently. Consequently, the inability to perform basic needs can result in the development of depression among the elderly. Resilience is considered one of the psychotherapeutic approaches in dealing with depression among the elderly. Currently, the data representing the prevalence of depression and its associated factors are scarce, especially in Southeast Asia. Thus, this study aimed to determine the prevalence and determinants of depression among community-dwelling older adults with chronic diseases.

##### 4.1. Sociodemographic prevalence of depression

The prevalence of depression among the elderly in this study sample is 16.4%. The prevalence of depression in this study is lower than that among patients with type 2 diabetes mellitus living in rural Malaysia. This study identified the prevalence as 32.1% [23]. However, this study reported high levels of depression due to diabetes complications. A national survey to determine the association between functional ability and depression among older adults in Malaysia reported the prevalence of depression as 11.5% [24], which is lower than the current study's findings. As many factors contribute to depression among older adults, thus the variations in prevalence of depression can be observed in this population. A high prevalence of depression can also be observed in females with multimorbidity and pain. As the prevalence of multimorbidity among the elderly population significantly increases (40.6%) [17], the possible risk for depression is also raised.

Malaysia is still low in comparing the prevalence of depression in other countries. A systematic review and meta-analysis of 83 cross-sectional studies by Wang *et al.* [25] found that the prevalence of depression among outpatient older adults is 27.0%. The low prevalence in this current study can be attributed to cultural norms in Malaysia. Stronger familial relationships are still practised, and adequate social support is well received among the elderly. Concerning that, social support has been proven to be one of the protective factors against the development of depression [26].

##### 4.2. Sociodemographic relationship between sociodemographic, disease factors and depression

Logistic regression analysis found gender and ethnic group are two sociodemographic variables that predicted depression. Similar to a study among older adults with chronic conditions in China, our study found that females are more likely to experience depression than their male counterparts [27]. Females are prone to report negative emotions because of commonly adopted emotion-focused coping skills compared to males [28], thus making them more susceptible to stress and depression.

Another sociodemographic variable that significantly predicted depression in older adults with chronic illness is the ethnic group. This study found that the Chinese reported higher levels of depression compared to Malay and Indians. Malaysia has three major ethnic groups: Malay, Chinese, Indian and Others [3], with each ethnic group having different beliefs and cultural practices. A study related to ethnic differences and depression in the US also found a significant difference in mental health problems in different ethnic groups [29]. African Americans are less likely to report major depressive disorders than Caucasians but are more likely to experience chronic depression. Thus, healthcare providers should be cognizant of the distinct manifestations of depression in different ethnic groups.

This study also found that multimorbidity and pain are significant predictors of depression among older adults with chronic diseases. Patients with multiple conditions experience various symptoms that can cause discomfort, sometimes impair functional ability, and subsequently impact their emotional well-being. Similarly, a study from China reported the association between pain and depressive symptom [30]. Depression is common among those who suffer from chronic pain because of its toll on their personal and professional lives.

#### 4.3. Sociodemographic relationship between depression and resilience

This study's result agrees with previous studies' results which found a relationship between resilience and depression [15], [26], [31]. Resilience is a significant protective factor against geriatric depression because those with higher levels of resilience demonstrated lower levels of depression. A study among 385 Chinese elderly also reported the influence of resilience on depressive symptoms [31]. Personal competence and optimism have mediated the relationship between age and depressive symptoms. The study also shows that more resilient persons have better mental and physical states, sense adequate family or friends' support, and deal effectively with adversity [32].

There are limitations of present studies that should be taken into consideration when generalizing the findings. The depression reported in this study was self-reported depressive symptoms and not a definite clinical diagnosis of depression. Then, we also have a lack of data on other factors that might contribute to depression, such as perceived social support and self-efficacy. Notwithstanding its limitation, the findings of this study enrich the knowledge of older adults' psychosocial well-being. Early identification of depression in this population is crucial for effective chronic disease management.

#### 5. CONCLUSION

In conclusion, depression affects various domains in older adults' life. This study found that sociodemographic factors such as age, gender and ethnic groups predicted depression. In addition, disease factors like multimorbidity and pain are also associated with depression among older adults with chronic illnesses. However, resilience is a protective factor in reducing the depressive symptoms in this study population. Effective intervention to promote resilience among older adults with chronic diseases is necessary. A medical model of care that focuses on treating the physical conditions should incorporate the psychological aspects of the patients so that holistic management can be achieved.

#### ACKNOWLEDGEMENTS

We would like to express our gratitude to the Faculty of Health Sciences, Universiti Teknologi MARA, Malaysia, for their support of this study. We also acknowledge Muhammad Khairil Azfar, Maz Nur Nadjmi and Muhamad Haziq for their contribution to this study's data collection phase.




#### REFERENCES

- [1] J. Bae, Y. Y. Kim, and J. S. Lee, "Factors Associated With Subjective Life Expectancy: Comparison With Actuarial Life Expectancy," *Journal of Preventive Medicine and Public Health*, vol. 50, no. 4, p. 240, Jul. 2017, doi: 10.3961/JPMMPH.17.036.
- [2] United Nations Department of Economic and Social Affairs Population Division, *World Population Ageing 2019*, vol. Highlights. United Nations Department of Economic and Social Affairs Population Division, 2019.
- [3] M. U. Mahidin, "Department of Statistics Malaysia Press Release: Current Population Estimates, Malaysia, 2018-2019," 2019. [Online]. Available: <https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=aWJZRkJK4UEdKcUZpT2tVT090Snpzd09>. (accessed Apr 11, 2022).
- [4] National Center for Chronic Disease Prevention and Health Promotion, "About Chronic Diseases," *Centers for Disease Control and Prevention*, 2022. <https://www.cdc.gov/chronicdisease/about/index.htm>. (accessed Apr 11, 2022).
- [5] S. Bernell and S. W. Howard, "Use Your Words Carefully: What Is a Chronic Disease?," *Frontiers in Public Health*, vol. 4, no. August, pp. 2–4, 2016, doi: 10.3389/fpubh.2016.00159.
- [6] Y. Ma, Q. Xiang, C. Yan, H. Liao, and J. Wang, "Relationship between chronic diseases and depression: the mediating effect of pain," *BMC Psychiatry*, vol. 21, no. 1, pp. 1–11, 2021, doi: 10.1186/s12888-021-03428-3.
- [7] T. Vos *et al.*, "Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019," *The Lancet*, vol. 396, no. 10258, pp. 1204–1222, Oct. 2020, doi: 10.1016/S0140-6736(20)30925-9.
- [8] N. M. Hussin *et al.*, "Incidence and predictors of multimorbidity among a multiethnic population in Malaysia: a community-based longitudinal study," *Aging Clinical and Experimental Research*, vol. 31, no. 2, pp. 215–224, Feb. 2019, doi: 10.1007/S40520-018-1007-9.
- [9] S. M. McPhail, "Multimorbidity in chronic disease: impact on health care resources and costs," *Risk Management and Healthcare Policy*, vol. 9, pp. 143–156, Jul. 2016, doi: 10.2147/RMHP.S97248.
- [10] V. Ingle, I. Pandey, A. Singh, A. Pakhare, and S. Kumar, "Screening of Patients with Chronic Medical Disorders in the Outpatient Department for Depression Using Handheld Computers as Interface and Patient Health Questionnaire-9 as a Tool," *International Journal of Applied & Basic Medical Research*, vol. 7, no. 2, p. 129, 2017, doi: 10.4103/2229-516X.205809.
- [11] Y. Ozaki, A. Plácido, B. Sposito, D. Ribeiro, S. Bueno, and M. E. Guariento, "Depression and chronic diseases in the elderly," *Revista da Sociedade Brasileira de Clínica Médica*, vol. 13, no. 2, pp. 149–153, 2015.
- [12] M. Englbrecht *et al.*, "New insights into the prevalence of depressive symptoms and depression in rheumatoid arthritis - Implications from the prospective multicenter VADERA II study," *PloS one*, vol. 14, no. 5, May 2019, doi: 10.1371/JOURNAL.PONE.0217412.
- [13] J. R. Read, L. Sharpe, M. Modini, and B. F. Dear, "Multimorbidity and depression: A systematic review and meta-analysis," *Journal*




- of *Affective Disorders*, vol. 221, pp. 36–46, Oct. 2017, doi: 10.1016/J.JAD.2017.06.009.
- [14] E. Fuller-Thomson and J. Nimigon, “Factors associated with depression among individuals with chronic fatigue syndrome: findings from a nationally representative survey,” *Family practice*, vol. 25, no. 6, pp. 414–422, 2008, doi: 10.1093/FAMPRA/CMN064.
- [15] S. MacLeod, S. Musich, K. Hawkins, K. Alsgaard, and E. R. Wicker, “The impact of resilience among older adults,” *Geriatric Nursing (New York, N.Y.)*, vol. 37, no. 4, pp. 266–272, Jul. 2016, doi: 10.1016/J.GERINURSE.2016.02.014.
- [16] K. C. Tan *et al.*, “Depression, anxiety and stress among patients with diabetes in primary care: A cross-sectional study,” *Malaysian Family Physician : the Official Journal of the Academy of Family Physicians of Malaysia*, vol. 10, no. 2, pp. 9–12, 2015.
- [17] S. Shariff Ghazali *et al.*, “Prevalence and factors associated with multimorbidity among older adults in Malaysia: a population-based cross-sectional study,” *BMJ Open*, vol. 11, no. 10, p. e052126, Oct. 2021, doi: 10.1136/bmjopen-2021-052126.
- [18] M. A. Pourhoseingholi, M. Vahedi, and M. Rahimzadeh, “Sample size calculation in medical studies,” *Gastroenterology and Hepatology From Bed to Bench*, vol. 6, no. 1, pp. 14–17, 2013.
- [19] A. Rashid and I. Tahir, “The Prevalence and Predictors of Severe Depression Among the Elderly in Malaysia,” *Journal of Cross-Cultural Gerontology*, vol. 30, no. 1, pp. 69–85, Mar. 2015, doi: 10.1007/s10823-014-9248-3.
- [20] E. E. Teh and Hasanah Che Ismail, “Validation of Malay Version of Geriatric Depression Scale among Elderly Inpatients,” *Age*, 2004, [Online]. Available: [http://eprints.usm.my/10198/1/Validation\\_of\\_Malay\\_Version\\_of\\_Geriatric\\_Depression\\_Scale\\_Among\\_Elderly\\_Inpatients\\_\(PPSP\\_erubatan\).pdf](http://eprints.usm.my/10198/1/Validation_of_Malay_Version_of_Geriatric_Depression_Scale_Among_Elderly_Inpatients_(PPSP_erubatan).pdf). (accessed Apr 21, 2022).
- [21] C. Pocklington, D. McMillan, S. Gilbody, and L. Manea, “The Diagnostic Accuracy of Brief and Ultra-brief Versions of the Geriatric Depression Scale: a Meta-analysis,” *European Psychiatry*, vol. 30, p. 1437, Mar. 2015, doi: 10.1016/S0924-9338(15)31111-1.
- [22] K. M. Connor and J. R. T. Davidson, “Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC),” *Depression and Anxiety*, vol. 18, no. 2, pp. 76–82, Jan. 2003, doi: 10.1002/da.10113.
- [23] A. M. Radzi, N. Draman, S. S. M. Yusoff, and R. Muhamad, “Depression and potential risk factors among the elderly with Type 2 Diabetes Mellitus in Kedah, Malaysia,” *The Medical Journal of Malaysia*, vol. 74, no. 2, pp. 103–108, Apr. 2019.
- [24] N. A. Ahmad *et al.*, “Association between functional limitations and depression among community-dwelling older adults in Malaysia,” *Geriatrics & Gerontology International*, vol. 20 Suppl 2, no. S2, pp. 21–25, Dec. 2020, doi: 10.1111/GGI.14012.
- [25] J. Wang *et al.*, “Prevalence of depression and depressive symptoms among outpatients: a systematic review and meta-analysis,” *BMJ open*, vol. 7, no. 8, 2017, doi: 10.1136/BMJOPEN-2017-017173.
- [26] J. Li, Y. L. Theng, and S. Foo, “Does psychological resilience mediate the impact of social support on geriatric depression? An exploratory study among Chinese older adults in Singapore,” *Asian Journal of Psychiatry*, vol. 14, pp. 22–27, Apr. 2015, doi: 10.1016/J.AJP.2015.01.011.
- [27] H. Nan, P. H. Lee, I. McDowell, M. Y. Ni, S. M. Stewart, and T. H. Lam, “Depressive symptoms in people with chronic physical conditions: Prevalence and risk factors in a Hong Kong community sample,” *BMC Psychiatry*, vol. 12, 2012, doi: 10.1186/1471-244X-12-198.
- [28] B. S. Graves, M. E. Hall, C. Dias-Karch, M. H. Haischer, and C. Apter, “Gender differences in perceived stress and coping among college students,” *PLoS One*, vol. 16, no. 8, Aug. 2021, doi: 10.1371/JOURNAL.PONE.0255634.
- [29] R. K. Bailey, J. Mokonogho, and A. Kumar, “Racial and ethnic differences in depression: current perspectives,” *Neuropsychiatric Disease and Treatment*, vol. 15, pp. 603–609, 2019, doi: 10.2147/NDT.S128584.
- [30] Y. Hu *et al.*, “Prevalence and Associated Factors of Depressive Symptoms Among Patients With Chronic Low Back Pain: A Cross-Sectional Study,” *Frontiers in Psychiatry*, vol. 12, no. January, pp. 1–7, 2022, doi: 10.3389/fpsyt.2021.820782.
- [31] M. L. Lim, D. Lim, X. Gwee, M. S. Z. Nyunt, R. Kumar, and T. P. Ng, “Resilience, stressful life events, and depressive symptomatology among older Chinese adults,” *Ageing & Mental Health*, vol. 19, no. 11, pp. 1005–1014, Nov. 2015, doi: 10.1080/13607863.2014.995591.
- [32] Z. A. Mulud and G. McCarthy, “Caregiver Burden Among Caregivers of Individuals With Severe Mental Illness: Testing the Moderation and Mediation Models of Resilience,” *Archives of Psychiatric Nursing*, vol. 31, no. 1, pp. 24–30, Feb. 2017, doi: 10.1016/j.apnu.2016.07.019.

## BIOGRAPHIES OF AUTHORS



**Zamzaliza A. Mulud**    is a senior lecturer at the Centre for Nursing Studies, Universiti Teknologi MARA (UiTM), Malaysia and was a visiting scholar at University College Cork, Ireland, in 2021. Zamzaliza received her PhD from University College Cork in Ireland, where her research focused on family caregivers of individuals with severe mental illness. She also completed her Master's degree in Gerontological Nursing at Griffith University, Australia. Zamzaliza's research focuses on chronic disease in older adults, depression and anxiety in the elderly and adolescents, as well as caregiver burden and resilience. She can be contacted at email: zamzaliza@uitm.edu.my.



**Norfidah Mohamad**    is a Senior Lecturer at the Centre for Nursing Studies, UiTM, Selangor, Malaysia. Her specialization is in critical care nursing. Her research work and interests are in critical care nursing, which focuses on intensive care nursing and cardiology nursing. She can be contacted at email: norfidah@uitm.edu.my.