

## ORIGINAL ARTICLE

# Physical Activity and its Relationship with Mental Health and Quality of Life Among Community-Dwelling Older Adults.

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## ABSTRACT

**Introduction:** The global population is aging rapidly, accompanied by high rates of physical inactivity among older adults. Physical inactivity in later life can negatively impact physical function, mental health, and quality of life. Gardening meets physical activity guidelines for older adults (150-300 minutes of moderate activity per week). This study examined relationships between physical activity levels, mental health, and quality of life in community-dwelling older adults. **Methods:** A cross-sectional study was conducted with 150 adults aged  $\geq 60$  years (mean  $65.65 \pm 6.54$  years). Physical activity levels, mental health, and quality of life were assessed using validated questionnaires. Spearman's rank correlation coefficients were calculated to assess relationships between variables. Data were analyzed using SPSS version 26.0. **Results:** There was a statistically significant, negative, fair correlation between physical activity levels and mental health scores ( $r=-0.21$ ,  $p<0.05$ ), indicating higher physical activity was associated with better mental health. Physical activity levels positively correlated with quality of life ( $r=0.19$ ,  $p<0.05$ ). **Conclusion:** Higher physical activity levels were associated with better mental health and higher quality of life in community-dwelling older adults. Gardening may be an effective activity to improve health outcomes in this population. Further research should examine causal relationships and gardening interventions.

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## INTRODUCTION

Optimum physical wellbeing is critical for older Malaysians maintaining a good quality of life in society. Previous statistic reports show a substantial percentage of the older adults (48.8%) were reported to be physically inactive (1). Research into functional wellbeing and other aging problems has become a concern as the Malaysian population ages, comparable to other regions globally. If this is left unattended, it may cause a burden to society, especially in terms of health care. While recent evidence supported that physical inactivity and sedentary behavior contribute to the global burden of chronic disease among older adults (2), careful consideration concerning the type of physical activity (PA) designed for them is needed.

Gardening can be an activity that promotes general health and physical strength, quality of life, fitness,

flexibility, cognitive ability, and socialization (3). Elder-accessible gardens allow older volunteers to contribute their time and expertise to cultivate nutritious foods (4) communicate with each other (5) and pass on cross-generational wisdom to younger community members (6). It is also an ideal approach in engaging people of all age groups to remain active, lowering the risks of frailty, loneliness, and depression, and improving social interactions (5,6). Moderate intensity raises generally be equivalent to gardening, brisk walking, walking with a purpose, or any activities that significantly raise the heart rate.

Gardening is one of PA adhering to the American College of Sports Medicine (ACSM) guidelines, where older adults who engage in at least 30 minutes of moderate-intensity activities on most days of a week (7) can acquire successful aging. It can lower the risk of falling (8), improve mental wellbeing (9) and enhance the quality of life. However, the number of older adults that failed meeting these criteria during the COVID-19 pandemic increased more than before the virus outbreak started in 2019 (10). Limited articles have evaluated the level of PA and its relationship with mental health and

quality of life, albeit some had established gardening enhances physical health among them (9). Therefore, this study aimed to determine Physical Activity Scale for the Elderly (PASE) scores measuring PA levels and examine relationships between PA, mental health, and quality of life among community-dwelling older adults. Gardening was evaluated as a potential PA modality to improve health outcomes in this population.

**MATERIALS AND METHODS**

**Subjects and setting**

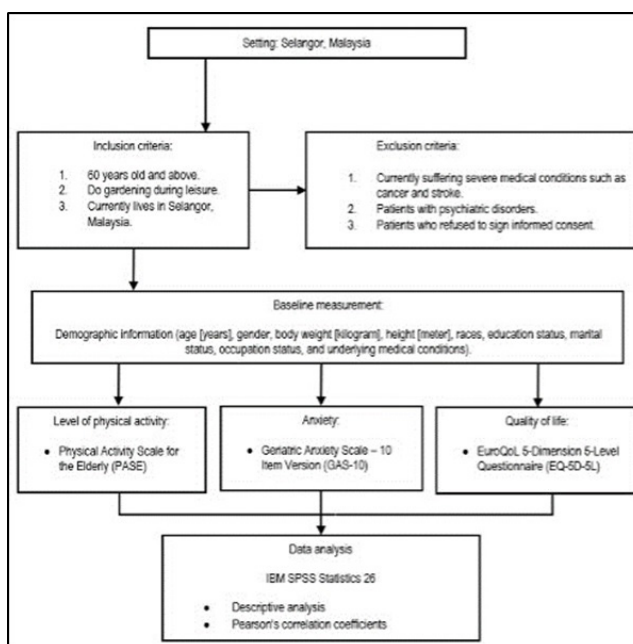
The study design used in this research is a descriptive cross-sectional study design because it is the most appropriate to use in acquiring the relationship between two variables in a target population at a particular point in time. Due to Covid-19 pandemic, this study design is quicker and easier to conduct compared to using mails and telephone interviews when collecting data from large sample size. To be included in this study, the participants had to meet the following criteria (I) aged 60 years or older; (II) perform gardening at least 1-2 hours per week; (III) able to understand in either in Bahasa or English.

The inclusion criteria requiring regular gardening participation for at least 1-2 hours per week in this study was important to specifically examine gardening as a beneficial form of physical activity among older adults. Gardening meets physical activity guidelines for older adults and provides multidimensional health benefits including physical, cognitive, and social. Requiring a sample of active gardeners allowed for analyzing relationships between regular gardening engagement, mental health, and quality of life compared to being inactive. Additionally, gardening is a feasible and accessible activity for many older adults, even those with mobility limitations, so studying gardeners enhanced generalizability of findings to the broader senior population. While research has demonstrated overall physical activity benefits for older adult health, current evidence specifically on gardening’s impacts is more limited compared to other activity types. Therefore, selectively recruiting active older gardeners aligned with the study’s aims to build knowledge on gardening while also elucidating associations between levels of this recommended activity, mental wellbeing, and quality of life in this age group.

A compromise power analysis based on the G\*Power calculation analysis was conducted to determine the sample size. A total sample size of 123 was obtained. The total sample size of the research will be 148 participants after considering 20% of the dropout rate. The approval and ethical clearance from the Faculty Ethics Review Committee (FERC) of Faculty of Health Science (UiTM) and Department of Social Welfare was attained upon commencement of the study [Reference No: REC/12/2021(UG/MR1143)].

**Data Collection Procedure**

The method of the data collection is through self-report. The questionnaire and study information were distributed through online survey administration software targeting the older adult population in Selangor, Malaysia. The first section of the questionnaire comprised of informed consent and sociodemographic data. The second section consisted of the Physical Activity Scale for the Elderly (PASE) followed by the Geriatric Anxiety Scale – 10 Item Version (GAS-10) and EuroQoL 5-Dimension 5-Level Questionnaire (EQ- 5D-5L) for assessing physical activity, anxiety and evaluating health-related quality of life in older people. The study process as showed in Figure 1.



**Figure 1: The study flow chart**

The Physical Activity Scale for the Elderly (PASE) is a brief, self-report questionnaire that assesses frequency, duration, and intensity of physical activities over a 7-day period in older adults. The PASE has demonstrated good test-retest reliability (ICC=0.75) and moderate correlation with health status and physical function (r=0.3-0.4) in community-dwelling seniors. Scores range from 0 to over 400, with higher scores indicating greater physical activity levels.

The Geriatric Anxiety Scale - 10 item (GAS-10) is a short anxiety screening tool designed for older adults. The GAS-10 has high internal consistency (Cronbach’s  $\alpha=0.89$ ) and sound convergent validity with other anxiety measures (r=0.64-0.73). Total scores range from 0 to 30, with higher scores suggesting greater anxiety severity. Scores above 10 indicate clinically significant anxiety symptoms.

The EQ-5D-5L is a standardized instrument assessing health-related quality of life across five domains:

mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each domain is rated on a 5-level scale. The EQ-5D-5L has demonstrated validity in older adults and is available in multiple languages. Index-based values range from -0.446 to 1, with higher scores representing better quality of life.

All instruments were available in English and Malay to accommodate participants' preferred language. The validated tools provided quantitative scores to examine relationships between physical activity, mental health, and quality of life in this sample of older Malaysian adults.

### Statistical analysis.

Data analysis was conducted using Statistical Package for the Social Science (SPSS) version 26.0 (22). For descriptive analysis, results were presented as frequency and percentages. A Spearman's correlation coefficient test was used to determine the association between categorical variables. The level of statistical significance was set as a p-value of less than 0.05.

## RESULT

### Sociodemographic data

The final sample size comprised 150 participants after excluding 19 for having less than 60 years of age. The baseline characteristics of the study participants were summarized in Table I. A total of 62 were males, while the rest were females. Most of them were ethnic Malay (72.70%), followed by Chinese (17.30%) and Indian (9.30%). The mean age of the participants was 65.65 (SD = 6.54 years). The mean body weight, height, and Body Mass Index (BMI) were recorded as 67.31 ± 10.21, 1.60 ± 0.06, and 26.36 ± 3.94.

**Table I. Characteristics of participants**

Characteristics	Frequency (%)	Mean ± SD (Range)
<b>Age (years)</b>	–	65.65 ± 6.54 (24)
<b>Body weight (kilogram)</b>	–	67.31 ± 10.21 (53)
<b>Height (meter)</b>	–	1.60 ± 0.06 (0.38)
<b>BMI (kg/m<sup>2</sup>)</b>	–	26.36 ± 3.94 (22.90)
<b>Gender</b>		
Male	62 (41.30)	–
Female	88 (58.70)	
<b>Races</b>		
Melayu	109 (72.70)	–
Cina	26 (17.30)	
India	14 (9.30)	
<b>Education status</b>		
Did not go to school	16 (10.70)	
Primary school	19 (12.70)	–
Secondary school	45 (30.00)	
University	70 (46.70)	

CONTINUE

**Table I. Characteristics of participants (cont.)**

Characteristics	Frequency (%)	Mean ± SD (Range)
<b>Marital status</b>		
Single	3 (2.00)	
Married	121 (80.70)	–
Divorced	23 (15.30)	
Widowed	23 (15.30)	
<b>Occupation status</b>		
Housewife	34 (22.70)	
Retired	92 (61.30)	–
Self-work	24 (16.00)	
<b>Health status</b>		
Asthma	1 (0.70)	
Diabetes	2 (1.30)	
Hypertension	6 (4.00)	
Heart problem	5 (3.30)	–
Cholesterol	4 (2.70)	
2 or more diseases	104 (69.30)	
None	28 (18.70)	

Note. SD, standard deviation.

### Level of physical activity

The mean PASE score was 150.73 ± 46.82. The median was 155.80 (interquartile range [IQR] = 69.40). Results showed the frequency for each component incorporating hours spent each day participating in that activity over seven days and the percentage of participants taking part in that activity during the past seven days. The most substantial influence on the PASE score was the household activity section. Light housework, outdoor gardening, and heavy housework gave the highest average individual contributions to the total scores. Most of the older people who participated in light housework had the highest percentages (98.00%), followed by outdoor gardening (92.67%), heavy housework (89.30%), and lawn work or yard care (43.33%). Also, walking outside the home utilized the most long-lasting hour spent for the leisure activity component. This data is shown in Table II.

**Table II. Frequency and Scores of Physical Activity Scale for the Elderly (PASE) Components**

PASE Component	Frequency	PASE Weight <sup>b</sup>	Contribution to Total PASE Score
	Total (N = 150)		
<b>Leisure activity component</b>			
Walk outside home	2.61 h/d	20	52.20
Light sports and recreational activities	0.07 h/d	21	1.47
Moderate sports and recreational activities	0.01 h/d	23	0.23
Strenuous sports and recreational activities	0.08 h/d	23	1.84
Muscle strength and endurance activity	0.01 h/d	30	0.30

CONTINUE

**Table II. Frequency and Scores of Physical Activity Scale for the Elderly (PASE) Components (cont.)**

PASE Component	Frequency	PASE Weight <sup>b</sup>	Contribution to Total PASE Score
	Total (N = 150)		
<b>Housework activity</b>			
Light housework	98.00%	25	24.50
Heavy housework	89.30%	25	22.33
Home repairs	5.33%	30	1.60
Lawn work/yard care	43.33%	36	15.60
Outdoor gardening	92.67%	20	18.53
Caring for another person	34.00%	35	11.90
<b>Work-related activity</b>			
Paid/voluntary work	0.01 h/d	21	0.21

h/d indicates hours spent each day participating in that activity over a 7-day period while % indicates the percentage of participants engaging in that activity during the 7 days.

<sup>b</sup>Quoted from the PASE original article (Washburn et al., 1993).

**Correlation between level of physical activity (PASE) with mental health and quality of life (EQ5D5L)**

Spearman’s rank correlation coefficient was used to analyze the relationship between physical activity levels, mental health, and quality of life. A significance level of 5% was set for both correlations. Results revealed a statistically significant, negative, fair correlation between physical activity levels (PASE scores) and mental health (GAS-10 scores) ( $r=-0.275$ ,  $p<0.05$ ). The negative correlation indicates an inverse relationship, whereby higher physical activity levels were associated with lower anxiety symptoms. In contrast, the correlation between physical activity levels and quality of life (EQ-5D-5L index values) was positive but weak and not statistically significant ( $r=0.091$ ,  $p=0.269$ ). The findings presented in Table III.

**Table III. Correlation between level of physical activity (PASE) with mental health and quality of life (EQ5D5L)**

Variable	Mental health (GAS10)	Quality of life (EQ5D5L)
Level of physical activity (PASE)	-0.275 (0.001) <sup>b</sup>	0.091 (0.269) <sup>b</sup>
Spearman correlation coefficient		

<sup>b</sup> P value

**DISCUSSION**

This study’s primary objective was to evaluate physical activity (PA) levels among community-dwelling older adults using the Physical Activity Scale for the Elderly (PASE). Secondary and tertiary objectives were examining relationships between PA and mental health and quality of life, respectively. To our knowledge, this is the first study investigating these associations in older Malaysian adults during the COVID-19 transition from pandemic to endemic phase.

The mean PASE score obtained ( $150.73 \pm 46.82$ ) was higher than pre-pandemic studies (131.3 (13), 94.96 (14)) but lower than another pre-pandemic report ( $159 \pm 77.88$  (12)). However, it exceeded a pandemic-era study ( $102.5 \pm 63.8$ ) (15), aligning with evidence that PA declined in older adults during COVID-19 restrictions (10,16). The focus on gardeners may explain the higher PASE scores versus pandemic findings, as gardening has been associated with improved strength, cardiovascular health, and other benefits in older adults (17,18). Gardening provides light-to-moderate intensity PA, which meets guidelines for older adults (28). Qualitative work highlights gardening’s multidimensional impacts, including sense of purpose, social connectedness, stress relief, and mental restoration (29,30). Regardless of gardening extent, this cost-effective activity may help older adults maintain health (19). Comparing current post-pandemic gardeners’ PA to pre-pandemic levels would be valuable.

A significant negative correlation was found between PA and anxiety symptoms ( $r=-0.275$ ,  $p=0.001$ ), indicating higher PA associated with lower anxiety. This aligns with systematic reviews showing PA reduces anxiety and other mental illness symptoms (20,21). However, the relationship’s mechanism remains unclear. Contrary to our findings, some studies using anxiety questionnaires found no PA-anxiety association (15,23). Differences may stem from methodological limitations in those works, including substantial missing data (15). The use of validated tools strengthens our study. Additional research should investigate this relationship and PA’s anxiolytic potential in diverse older adult populations. The anxiolytic effects of PA may be due to neurobiological and psychosocial mechanisms. Exercise increases brain-derived neurotrophic factor which enhances nerve cell growth and protects mental health (31). Physical activities like gardening also provide stress relief and mood enhancement through engagement with nature (32). Socially interactive exercises may reduce anxiety by fulfilling needs for companionship (33). While moderate-intensity PA shows anxiety-reducing effects (34), very high-intensity exercise could worsen anxiety in unfit populations (22). Gardening’s light-to-moderate demands may create an optimal anxiolytic effect.



Surprisingly, the PA-quality of life correlation was non-significant ( $r=0.091$ ,  $p=0.269$ ), conflicting with research linking higher PA to improved quality of life in older adults (26,27). Variations in quality of life measures may partly explain discrepancies. Other factors like comorbidities and living circumstances may influence quality of life ratings regardless of PA levels. Nonetheless, facilitating PA engagement remains critical for healthy aging and merits ongoing attention from healthcare providers and policymakers during public crises.

These findings have clinical implications for physical therapists, who can educate and motivate older adults regarding lifestyle changes to manage anxiety symptoms. High-quality, patient-centered care addressing physical and mental health needs can optimize intervention adherence and wellbeing (35). Therapists should assess anxiety when developing exercise programs for older adults and consider potential benefits of socially engaging activities like community gardening. Policy initiatives to improve neighborhood walkability and access to green spaces could also promote PA engagement among anxious seniors (36).

Thus, higher physical activity related to lower anxiety but not quality of life in this sample. Study limitations like the cross-sectional design and limited generalizability should be addressed in future work. Longitudinal and experimental studies on gardening's impacts are needed. Research examining multidomain lifestyle interventions and interactions between physical activity, diet, social engagement, and mental health warrants exploration. Thorough study of PA's mental health benefits can inform clinical practice and public health efforts to enhance successful aging.

## CONCLUSION

In conclusion, this study found a statistically significant, negative, fair correlation between physical activity levels and anxiety symptoms, indicating higher physical activity was associated with better mental health in community-dwelling older adults. However, the correlation between physical activity and quality of life, while positive, was weak and not statistically significant. Further research with larger sample sizes is warranted to confirm and expand on these findings. Additionally, assessing depression and stress alongside anxiety when evaluating mental health outcomes may provide a more comprehensive understanding, as these factors are often interrelated and may differentially impact physical activity. Overall, results indicate physical activity benefits older adults' mental wellbeing, and efforts to promote active lifestyles through gardening and other modalities could support healthy aging during public health crises. Longitudinal and experimental studies are needed to establish causal relationships between physical activity, gardening, mental health, and quality of life in this vulnerable population.

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