

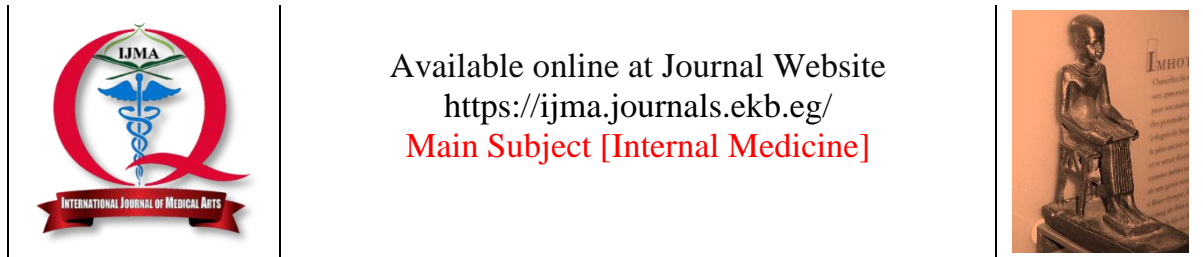
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Original Article

Relationship between Depression and Gait Speed Disturbance in Elderly Outpatient of Geriatric and Psychiatric Clinics of Syed Galal University Hospital

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ABSTRACT

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Background: Despite being one of the most prevalent mental illnesses worldwide, depression is frequently misdiagnosed. As some of their symptoms may mimic typical aging-related problems, older persons run the risk of becoming misdiagnosed and not receiving treatment. Psychomotor retardation is a cardinal symptom of depression and one of the criteria of diagnosis of depression. In this paper we try to investigate the correlation among depression and gait speed with the goal to facilitate diagnosis of depression and to help depression recognition. We try to diagnose the depressed older adults through their gait speed.

The aim of the work: To assess the correlation among depression & gait speed in elderly patients with the aim to assist in the diagnosis of depression.

Patients and Methods: One hundred older adults [60 years and more] with positive screening test for depression were included in this study. Participants were collected from geriatric and psychiatric outpatient clinics of Syed Galal University Hospital, Cairo, Egypt. All participants were subjected to comprehensive geriatric assessment. 10-meter walk test was carried out for all participants to assess gait speed in depressed patients.

Results: The majority of participants were females [60%]. Regarding the relationship between depression symptoms and gait speed, subjects experienced weight changes, sleep disturbance, and worthlessness were significantly had slow gait speed.

Conclusion: The results of this study demonstrated that slow gait speed may be a clue for the diagnosis of depression in older adults.

Keywords: Depression; Gait Speed; Elderly; Geriatrics.



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INTRODUCTION

The loss of homeostasis, diminished capacity to respond to internal or external stimuli and increased susceptibility to disease and mortality have been all consequences of aging, which has been a progressive decline and deterioration of functional qualities at the cellular, tissue, and organ level ^[1].

Compared to other categories, the share of the elderly [those over sixty] is expanding at the quickest rate in the world. The senior population will more than double by 2050, rising from eleven percent to twenty-two percent ^[2].

As some of their symptoms may resemble typical aging-related changes, older people are at risk of having their depression misdiagnosed and not receiving treatment. Additionally, symptoms may be wrongly linked to other conditions, drugs, or life changes ^[3].

Gait speed is a straightforward, affordable, & clinically helpful indicator of physical function in older persons ^[4]. The "6th vital sign"—walking speed—is dubbed as having the potential to be a key indication of health & function in aging & disease. A reduction in walking speed could be a precursor to issues with 1 or more physiological systems ^[5].

While low gait speed has been linked with depression in older adults, little has been known about the correlation among gait speed and depression. In this study, we try to investigate the correlation among depression and gait speed with the goal to facilitate diagnosis of depression and to help depression recognition.

PATIENTS AND METHODS

Cross sectional research had been used to analyze the results of the 10-meter walk test [MWT] in depressed patients. A total of 100 participants aged 60 years and older were included in this study.

Participants were collected from geriatric and psychiatric outpatient clinics, Sayed Galal University Hospital, Cairo, Egypt, in the period from November 2022 to September 2023.

All participants were subjected to comprehensive geriatric assessment [CGA] including history and examination. History items include: demographic

data, presenting complaint [acute problem], past history of medical illness, past surgical history, loss events including loss of employment/retirement, loss of independence, loss of friends, or loss of partners, functional status, nutritional status, sensory impairment, medication history, and history of trouble mood.

Examination includes mini-Mental State examination, Patient Health Questionnaire-2, Timed Up and Go test, neurological examination, other systems examination, depression diagnosis by diagnostic and statistical manual of mental disorders-5, Geriatric Depression Scale-15 [GDS-15], gait speed assessment [10-meter walk test].

Study Tools include Screening of depression by [PHQ-2] ^[6, 7], diagnosis of depression by DSM-5 criteria ^[8], assessment of depression severity by GDS-15 ^[9, 10], TUG to assess fall¹¹, and Gait speed assessment ^[11, 12].

In this investigation, walking speed had been measured on a 10-meter level, clear ground. A stopwatch had been used to time each participant's walk at a base that they independently chose. The gait speed is the amount of time it takes to cover a predetermined distance on flat ground over a brief distance. Gait speed = distance walked by the patient/time to walk that distance. Normally it equals 0.8 or more meters/second. A gait speed of 0.8 m/s was set as the cut-off value of gait speed test ^[12].

Ethical considerations: Oral and written consents were obtained from the participants approving the acceptance of the research after explanation of the research goals and benefits from sharing in this study.

Statistical Analysis: All data were recorded, entered, and analyzed using the statistical package of social sciences. Categorical data were summarized by frequency and percentages, while numerical data were expressed by the mean and standard deviation. Groups compared by independent samples student test or Chi square test were used for quantitative and qualitative data respectively. P value < 0.05 was considered significant.

RESULTS

The majority of cases in the study group were in the seventh decade of life, with slight female sex predilection [60.0%]; the majority were married [38.0%] and a respected percentage were widows [36.0%] and 66.0% had an education

equal to or more than 5 years. Loss events was the commonest life style [50.0%] followed by living alone [34.0%]. The sleep duration was around 7 years per day. About 72% of study subjects had comorbid conditions and 70.0% received medications [Table 1].

The severity of depression evaluated by geriatric depression scale-15 was presented in Table 2. 44% of participants were had mild depression, 26% had moderate depression, and 30% had severe depression.

Table [3] shows the relationship between depression symptoms and gait speed. Subjects experienced weight changes, sleep disturbance,

and worthlessness were significantly had slow gait speed [0.53 ± 0.19 , 0.56 ± 0.16 and 0.53 ± 0.16] m/s respectively.

Table [4] and figure [1] demonstrates the association between depression grades [measured by GDS-15] and gait speed m/s. there had been a significant variation among mild and severe depressed cases.

Table [5] demonstrates the association among gait speed & age, weight, height, BMI, and sleep hours. There is statistically significant negative correlation between gait speed and age of participants [p. value = <0.001].

Table [1]: Sociodemographic, life styles and associated comorbid conditions among the study subjects

Variable	Measures	Values
Age [years]	Mean±SD	69.80 ± 5.80
Sex [n, %]	Male	40 [40.0%]
	Female	60 [60.0%]
Marital status [n, %]	Married	38 [38.0%]
	Single	10 [10.0%]
	Widow	36 [36.0%]
	Divorced	16 [16.0%]
Education [n, %]	≥ 5 years	66 [66.0%]
	< 5 years	28 [28.0%]
	Illiterate	6 [6.0%]
Life style	Living alone [n,%]	34 [34.0%]
	Loss events [n,%]	50 [50.0%]
	Sleep hours [mean±SD]	6.46 ± 1.07
Comorbid conditions [n, %]	≥3	49 [49.0%]
	<3	23 [23.0%]
	No comorbidities	28 [28.0%]
Medications [n, %]	≥5	57 [57.0%]
	<5	13 [13.0%]
	No medications	30 [30.0%]

Table [2]: Depression grades among studied subjects by using Geriatric Depression Scale-15

Grade of depression	N.	%
Mild	44	44
Moderate	26	26
Severe	30	30

Table [3]: Gait speed of studied subjects in relation with depression symptoms

	Gait speed [m/s] in relation to condition [Y/N]				P. value
	Yes		No		
	Mean	SD	Mean	SD	
Loss of interest	0.60	0.22	0.59	0.17	0.954
Weight changes	0.53	0.19	0.66	0.22	0.003*
Sleep disturbances	0.56	0.16	0.71	0.30	0.031*
Psychomotor retardation	0.59	0.22	0.60	0.18	0.812
Fatigue	0.60	0.21	0.58	0.21	0.826
Worthlessness	0.53	0.16	0.65	0.24	0.006*
Decrease concentration	0.59	0.20	0.61	0.33	0.802
Suicidal ideation	0.45	0.16	0.60	0.21	0.080

Table [4]: Comparison of gait speed test by depression grades among studied subjects

	Depression grades			P. value	Sig.
	Mild	Moderate	Severe		
	Mean ± SD	Mean ± SD	Mean ± SD		
GS test [m/s]	0.67±0.22	0.58±0.18	0.49±0.16	0.001	S

Table [5]: correlation of gait speed of studied subjects with their characteristics

Q	Age [years]	Wt [KG]	Ht [CM]	BMI	Sleep hours	
GS	r	-0.375	-0.080	0.013	-0.090	-0.044
[m/s]	p. value	<0.001	0.426	0.900	0.372	0.665
	Sig	S	NS	NS	NS	NS

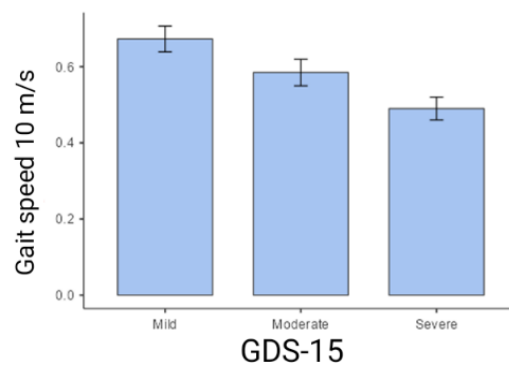


Figure [1]: Illustrates distribution [Mean ± SD] of gait speed in relation to depression severity

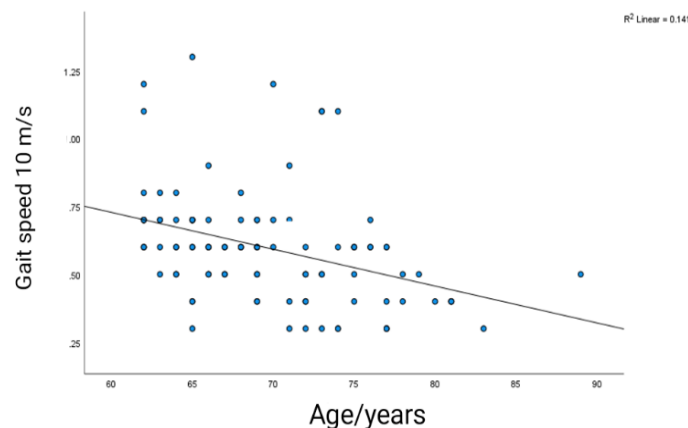


Figure [2]: Scattered diagram showing the correlation between gait speed and age in years

DISCUSSION

The current study showed that elderly persons are more likely to be severely depressed with increasing age [r = -0.375] with statistically significant [P value <0.001]. This was consistent to **Anbesaw and Fekadu** [13] who found that elderly people had a significant risk increases more with increasing age.

The present research found that depression had been more prevalent between women [60%] which was concordant with previous numerous epidemiological studies who reported that women

have a higher prevalence rate of depression than men [13, 14]. According to our findings, female participants had been more susceptible to geriatric depression than male ones. This result is consistent with earlier research [15]. This can be explained by women have been more likely than men to develop internalization disorders like depression & anxiety, while men have been more likely to exhibit externalization disorders such as violence and substance abuse [16].

Our results revealed that older adults whose educational status was less than five years was more likely to develop depression compared to

higher education level. This had been in accordance with **Anbesaw and Fekadu** ^[13], who found that older adults with education grades five-eight years had been nearly six times and nine-twelve years had been 3.44 times more likely to develop depression than those of college and above.

The current research displayed that depression had been correlated to disturbed marital status or singles. This agreed with **El-Gilany *et al.*** ^[14]. This could be explained by a sense of isolation and a lack of social support. When asked how often you feel lonely, the definition is either a fair amount of the time or all the time. Our study revealed that 34% of participants were living alone. This loneliness was due to widow, divorced, single or separated. Social support in the form of spouse support and social activities promote the people to keep a good mood which is good for declaring normal gait speed ^[17].

Slowing mobility is a sign of both neurological and musculoskeletal abnormalities, which may indicate increased susceptibility to disease and decreased neural balance ^[18]. Psychomotor slowing is a risk factor for worse mobility and mood. Psychomotor retardation including slow gait speed is one of the criteria of diagnosis of depression ^[19]. Elderly persons with depression appear to have a greater risk of suicide and suicidal ideation ^[20], this agreed with our study where 6% of participants have tendency to suicidal behavior.

Depression grades among participants of this study were mild depression 44%, moderate depression 26%, and severe depression 30% by using geriatric depression scale [GDS-15]. Relationship among depression grades measured by GDS-15 and gait speed measured by m/s were statistically significant and P-value was 0.001.

In this research we found a significant relationship among slow gait speed and severe depression [$P < 0.05$]. There is negative correlation between gait speed and increasing age. Support from the family had been inversely correlated with geriatric depression. This suggests that an increase in geriatric depression or a decline in perceived social support can be related.

Current study conducted by **Vilas *et al.*** ^[21] proved that the lack of family support is related to depression in older adults. On the other hand, various studies have proved that geriatric depression symptoms reduce significantly with increased support from family members ^[22, 23].

The results of this study were strengthened by the finding that the elderly people who had good family support had low levels of depression, whereas the elderly group who had poor family support had high levels of depression. This suggests that a strong sense of family support and good communication among family members who care for elderly relatives at home play a major and beneficial impact in reducing the amount of depression that the elderly suffer. According to a study by **Nshimyumuremyi *et al.*** ^[24], this is the case.

Although there are numerous published walk test techniques, they are often easy to conduct and only call for a timer and level surface. Gait speed is frequently assessed using a walk test ^[25].

Protocols for walk tests can be either time- or distance-based [e.g., six minutes]. Even though published cutoffs for low vs normal gait speed vary, the most widely accepted cutoffs fall among 0.8 and 1 m/s, with gait rates below these ranges being termed low gait speed. Gait speed measurement as a quick & reliable diagnostic technique could have important clinical implications. Older adults experiencing depression have significantly lower gait speeds than those without mood disorders ^[19]. Our results are like earlier research in that studied cases with low gait speed had been more likely to have severe depressive symptoms ^[26].

As elderly women typically have shorter physical heights due to postmenopausal osteoporosis and as men are generally taller than women, there was a significant relationship among height and gait speed among male participants older adults ^[12].

Elbaz *et al.* ^[28] reported that height explains the commonly noted variation in usual gait speed among men and women.

The present study shows that depressed older adults had low gait speed. Factors associated with low gait speed in addition to depression include age, comorbidities, and medications.

Comorbidities have been generally related to gait speed decline; our research showed that associated comorbidities were 49% of subjects had 3 or more chronic disease and 23% had less than three chronic disease, while 28% had no any comorbidity. Our participants with low gait speed were had hypertension, diabetes mellitus, coronary artery disease, and COPD, this was in consistent with the results of **Tian *et al.*** ^[29].

Regarding the medications used by studied subjects, 57% were taken five or more drugs and 13% were taken less than five medications, while 30% were taken no medications. The increase number of medications was associated with slow gait speed.

Depression symptoms, especially weight changes, sleep disturbance, and worthlessness were significantly affecting gait speed [13]. The present research revealed that gait speed of studied subjects who had weight changes, sleep disturbance and worthlessness were statistically significant in relation with other depression symptoms. The P-values were 0.003, 0.031, and 0.006 respectively for weight changes, sleep disturbance and worthlessness. The other depressive symptoms among studied subjects were non-significant in relation to gait speed.

In our research, depression had been statistically significant between those who experienced sleeplessness, reinforcing the link between these two conditions. This finding was in consistence with that reported by Taylor *et al.* [30] who discovered that older persons with insomnia had been 9.82 times more likely to have clinically severe depression than older adults without insomnia. Our results confirmed that gait speed was slow in depressed subjects with sleep disturbance [P-value = 0.031] with statistically significant result.

Our results showed that worthlessness which is a cardinal depression symptom was affect gait speed [P-value = 0.006] of participants involved in this study. This research had been crucial to determine the importance of slow gait speed in depressed older adults & pave the way for further studies and intervention to its prevention.

Conclusion: The results of this study showed that slow gait speed may be a clue for the diagnosis of depression in older adults. This research suggested that gait speed which is the 6th vital sign could be effectively utilized to identify depression among Egyptian older adults.

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