Gait Speed and Mood, Cognition, and Quality of Life in Older Adults With Atrial Fibrillation

ORIGINAL RESEARCH

Gait Speed and Mood, Cognition, and Quality of Life in Older Adults With Atrial Fibrillation

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***Background*—**Low gait speed has been linked with impaired mood, cognition, and quality of life (QOL) in older adults. We examined whether low gait speed was associated with impaired mood, cognition, and QOL among older adults with atrial fibrillation (AF).

***Methods and Results*—**Participants (n=1185) had a diagnosis of AF, aged ≥65 years, CHA_2DS_2VASc ≥2 and had no contraindications to anticoagulation. Participants completed a 15-foot walk test, and low gait speed was categorized using cutoffs from the Fried Frailty Index. Participants self-reported measures of depressive symptoms (Patient Health Questionnaire 9 ≥10), anxiety symptoms (Generalized Anxiety Disorder 7 ≥10), cognitive impairment (Montreal Cognitive Assessment ≤23), and potentially impaired Atrial Fibrillation Effect Quality-of-Life Questionnaire <80. Participants were on average aged 75.3 (SD: 7.0) years, 48.0% were women, and 85.5% were non-Hispanic white; 85.6% were taking an oral anticoagulant, 26.1% had low gait speed, 8.4% had elevated depressive symptoms, 5.7% had elevated anxiety symptoms, 41.1% were cognitively impaired, and 41.6% had potentially impaired AF-related QOL. Participants with low gait speed were significantly more likely to have elevated depressive symptoms (adjusted odds ratio: 2.1, 95% CI: 1.3–3.4), elevated anxiety symptoms (adjusted odds ratio: 2.2, 95% CI: 1.2–3.9), and cognitive impairment (adjusted odds ratio: 1.5, 95% CI: 1.1–2.1). Impaired AF-related QOL did not differ by gait speed after adjustment for clinical characteristics (adjusted odds ratio: 1.1, 95% CI: 0.8–1.5).

***Conclusions*—**Twenty-six percent of older adults with AF had low gait speed, and low gait speed was associated with impaired mood and cognition. Further research is needed to determine whether declines in gait speed lead to impaired mood and cognition or whether these conditions develop concurrently. **(*J Am Heart Assoc*. 2019;8:e013212. DOI: 10.1161/JAHA.119.013212.)**

Key Words: anxiety • atrial fibrillation • cognition • depression • quality of life

Atrial fibrillation is the most common sustained arrhythmia in older adults and is associated with an increased risk of stroke. Adults with atrial fibrillation have been found to have lower quality of life and cardiac performance and higher rates of cardiac comorbidities such as coronary disease, heart failure, and hypertension.[1,2] Frailty is common among older adults, and gait speed is one of its predominant components.[3–5] Atrial fibrillation relates to reduced exercise capacity, cardiac output, frailty, cognition, and vascular function, all of which may contribute to an observed decrease in gait speed.[6]

Gait speed has been used to predict factors such as depression, anxiety, cognition, and quality of life, which relate to the functional status of older adults.[7–10] Gait speed has been studied in community-dwelling older adults,[7,10] patients undergoing cardiac surgery,[11] and in patients with chronic stroke, incomplete spinal cord injury, hip fracture, multiple sclerosis, Parkinson disease, Huntington disease, Alzheimer disease, and dementia.[12] Gait speed is commonly measured from a walk test, and although there are many published walk test procedures, the processes are generally simple to administer and require only a timer and flat surface.[10,12] Walk test protocols include either time (eg, 6 minutes) or distance (eg, 4–10 m)[10,12]; the Fried Frailty Index includes a 15-foot walk test.[3] Published cutoffs for low versus normal gait speed are also variable, but the most commonly used cutoffs are between 0.8 and 1 m/s, where gait speeds below

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Clinical Perspective

What Is New?

- We found that 26% of older adults with atrial fibrillation had low gait speed.
- Low gait speed was associated with elevated symptoms of depression and anxiety and cognitive impairment.

What Are the Clinical Implications?

- Older adults with atrial fibrillation who are identified as having low gait speed may benefit from screening for depression, anxiety, or cognitive impairment and referrals for mental health care.

this range are considered low gait speed.[13,14] Using gait speed as an easy and accurate diagnostic tool could have meaningful clinical implications.[4]

Patients experiencing depression or sadness have significantly lower gait speeds than those without mood disorders,[15] and this relationship has also been observed in older adults.[16] Gait speed also relates to general anxiety, balance-, and fall-related anxiety in older adults.[9,17] Similarly, those with low gait speed (eg, <0.83 m/s,[11] <1.0 m/s[7]) are more likely to have morbidity and adverse clinical outcomes.

While low gait speed has been linked with mood, cognitive impairment, and quality of life in community-dwelling older adults and older adults undergoing cardiac surgery, little is known about the relationship between low gait speed and these outcomes in older adults with atrial fibrillation, an important question given that low gait speed is common in this population.[6,7,9,11,15–17] In this study, we examined the association between low gait speed and elevated depressive symptoms, elevated symptoms of anxiety, cognition, and atrial fibrillation-related quality of life in a cohort of older adults with atrial fibrillation. We hypothesized that patients with low gait speed will be more likely to have elevated depressive symptoms, elevated symptoms of anxiety, and more cognitive impairment, and have lower atrial fibrillation quality of life as compared with patients with gait speeds in the normal range.

Methods

Study Design, Participants, and Data Collection

The data that support the findings of this study are available from SAGE-AF (Systematic Assessment of Geriatric Elements in Atrial Fibrillation) study principal investigators upon reasonable request (david.mcmanus@umassmemorial.org and j.saczynski@northeastern.edu).

Data for the current study are from the SAGE-AF study, an ongoing prospective cohort study of older adults >65 years with atrial fibrillation (AF). SAGE-AF enrolled a cohort of 1244 older adults with atrial fibrillation that received care at a clinical site in Central Massachusetts (University of Massachusetts Memorial Health Care [UMMHC] internal medicine, UMMHC cardiology, UMMHC electrophysiology, or Heart Rhythm Associates of Central MA), Eastern Massachusetts (Boston University cardiology), or Central Georgia (Family Health Center or Georgia Arrhythmia Consultants). Potential participants were screened before their upcoming clinic visit, and eligible participants received an invitation to participate 1 week before this appointment. Eligibility criteria for SAGE-AF included having a scheduled ambulatory care visit at 1 of the study practices; having AF (participants were considered to have a history of AF if the arrhythmia was present on an ECG or Holter monitor or if AF was noted in any clinic note or hospital record); being aged ≥65 years; having a CHA_2DS_2-VASC risk score ≥2. Participants were not eligible for enrollment if they had documentation of an absolute contraindication to oral anticoagulants (ie, large esophageal varices, recent major surgery within the past 72 hours, recent major bleeding in the past 3 months, arteriovenous malformation or aneurysm, planned invasive procedure with high risk for uncontrollable bleeding [eg, open surgical procedure], decompensated liver disease, significant thrombocytopenia [ie, platelet count <50k], or documented hypersensitivity/allergic reaction to oral anticoagulation); had an indication for oral anticoagulants other than AF (ie, mechanical heart valve in the mitral position); did not demonstrate capacity to provide informed consent as assessed by a capacity instrument that combines direct questions about their understanding of study participation with interviewer observations of the patient[18]; did not speak English; had a planned invasive procedure with high risk for uncontrollable bleeding; were pregnant; were prisoners; were unwilling or unable to participate in planned 1- and 2-year follow-up visits at their study sites. Data were collected through a comprehensive baseline geriatric assessment, structured interview, and abstraction of electronic medical records. All participants provided written informed consent. SAGE-AF was approved by the Institutional Review Boards at each study site.

At baseline, participants completed a 60-minute in-person assessment visit that included physical examination and a survey completed via paper or iPad. Trained research staff abstracted clinical, demographic, treatment, and laboratory characteristics from participants' electronic medical records.

Assessment of Gait Speed

At baseline, participants completed a self-paced 15-foot walk test following the procedures of the Fried Frailty Index[3] as

part of the comprehensive assessment of geriatric elements. Staff instructed participants to stop at the beginning of a hallway located in an indoor, private research center, and the hallway was marked to indicate where participants should start and stop the 15-foot walk. Study staff were available throughout the test to provide balance or gait support as needed. Staff timed the walk test and calculated gait speed. Gait speed was dichotomized (low versus normal) according to cutoffs for low gait speed in the Fried Frailty Index.[3] This score stratifies walk time by sex and height, such that men with a height ≤173 cm had low gait speed if their time to walk 15 feet (walk time) was ≥7 seconds, men with a height >173 cm had low gait speed if their walk time was ≥6 seconds, women with a height ≤159 cm had low gait speed if their walk time was ≥7 seconds, and women with a height >159 cm had low gait speed if their walk time was ≥6 seconds.[3] These cutoffs are equivalent to paces of 0.76 m/s (6 seconds) and 0.65 m/s (7 seconds). We conducted a sensitivity analysis in which we categorized low gait speed as a walking pace of <0.83 m/s for all participants, an alternative cutoff for slow gait speed also commonly used in the literature.[14]

Outcome Measures

As part of the baseline interview, participants completed measures of depressive symptoms, symptoms of anxiety, cognitive impairment, and atrial fibrillation quality of life. Depressive symptoms were assessed using the Patient Health Questionnaire-9. This 9-item questionnaire asks participants to self-report the frequency with which they have experienced depressive symptoms over the past 2 weeks. Response options for this questionnaire include "not at all," "several days," "more than half the days," or "nearly every day." Symptoms of depression were calculated from the sum of responses, with a potential range of 0 to 27 (higher scores indicate more severe depressive symptoms).[19] We used a cutoff of ≥10 to indicate moderate/severe depression.[19]

Symptoms of anxiety were assessed using the Generalized Anxiety Disorder-7 Scale. This 7-item scale asks participants to self-report the frequency with which they have experienced symptoms of anxiety over the past 2 weeks. Response options for this scale include "not at all," "several days," "over half the days," or "nearly every day." Symptoms of anxiety were calculated from the sum of responses, with a potential range of 0 to 21 (higher scores indicate more severe symptoms of anxiety). We used a cutoff of ≥10 to indicate moderate/severe anxiety.[20]

Cognitive impairment was assessed using the Montreal Cognitive Assessment Battery.[21] This 30-item battery includes an assessment of participants' visuospatial/executive skills, naming skills, memory, attention, language, abstraction skills, delayed recall, and orientation. Cognitive impairment was calculated from the sum of correct responses, with a potential range of 0 to 30 (higher scores indicate better cognitive functioning). We used a cutoff of ≤23 to indicate cognitive impairment.[22]

Atrial fibrillation quality of life was assessed using the Atrial Fibrillation Effect Quality-of-Life (AFEQT) Questionnaire.[23] This 20-item questionnaire asks participants to self-report the extent to which atrial fibrillation has affected their quality of life in the past month, and there are individual subscales for symptoms, daily activities, and treatment concern. Response options for this questionnaire include "not at all bothered OR I did not have this symptom," "hardly bothered," "a little bothered," "moderately bothered," "quite a bit bothered," "very bothered," or "extremely bothered." Atrial fibrillation quality of life was calculated according to the following formula: 100−[(sum of severity for all questions answered)−(number of questions answered)×100]/[(total number questions answered)×6],[24] with a potential range of 0 to 100 (higher scores indicate better quality of life). We categorized atrial fibrillation-related quality of life as potentially impaired (<80) versus not impaired (≥80). A score of 80 indicates that on average patients responded that they were not at all or hardly bothered (or not/hardly limited, or experienced no/hardly any difficulty) by the symptoms, daily activities, and treatment concerns queried on the AFEQT, and roughly equals the mean AFEQT scores in patients with atrial fibrillation who maintained sinus rhythm 3 months after ablation.[25] We also examined atrial fibrillation quality of life as a continuous variable, with lower scores representing worse atrial fibrillation quality of life.

Potential Confounders

Participants reported their race/ethnicity, education level, marital status, living situation, number of falls in the past 6 months, and use of a walking aid during the baseline interview. Age, sex, type of atrial fibrillation, current medications (eg, oral anticoagulants, beta blockers, calcium channel blockers), and medical history (eg, type 2 diabetes mellitus, heart failure, chronic obstructive pulmonary disease) were abstracted from participants' medical records.

Statistical Analysis

First, we reported descriptive statistics by gait speed. We presented frequency and percentages for categorical variables. We used chi-squared tests to assess differences among demographic and clinical characteristics by gait speed. Then, we estimated crude and adjusted odds ratios (ORs) and 95% CIs for elevated depressive symptoms, elevated symptoms of anxiety, cognitive impairment, and potentially impaired atrial fibrillation-related quality of life in relationship to gait speed

(low versus normal) using logistic regression models. Demographic and clinical characteristics that differed by gait speed were included in adjusted models. We present models adjusted for demographic characteristics and also models adjusted for demographic and clinical characteristics. We additionally included study site (Massachusetts versus Georgia) in adjusted regression models to control for additional confounding by other differences between sites. We also examined continuous AF quality of life scores in relationship to gait speed using linear regression models and the model-building strategy outlined above. Finally, we conducted a sensitivity analysis using an alternative definition of low gait speed (<0.83 m/s).[14] $P<0.05$ was considered statistically significant. All statistical analyses were conducted using SAS software version 9.4 (SAS Institute Inc, Cary, NC).

Results

Of the 1244 older adults with atrial fibrillation enrolled in SAGE-AF, we excluded participants who did not complete the walk test (n=41). Of the 1203 participants with information on gait speed, we excluded participants missing information about any of the variables used in the analysis (n=1 race/ethnicity, n=18 education), resulting in an analytic sample of 1185 older adults with AF.

Participants were on average 75.3 (SD: 7.0) years old, 48.0% women, 85.5% non-Hispanic white (Table 1). Most patients (59.6%) had paroxysmal AF, 25.0% had persistent AF, and 5.7% had permanent AF. The majority (85.6%) were taking an oral anticoagulant. A quarter (26.1%; n=309) had low gait speed. Characteristics of the sample in relationship to gait speed are shown in Table 1.

Overall, 8.4% of participants had elevated depressive symptoms, 5.7% had elevated anxiety symptoms, and 41.1% were cognitively impaired. Average atrial fibrillation-related quality of life was 80.2 (SD: 17.9), and 41.6% had potentially impaired atrial fibrillation-related quality of life.

Participants with low gait speed were more likely to have elevated depressive symptoms (16.5% versus 5.6%; adjusted OR: 2.1, 95% CI: 1.3–3.4), elevated anxiety symptoms (10.7% versus 3.9%; adjusted OR: 2.2, 95% CI: 1.2–3.9), cognitive impairment (59.9% versus 34.5%; adjusted OR: 1.5, 95% CI: 1.1–2.1; Figure and Table 2). While potentially impaired atrial fibrillation-related quality of life differed by gait speed in crude models and after adjustment for demographics (50.3% versus 35.5%; crude OR: 1.6; 95% CI: 1.2–2.1; adjusted OR: 1.4, 95% CI: 1.1–1.9; Figure and Table 2), the proportion of patients with impaired atrial fibrillation-related quality of life did not differ by gait speed after adjusting for clinical characteristics (adjusted OR: 1.1; 95% CI: 0.8–1.5; Table 2).

Participants with low gait speed had lower atrial fibrillation-related quality of life on average than participants without low gait speed in the crude and adjusted models (M [SD]: 75.6 [20.5] versus 81.9 [16.6]; crude β: −6.3, 95% CI: −8.6 to −4.0, $P<0.0001$; demographics-adjusted β: −5.2, 95% CI: −7.6 to −2.8, $P<0.0001$; fully-adjusted β: −3.4, 95% CI: −5.9 to −0.9, $P=0.0073$). Results from regression models that included study site as a covariate were nearly identical to the main findings, and outcomes did not differ by study site (data not shown). We conducted a sensitivity analysis using an alternate definition of low gait speed. Using this definition, 41.1% of the sample had low gait speed. Results examining elevated depressive symptoms, elevated anxiety symptoms, and cognitive impairment were similar to the main analysis (data not shown). However, patients with low gait speed were more likely to have impaired atrial fibrillation-related quality of life than patients with normal gait speed after adjustment for demographic and clinical characteristics (adjusted OR: 1.3; 95% CI: 1.0–1.7, $P=0.0463$).

Discussion

In this study, a quarter of older adults with atrial fibrillation had low gait speed. Patients with low gait speed had significantly greater odds of having symptoms of depression, symptoms of anxiety, cognitive impairment, and potentially impaired atrial fibrillation-related quality of life, in support of our hypotheses.

Our findings that patients with AF who have low gait speed were more likely to have elevated depressive symptoms is consistent with previous research.[8,15,16] Depression is common among older adults, due in part to the increased functional decline and social isolation in this population.[8,26] While the direction of this relationship is unknown, our findings suggest there is a strong association between gait speed and symptoms of depression. Although there are many factors that can cause depression, studies have shown that clinically depressed individuals have distinct gait patterns, posture, and walking speed.[15] Furthermore, gait is regulated by psychomotor skills, which are adversely affected by depression.[27] These skills combine both physical and mental domains; therefore, it is possible that low gait speed may be predictive of psychological status.[8] Future longitudinal studies could shed light on whether slowing gait speed leads to an increase in depressive symptomology, whether the development of depression results in lowered gait speed, or whether low gait speed and depression develop simultaneously.

We also found that patients with low gait speed were more likely to have elevated anxiety symptoms. Clinical anxiety has been shown to affect attention and working memory, and these domains are also involved in regulating gait.[9,28–30] One specific cause of anxiety in older adults is fear related to balance and falls, and studies have shown that increasing this type of anxiety results in a more cautious, restricted walking

Table 1. Demographic and Clinical Characteristics of Older Adults With Atrial Fibrillation, Overall Sample and in Relationship to Gait Speed, SAGE-AF 2016 to 2018, N (%)

	Total Sample (N=1185)	Low Gait Speed (n=309)	Normal Gait Speed (n=876)	*P* Value
Age				
65 to 74 y	605 (51.1)	105 (34.0)	500 (57.1)	<0.0001
75 to 84 y	433 (36.5)	131 (42.4)	302 (34.5)	
85 y	147 (12.4)	73 (23.6)	74 (8.5)	
Women	569 (48.0)	190 (61.5)	379 (43.3)	<0.0001
Non-Hispanic white	1013 (85.5)	229 (74.1)	784 (89.5)	<0.0001
Education				
High school, GED, or less	97 (8.2)	45 (14.6)	52 (5.9)	<0.0001
Some college, trade school	575 (48.5)	181 (58.6)	394 (45.0)	
College/some graduate coursework	187 (15.8)	33 (10.7)	154 (17.6)	
Graduate degree	326 (27.5)	50 (16.2)	276 (31.5)	
Weight status				
Underweight	12 (1.0)	4 (1.3)	8 (0.9)	0.0138
Normal weight	223 (18.8)	67 (21.7)	156 (17.8)	
Overweight	415 (35.0)	85 (27.5)	330 (37.7)	
Obese	535 (45.2)	153 (49.5)	382 (43.6)	
Type of atrial fibrillation				
Paroxysmal	706 (59.6)	178 (57.6)	528 (60.3)	0.4535
Persistent/long-standing persistent	296 (25.0)	86 (27.8)	210 (24.0)	
Permanent	67 (5.6)	19 (6.2)	48 (5.5)	
Other/unknown	116 (9.8)	26 (8.4)	90 (10.3)	
Medication use				
OAC	1014 (85.6)	270 (87.4)	744 (84.9)	0.2926
Beta blocker	754 (63.6)	218 (70.6)	536 (61.2)	0.0033
Calcium channel blocker	369 (31.1)	93 (30.1)	276 (31.5)	0.6454
Type of anticoagulant among OAC users (n=1014)				
Warfarin	566 (55.8)	150 (55.6)	416 (55.9)	0.9191
Other anticoagulant	448 (44.2)	120 (44.4)	328 (44.1)	
Prior implantable cardiac device	392 (33.1)	153 (49.5)	239 (27.3)	<0.0001
Medical history				
Anemia	362 (30.6)	123 (39.8)	239 (27.3)	<0.0001
Major bleeding	229 (19.3)	78 (25.2)	151 (17.2)	0.0022
Stroke	109 (9.2)	42 (13.6)	67 (7.7)	0.0019
Renal disease	327 (27.6)	114 (36.9)	213 (24.3)	<0.0001
Chronic obstructive pulmonary disorder	291 (24.6)	97 (31.4)	194 (22.2)	0.0012
Type 2 diabetes mellitus	322 (27.2)	119 (38.5)	203 (23.2)	<0.0001
Myocardial infarction	233 (19.7)	78 (25.2)	155 (17.7)	0.0041
Peripheral vascular disease	164 (13.8)	58 (18.8)	106 (12.1)	0.0035
Heart failure	429 (36.2)	177 (57.3)	252 (28.8)	<0.0001

OAC indicates oral anticoagulants, SAGE-AF, Systematic Assessment of Geriatric Elements in Atrial Fibrillation.

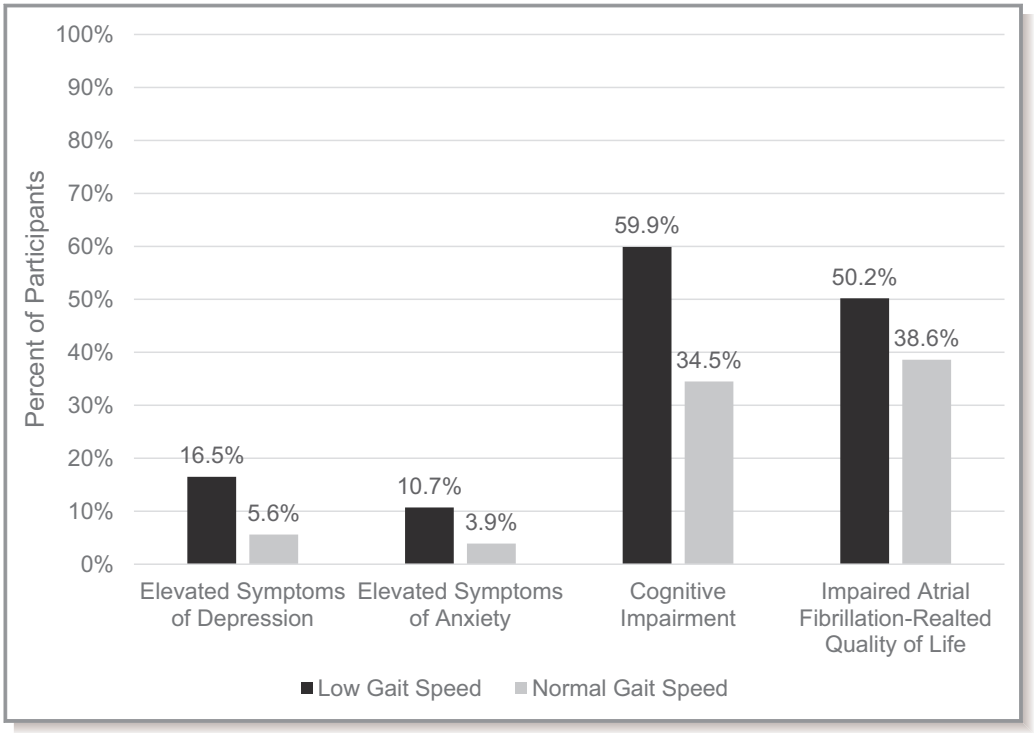

Figure. Prevalence of elevated depressive symptoms, elevated anxiety symptoms, cognitive impairment, and impaired quality of life in relationships to gait speed among older adults with atrial fibrillation, SAGE-AF (Systematic Assessment of Geriatric Elements in Atrial Fibrillation) 2016 to 2018.

style.[9,26] Similar to our findings related to depressive symptoms, future longitudinal studies could elucidate the directionality of the observed association between low gait speed and elevated anxiety symptoms.

We also found that patients with low gait speed were more likely to be cognitively impaired. As previously stated, walking requires attention, executive function, memory, and other cognitive demands. It is well documented that these domains, as well as global cognition, can be affected by age.[29,30] Like cognition, there can also be age-related changes in gait, such as shortened stride length and slower walking speed. One explanation for our finding is that physical changes in gait, such as slower walking speed, are related to declines in the cognitive domains that regulate posture, balance, and other gait elements.[9] Previous research has documented that neurologic disease can adversely affect gait, and that gait speed may also be related to worsening of these impairments.[26] These results help explain our finding that patients with low gait speed had significantly greater odds of having cognitive impairment.

Finally, we found that patients with low gait speed were more likely to have potentially impaired atrial fibrillation-related quality of life in crude models and after adjusting for demographic characteristics. However, after adjusting for clinical characteristics, impaired atrial fibrillation-related quality of life did not differ by gait speed, suggesting that differences in impaired quality of life can be explained by differences in clinical burden between patients with low versus normal gait speed. When examining continuous AFEQT scores, we found that patients with low gait speed had lower AF-related quality of life in both crude and adjusted models. To our knowledge, there is little known about the relationship between gait speed and disease-specific, atrial fibrillation-related quality of life; however, previous research in other cardiac populations and among older adults generally has shown that low gait speed is predictive of frailty, mortality, hospitalizations, and overall physical function, all of which relate to quality of life.[11,16,31] Longitudinal studies are needed to examine whether low gait speed leads to impaired atrial fibrillation-related quality of life, or whether other health conditions lead to both declines in gait speed and worsening of quality of life.

There is no standard cutoff in the literature to indicate impaired atrial fibrillation-related quality of life as measured by the AFEQT. We defined impaired quality of life as an AFEQT score <80, a score similar to the mean AFEQT scores of 81.3 in a previous study of patients with atrial fibrillation who maintained sinus rhythm 3 months after ablation.[25] A score of 80 indicates that on average patients responded that they were not at all or hardly bothered (or not/hardly limited, or experienced no/hardly any difficulty) by the symptoms, daily activities, and treatment concerns queried on the AFEQT.

Table 2. Associations Between Low Gait Speed and Depressed Mood, Symptoms of Anxiety, Cognitive Impairment, and Impaired Quality of Life Among Older Patients With AF, SAGE-AF 2016 to 2018

	Low Gait Speed, n (%)	Normal Gait Speed, n (%)	Crude OR (95% CI)	Adjusted* OR (95% CI)	Adjusted† OR (95% CI)
Elevated depressive symptoms	51 (16.5)	49 (5.6)	3.3 (2.2–5.1)‡	3.0 (1.9–4.7)‡	2.1 (1.3–3.4)‡
Elevated symptoms of anxiety	33 (10.7)	34 (3.9)	3.0 (1.8–4.9)‡	2.4 (1.4–4.1)‡	2.2 (1.2–3.9)‡
Cognitive impairment	185 (59.9)	302 (34.5)	2.8 (2.2–3.7)‡	1.7 (1.3–2.3)‡	1.5 (1.1–2.1)‡
Potentially impaired AF-related quality of life	155 (50.2)	338 (38.6)	1.6 (1.2–2.1)‡	1.4 (1.1–1.9)‡	1.1 (0.8–1.5)

AF indicates atrial fibrillation; OR, odds ratio; SAGE-AF, Systematic Assessment of Geriatric Elements in Atrial Fibrillation.
*Adjusted for age, sex, race/ethnicity, and education.
†Adjusted for age, sex, race/ethnicity, education, body mass index categories, beta-blocker use, prior implantable cardiac device, and medical history of anemia, major bleeding, stroke, renal disease, chronic obstructive pulmonary disorder, type 2 diabetes mellitus, myocardial infarction, peripheral vascular disease, and heart failure.
‡$P<0.05$.

Future studies may wish to use this cutoff to examine which patients are more likely to report impaired atrial fibrillation-related quality of life.

A major limitation of this work is the cross-sectional nature of the data. For this reason, we are unable to determine the direction of the relationships between gait speed and our outcomes. There is evidence to suggest that there is a bidirectional association between depression and low gait speed. Studies have shown that depression can affect motor control, gait, and walking speed, and that low gait speed can also increase depressive symptoms.[8,15,16] It is possible that some patients may have sought treatment with psychotherapy or pharmacotherapy and, therefore, did not score high on the depression or anxiety symptom scales. Furthermore, patients treated with antidepressants may have experienced weight gain or alterations to neural circuits, which may have contributed to altered gait speed.[15] Future longitudinal studies may be able to shed light on whether use of antidepressants or other medications lead to declines in gait speed. However, the current study's findings suggest that low gait speed is often comorbid with elevated depressive symptoms, elevated anxiety symptoms, cognitive impairment, and potentially impaired AF-related quality of life.

This work also has strengths. The SAGE-AF cohort is geographically diverse, and participants were enrolled from cardiology, primary care, and electrophysiology clinics, resulting in a more generalizable sample of older adults with AF. The inclusive eligibility criteria allowed us to study patients who may have otherwise been excluded from clinical studies because of age, comorbidities, or other factors.

Conclusions

In conclusion, this study of older adults with atrial fibrillation found that low gait speed was associated with elevated depressive symptoms, elevated anxiety symptoms, and cognitive impairment. A major limitation of the current study is its cross-sectional nature, especially given previous research that is inconsistent about the directionality of these associations. However, gait speed is easy to measure in the clinical setting and already commonly used as a screening criterion for some procedures (eg, transcatheter aortic valve replacement).[32,33] The current findings suggest that screening for depression, anxiety, cognitive impairment, or impaired AF-related quality of life may be prudent in patients with AF identified as having low gait speed, and appropriate referrals be made for mental health care. If future prospective studies were to observe that patients whose gait speed declined subsequently developed adverse psychological and cognitive outcomes, then screening for declines in gait speed and either behavioral or physical activity interventions to prevent declines in gait speed could potentially have an impact on these outcomes, thus improving the lives of older adults with atrial fibrillation.

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