Original Article

Knowledge, Medication Adherence, Self-Care Behaviors, and Health Care Utilization among Patients with Atrial Fibrillation: A Cross-Sectional Study

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Highlights

- More than 40% of patients with AF had poor disease-related knowledge.
- Over half had poor pharmacological adherence and overall self-care behaviors.
- Context-specific educational and behavioral interventions are needed to support AF self-management.

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ABSTRACT

Background: Atrial fibrillation (AF) is a common cardiac arrhythmia associated with an increased risk of stroke, heart failure, and other adverse clinical outcomes. Self-care and treatment adherence are important components of preventing complications and improving long-term outcomes. This study aimed to assess AF-related knowledge, pharmacologic and nonpharmacologic treatment adherence, self-care behaviors, and health care utilization among patients attending the Atrial Fibrillation Clinic at Tehran Heart Center.

Methods: This cross-sectional study was conducted between January and February 2024 among 144 patients randomly selected from the Atrial Fibrillation Clinic at Tehran Heart Center. Data were collected via telephone interviews using the Persian version of the Jessa Atrial Fibrillation Knowledge Questionnaire, a researcher-developed Atrial Fibrillation Self-Care Adherence Behavior Scale (AF-SCABS), and questions assessing health care utilization during the previous 6 months. Data were analyzed using descriptive statistics, t tests, analysis of variance, $\chi 2$ tests, and logistic regression analyses.

Results: Participants had a mean age of 62.36 (11.40) years, and 56.2% were male. Fifty percent demonstrated moderate knowledge of AF, whereas 41.0% had poor knowledge. Only 20.8% demonstrated good pharmacologic treatment adherence. Poor adherence to nonpharmacologic treatment was observed in 45.8% of participants, and 52.1% reported poor overall self-care behaviors. During the previous 6 months, 42.4% had visited the emergency department, 21.6% had been hospitalized, and 13.9% reported hospital stays of 2 or more days. In multivariable analyses, knowledge, treatment adherence, and self-care were not independently associated with emergency department visits or hospital admissions.

Conclusion: Patients with AF demonstrated limited disease-related knowledge, suboptimal treatment adherence, and poor self-care behaviors, highlighting the need for context-specific educational and behavioral interventions to support effective self-management.

Keywords: Atrial Fibrillation; Treatment Adherence; Cardiovascular Diseases; Knowledge; Self-Care

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Introduction

Atrial fibrillation (AF) is a common type of sustained cardiac arrhythmia and represents a major global health concern that has become a significant public health issue because of the aging population.[1,2] Between 2010 and 2019, the global prevalence of AF rose from 33.5 million to 59 million.[3] Trends indicate a continuous rise in the prevalence of this condition in recent years.[4]

AF increases the risk of ischemic stroke by 3 to 5 times and is estimated to account for approximately 15% of strokes worldwide.[5] Stroke prevention in patients with AF is, therefore, a central component of managing this arrhythmia.[6] In addition to severe complications such as myocardial infarction, heart failure, and stroke, AF adversely affects patients' quality of life.[7]

Late diagnosis and subsequent delays in treatment are often attributed to patients' limited knowledge of AF.[8] Many individuals living with AF have a poor understanding of their condition,[9] and general public awareness of the nature of AF remains low globally.[10] Patients with AF are required to engage in ongoing efforts to understand their symptoms and take necessary precautions in their daily lives. Nonetheless, their awareness of treatment options and the consequences of the disease appears to be insufficient.[11] Improving patients' knowledge of AF and stroke prevention may enhance adherence to treatment.[12]

Risk factors associated with the prevalence of AF are generally categorized as nonmodifiable, such as age, sex, family history of AF, and history of cardiovascular disease, and modifiable, including hypertension, obesity, diabetes mellitus, sleep apnea, alcohol consumption, physical inactivity, and smoking.[13] A wide range of lifestyle-related and clinically modifiable risk factors contribute to the onset, persistence, and progression of AF.[14] Addressing these modifiable risk factors through lifestyle changes and medical interventions is essential for the prevention and effective management of AF. A 13-year cohort study conducted in Korea identified 3 modifiable risk factors-systolic blood pressure greater than 140 mm Hg, central obesity, and a sedentary lifestyle-that were significantly associated with the incidence of AF.[15]

Alongside effective pharmacologic treatments, primarily anticoagulants, and interventional therapies,[16] substantial evidence supports the role of self-care behaviors in preventing and managing complications such as heart failure and stroke in patients with AF.[17] Assessing patients' knowledge of AF, treatment adherence, self-care behaviors, and health care utilization can provide essential information for designing targeted educational and behavioral interventions.

Although several international studies have examined patients' knowledge, medication adherence, and self-care behaviors in AF, evidence from Iran remains limited. Differences in health care delivery, health literacy, socioeconomic conditions, and cultural context may substantially influence disease knowledge, treatment adherence, and self-care practices, highlighting the need for context-specific evidence. To the best of our knowledge, no previous study has comprehensively evaluated AF-related knowledge, pharmacologic and nonpharmacologic treatment adherence, self-care behaviors, and health care utilization among patients attending a specialized AF clinic in Iran.

Tehran Heart Center, the largest tertiary cardiovascular referral center in the country, receives patients with diverse clinical characteristics and varying disease severity from across Iran and provides dedicated follow-up through its specialized AF clinic. As a major academic referral center, findings from this setting may provide valuable evidence to inform the development of educational and behavioral interventions for patients with AF at both institutional and national levels.

Accordingly, to address this important knowledge gap and provide context-specific evidence to support future management strategies, the present study aimed to assess AF-related knowledge, adherence to pharmacologic and nonpharmacologic treatment, self-care behaviors, and health care utilization during the previous 6 months-including emergency department (ED) visits and hospitalizations-among patients attending the Atrial Fibrillation Clinic at Tehran Heart Center.

Methods

Study Design and Participants

A cross-sectional study was conducted between January 23 and February 22, 2024, to assess AF-related knowledge, treatment adherence, and self-care behaviors among patients attending the Atrial Fibrillation Clinic at Tehran Heart Center. The study population comprised eligible patients attending the clinic, a tertiary cardiovascular referral center affiliated with Tehran University of Medical Sciences. The required sample size was calculated using the formula for estimating a population proportion. With the assumption of an expected prevalence of 50%, a margin of error of 10%, and a significance level of .05, the minimum required sample size was estimated to be 96 participants.

To improve the precision of the study estimates, the sample size was increased by 50%, which resulted in a final sample of 144 participants. Eligible participants were adults aged 18 years or older with a confirmed diagnosis of AF who were willing to participate in the study. Eligible patients were identified from the clinic registry, and a computer-generated random number sequence was used to perform simple random sampling. This article reports a cross-sectional analysis of baseline data collected before implementation of a subsequent educational intervention study.

Data Collection Procedures

Data were collected via interviewer-administered telephone interviews conducted by a trained researcher between January 23 and February 22, 2024. Ethical approval was obtained from the Ethics Committee of Tehran University of Medical Sciences (IR.TUMS.SPH.REC.1401.202) prior to participant recruitment. All participants were informed about the study objectives, the voluntary nature of participation, and the confidentiality of their responses.

Selected patients were contacted by telephone, informed about the purpose of the study, and invited to participate. After verbal informed consent was obtained, a convenient time was scheduled to complete the interview. Each telephone interview lasted approximately 15 to 20 minutes. During the interview, the researcher read each questionnaire item aloud and recorded participants' responses.

Measurements

The study questionnaire comprised 4 sections, as follows:

Sociodemographic and Clinical Characteristics

The first section collected participants' sociodemographic and clinical characteristics, including age, sex, educational level, marital status, employment status, perceived economic status, comorbidities, and type of AF.

Knowledge of AF

Knowledge of AF was assessed using the Persian version of the Jessa Atrial Fibrillation Knowledge Questionnaire, originally developed and validated by Desteghe et al[18] in 2016. Written permission to translate and use the questionnaire was obtained from the original developers before the study commenced.

The original English version was translated into Persian through a standardized forward-backward translation procedure and was culturally adapted according to established guidelines. Subsequently, face validity and content validity were evaluated by an expert panel comprising specialists in cardiology, health education, nursing, and instrument development. Content validity was evaluated using the content validity index (CVI) and content validity ratio (CVR). Based on expert consensus during the content validation process, 3 items were removed because they were not considered appropriate for local treatment protocols and clinical context, resulting in a final 16-item Persian version.

The final questionnaire consisted of 8 items assessing general knowledge of AF, 5 items assessing knowledge related to oral anticoagulant therapy, and 3 items assessing anticoagulation monitoring and medication use. Each correct response received 1 point, whereas incorrect and “I don’t know” responses received 0 points. Total scores ranged from 0 to 16, with higher scores indicating greater knowledge of AF.

The CVI ranged from 0.73 to 1.00, and the CVR ranged from 0.66 to 1.00. Internal consistency of

the Persian version in this study was acceptable (Cronbach α=.697). Test-retest reliability was assessed using Cohen *κ* coefficients, which ranged from 0.63 to 0.83 across individual items.

Because the original questionnaire does not provide validated cutoff values, knowledge scores were categorized into 3 levels (poor, moderate, and good) solely for descriptive purposes to facilitate interpretation of findings. These categories were defined a priori by the research team and were not utilized in inferential statistical analyses.

Treatment Adherence and Self-Care Behavior

Treatment adherence and self-care behaviors were assessed using the Atrial Fibrillation Self-Care Adherence Behavior Scale (AF-SCABS), a researcher-developed instrument that was developed and psychometrically evaluated as part of this study.

The scale comprises 33 items across 6 domains: medication adherence (9 items), participation in treatment (3 items), adjustment to and coping with treatment (6 items), follow-up tests and physician visits (3 items), lifestyle behaviors (9 items), and symptom management (3 items). Items are rated on a 5-point Likert scale ranging from 1 (never) to 5 (always), yielding a total score ranging from 33 to 165, with higher scores indicating better treatment adherence and self-care.

For analytical purposes, 3 scores were derived from this instrument. Pharmacologic treatment adherence was calculated using the 9 medication adherence items (score range, 9-45). Nonpharmacologic treatment adherence was calculated using the remaining 24 items covering participation in treatment, adjustment and coping, follow-up care, lifestyle behaviors, and symptom management (score range, 24–120). Overall self-care behavior was calculated as the total score of all 33 items (score range, 33–165). Accordingly, the overall self-care score represents a composite measure encompassing both pharmacologic and nonpharmacologic adherence domains.

The scale was developed based on a comprehensive review of the literature, existing clinical guidelines, and expert consultation. Face validity and content validity were assessed qualitatively and quantitatively by a panel of 10 experts. Quantitative content validity was evaluated using CVI and content validity ratio CVR. Items with a CVI of 0.80 or greater and a CVR of 0.70 or greater were considered acceptable. Internal consistency in the current study was satisfactory (Cronbach *α*=.74). Test-retest reliability was assessed in 25 participants over a 2-week interval, yielding a Cohen κ coefficient of 0.70, indicating good stability.

Because no validated cutoff values are available for this newly developed instrument, scores were categorized into poor, moderate, and good levels solely for descriptive purposes to facilitate interpretation of findings. These categories were defined a priori by the research team and were not used in inferential statistical analyses, which were performed using continuous scores.

Health Care Utilization

Health care utilization related to AF was assessed by drawing upon 2 investigator-developed items asking whether participants had visited an ED or had been hospitalized because of AF during the previous 6 months.

Data Analysis

All statistical analyses were performed using IBM SPSS Statistics, version 26 (IBM Corp). Descriptive statistics, including frequencies, means, and standard deviations, were employed to summarize the data. For inferential analyses, continuous scores were used. Knowledge was analyzed using total scores (range, 0–16), whereas treatment adherence and self-care measures were analyzed using mean item scores (1-5 scale) to facilitate comparison across subscales with different numbers of items. The normality of continuous variables was assessed using the Kolmogorov-Smirnov test. Because no substantial deviations from normality were observed, independent-samples *t* tests and 1-way analysis of variance (ANOVA) were applied for bivariate comparisons. Associations of ED visits (yes/no) and hospital admissions (yes/no) with demographic characteristics were assessed using Pearson χ^2 tests.

Univariable logistic regression analyses were

initially performed to evaluate the associations between knowledge score, pharmacologic treatment adherence score, nonpharmacologic treatment adherence score, overall self-care behavior score, age, sex, and health care utilization outcomes (ED visits and hospital admissions). Variables of primary interest were subsequently entered into multivariable logistic regression models to determine their independent associations with each outcome after adjustment for age and sex. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. A *P* value of less than .05 was considered statistically significant.

Results

The mean (SD) age of the 144 participants was 62.36 (11.40) years (range, 29-90 y), and 81 (56.2%) were male. Most participants were married (129 [89.6%]). Regarding educational level, employment status, and economic status, the largest proportions had less than a high school education (68 [47.2%]), were homemakers (50 [34.7%]), and reported a moderate economic status (69 [47.9%]), respectively. Hypertension was the most common comorbidity, affecting 91 participants (63.2%) (Table 1).

Knowledge, Treatment Adherence, and Self-Care Behaviors

Overall, 59 participants (41.0%) demonstrated poor knowledge of AF, 72 (50.0%) had moderate knowledge, and only 13 (9.0%) had good knowledge. The mean (SD) knowledge score was 6.75 (3.20) (range, 0-16).

Regarding pharmacologic treatment adherence, 81 participants (56.3%) had poor adherence, 33 (22.9%) had moderate adherence, and 30 (20.8%) demonstrated good adherence. For nonpharmacologic treatment adherence, 66 participants (45.8%) had poor adherence, 52 (36.1%) had moderate adherence, and 26 (18.1%) had good adherence. Overall, 75 participants (52.1%) exhibited poor self-care behaviors, 41 (28.5%) had moderate self-care behaviors, and only 28 (19.4%) had good self-care behaviors. The overall self-care score represents the total score of the AF-SCABS and encompasses both pharmacologic and nonpharmacologic adherence domains (Table 2).

ED Visits and Hospitalizations

Overall, 61 participants (42.4%) reported at least 1 ED visit because of AF during the previous 6 months. Among all participants, 23 (16.0%) reported spending 2 to 4 hours in the ED during these visits. In addition, 31 participants (21.6%) reported at least 1 hospitalization because of AF, and 20 (13.9%) reported a hospital stay of 2 or more days (Table 2).

Association Between Study Outcomes and Demographic Characteristics

As shown in (Table 3), several demographic characteristics were significantly associated with the study outcomes. Educational level, economic status, and employment status were significantly associated with knowledge of AF. Educational level, marital status, and employment status were significantly associated with overall self-care behaviors. Pharmacologic treatment adherence was significantly associated with marital status and economic status, whereas nonpharmacologic treatment adherence was significantly associated with marital status (all P<.05). No significant associations were observed between demographic characteristics and ED visits and hospital admissions (all P>.05). Although the overall association between economic status and ED visits was not statistically significant based on the Pearson χ^2 test (P=.39), a significant linear trend was observed across increasing levels of economic status (P for trend=.01).

Multivariable Logistic Regression

As depicted in (Table 4), univariable and multivariable logistic regression analyses were conducted to examine the associations between knowledge, treatment adherence, self-care behaviors, and health care utilization outcomes, including ED visits and hospital admissions.

In the univariable analyses, none of the variables examined, including knowledge score, pharmacologic treatment adherence score, nonpharmacologic treatment adherence score, overall self-care behavior score, age, and sex, was significantly associated with ED visits (all P>.05). Similarly, no significant associations were observed between these variables and hospital admissions.

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After adjustment for age and sex in the multivariable logistic regression model, higher knowledge scores (adjusted OR, 0.938; 95% CI, 0.838 to 1.050; P=.27) and higher pharmacologic treatment adherence scores (adjusted OR, 0.766; 95% CI, 0.509 to 1.153; P=.20) were associated with numerically lower odds of ED visits. Still, these associations did not reach statistical significance. Likewise, a nonsignificant inverse association was observed between overall self-care behavior and ED visits (adjusted OR, 0.894; 95% CI, 0.559 to 2.680; P=.61). In contrast, nonpharmacologic treatment adherence showed a nonsignificant positive association with ED visits (adjusted OR, 1.230; 95% CI, 0.517 to 2.929; P=.64). Neither age nor sex was significantly associated with the outcome.

Regarding hospital admissions, no statistically significant associations were observed between any of the variables included in the multivariable logistic regression model and the outcome. Specifically, no statistically significant associations were observed between knowledge score (adjusted OR, 0.943; 95% CI, 0.823 to 1.080; P=.81), pharmacologic treatment adherence (adjusted OR, 0.992; 95% CI, 0.610 to 1.614; P=.68), nonpharmacologic treatment adherence (adjusted OR, 0.945; 95% CI, 0.329 to 2.714; P=.62), overall self-care behavior (adjusted OR, 0.910; 95% CI, 0.460 to 3.126; P=.71), age, or sex and hospital admissions.

Table 1. Demographic and Clinical Characteristics of the Study Participants (No. = 144)

Characteristic	No. (%)
Sex	
Men	81 (56.2)
Women	63 (43.8)
Marital status	
Single	15 (10.4)
Married	129 (89.6)
Educational level	
Less than high school	68 (47.2)
High school to bachelor's degree	67 (46.5)
Postgraduate	9 (6.3)
Economic status	
Very low	5 (3.5)
Low	32 (22.2)
Moderate	69 (47.9)
High	27 (18.8)
Very high	11 (7.6)
Employment status	
Employed	9 (6.3)
Self-employed	48 (33.3)
Homemaker	50 (34.7)
Retired	35 (24.3)
Unemployed	2 (1.4)
Hypertension	91 (63.2)
Hyperlipidemia	53 (36.8)
Diabetes mellitus	31 (21.5)
Myocardial infarction	7 (4.9)
Stroke	10 (6.9)
Other	26 (18.1)
AF subtype	
Paroxysmal	55 (38.2)
Persistent	50 (34.7)
Permanent	39 (27.1)
Anticoagulant use	
Warfarin	18 (12.5)
DOACs	100 (69.4)
None	26 (18.1)

AF: atrial fibrillation; DOACs: direct oral anticoagulants

Table 2. Distribution of Atrial Fibrillation Knowledge, Treatment Adherence, Self-care Behaviors, and Health Care Utilization Among the Study Participants (No.=144)

Variable	Category (Score Range)	No. (%)
Knowledge of atrial fibrillation	Poor (0-5)	59 (41.0)
	Moderate (6-11)	72 (50.0)
	Good (12-16)	13 (9.0)
Adherence to pharmacologic treatment	Poor (9-21)	81 (56.3)
	Moderate (22-33)	33 (22.9)
	Good (34-45)	30 (20.8)
Adherence to nonpharmacologic treatment	Poor (24-56)	66 (45.8)
	Moderate (57-88)	52 (36.1)
	Good (89-120)	26 (18.1)
Overall self-care behavior (total AF-SCABS score)	Poor (33-77)	75 (52.1)
	Moderate (78-121)	41 (28.5)
	Good (122-165)	28 (19.4)
Emergency department visits (past 6 months)	No visit	83 (57.6)
	1 visit	52 (36.1)
	≥2 visits	9 (6.3)
Hospital admissions (past 6 months)	No admission	113 (78.5)
	One admission	27 (18.8)
	≥2 admissions	4 (2.8)
Duration of emergency department stay (past 6 months)	No visit	83 (57.6)
	>2 h	16 (11.1)
	2 to 4 h	23 (16.0)
	>4 h	22 (15.3)
Duration of hospital stay (past 6 months)	No admission	113 (78.5)
	1 d	11 (7.6)
	2–3 d	14 (9.7)
	≥4 d	6 (4.2)

AF: atrial fibrillation; AF-SCABS: Atrial Fibrillation Self-Care Adherence Behavior Scale
Percentages reported in the text for "at least 1" emergency department visit and hospitalization were calculated by summing the corresponding categories.
The overall self-care behavior score represents the total AF-SCABS score and includes both pharmacologic and nonpharmacologic adherence domains.

Table 3. Associations of Demographic Characteristics with Atrial Fibrillation Knowledge, Treatment Adherence, Self-Care Behavior, and Health Care Utilization

Demographic Variable	Knowledge (total score) Mean (SD)	P	Pharmacologic Adherence Mean Item Score (SD)	P	Nonpharmacologic Adherence Mean Item Score (SD)	P	Overall Self-Care Mean Item Score (SD)	P	Emergency Department Visit (Yes) No. (%)	P	Hospital Admissions (Yes) No. (%)	P
Sex												
Male	7.20 (3.25)	.054	2.38 (1.22)	.71	2.64 (0.84)	.97	2.68 (0.95)	.25	36 (44.4)	.70	18 (22.2)	.82
Female	6.17 (3.05)		2.45 (1.29)		2.65 (0.77)		2.51 (0.86)		26 (41.3)		13 (20.6)	
Educational Level												
Less than high school	5.66 (2.46)	<.001	2.45 (1.25)	.39	2.58 (0.76)	.10	2.45 (0.82)	<.001	26 (38.2)	.53	13 (19.1)	.61
High school to bachelor's degree	7.35 (3.34)		2.30 (1.18)		2.61 (0.80)		2.58 (0.92)		32 (47.8)		15 (22.4)	
Postgraduate	10.55 (3.24)		2.88 (1.68)		3.43 (0.79)		3.95 (0.47)		4 (44.4)		3 (33.3)	
Marital Status												
Single	5.46 (3.04)	.099	3.21 (1.41)	.008	3.09 (0.85)	.022	3.11 (0.99)	.025	3 (20.0)	.057	27 (20.9)	.61
Married	6.90 (3.19)		2.32 (1.20)		2.59 (0.78)		2.55 (0.89)		59 (45.7)		4 (26.7)	
Economic Status												
Very Low	5.60 (2.07)	.012	2.06 (0.82)	.047	2.38 (0.81)	.61	2.24 (0.66)	.45	2 (25.0)	.39	3 (37.5)	.47
Low	5.53 (2.77)		2.65 (1.20)		2.63 (0.75)		2.54 (0.84)		17 (39.5)		6 (14.0)	
Moderate	6.75 (3.05)		2.24 (1.89)		2.66 (0.79)		2.56 (0.88)		33 (43.4)		19 (25.0)	
High	8.40 (3.39)		2.27 (1.28)		2.54 (0.79)		2.73 (1.00)		10 (58.8)		3 (17.6)	
Employment Status												
Employed	8.88 (3.40)	.035	3.24 (1.40)	.23	3.14 (0.86)	.21	3.61 (0.72)	.014	4 (44.4)	.60	3 (33.3)	.51
Self-employed	7.12 (3.12)		2.30 (1.25)		2.58 (0.88)		2.53 (0.97)		20 (41.7)		13 (27.1)	
Homemaker	5.80 (2.87)		2.51 (1.32)		2.67 (0.75)		2.50 (0.85)		20 (40.0)		10 (20.0)	
Retired	7.14 (3.35)		2.21 (1.06)		2.53 (0.73)		2.58 (0.88)		18 (51.4)		5 (14.3)	
Unemployed	5.50 (4.94)		2.50 (0.39)		3.34 (0.55)		3.12 (0.31)		0 (0.0)		0 (0.0)	

* Knowledge, pharmacologic treatment adherence, nonpharmacologic treatment adherence, and overall self-care behavior were compared using the independent-samples t test or one-way analysis of variance (ANOVA), as appropriate.
** Associations between emergency department visits (Yes/No) and hospital admissions (Yes/No) and demographic characteristics were assessed using the Pearson χ^2 test.
*** P for trend was calculated using the Linear-by-Linear Association test for economic status and emergency department visits.
**** Knowledge values are presented as mean total scores (range, 0–16). Treatment adherence and self-care values are presented as mean item scores (1–5 scale).
*****Some categories contained small cell counts and should be interpreted with caution.

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Table 4. Univariable and Multivariable Logistic Regression Analyses of Factors Associated with Emergency Department Visits and Hospital Admissions

Variable	Emergency Department Visits Univariable Analysis		Emergency Department Visits Multivariable Analysis		Hospital Admissions Univariable Analysis		Hospital Admissions Multivariable Analysis	
	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*
Knowledge score	0.96 (0.86-1.06)	.40	0.94 (0.838-1.050)	.27	0.951 (0.841-1.076)	.43	0.943 (0.823-1.080)	.81
Pharmacologic treatment adherence score	0.965 (0.741-1.258)	.79	0.766 (0.509-1.153)	.20	1.098 (0.791-1.523)	.58	0.992 (0.610-1.614)	.68
Nonpharmacologic treatment adherence score	1.129 (0.748-1.705)	.56	1.230 (0.517-2.929)	.64	1.147 (0.693-1.900)	.59	0.945 (0.329-2.714)	.62
Overall self-care behavior score	0.892 (0.761-1.566)	.63	0.894 (0.559-2.680)	.61	0.937 (0.729-1.771)	.57	0.910 (0.460-3.126)	.71
Age (y)	1.007 (0.978-1.037)	.62	1.007 (0.977-1.037)	.65	0.982 (0.947-1.018)	.31	0.979 (0.944-1.017)	.27
Sex								
Male	Reference		Reference		Reference		Reference	
Female	0.878 (0.451-1.710)	.70	0.903 (0.450-1.814)	.78	0.910 (0.407-2.034)	.82	0.884 (0.380-2.054)	.78

Multivariable logistic regression models included knowledge score, pharmacologic treatment adherence score, nonpharmacologic treatment adherence score, overall self-care behavior score, age, and sex.

Discussion

This study was conducted to assess knowledge, treatment adherence, self-care behaviors, and health care utilization among patients with AF. A considerable proportion of participants demonstrated limited knowledge of AF, and only 13 (9.0%) demonstrated good knowledge. More than half of the participants reported poor adherence to both pharmacologic treatment and self-care behaviors. A considerable proportion of patients also reported having visited the ED or been hospitalized because of AF during the previous 6 months, which may reflect suboptimal disease management. Significant associations were observed between certain demographic variables and levels of knowledge and adherence, suggesting the influence of social determinants on disease management outcomes.

Patients' knowledge about their condition plays a fundamental role in their ability to manage it effectively. In this study, although knowledge levels varied among participants, a substantial proportion demonstrated limited knowledge of AF (59 [41.0%]), whereas half of the participants had moderate knowledge (72 [50.0%]). These findings are consistent with previous studies by LaRosa et al,[18] Brigitte et al,[19] and Tammy et al,[20] which reported that many patients with AF have only a superficial understanding of the condition and are unaware of key aspects, such as stroke prevention and anticoagulation therapy. Such knowledge deficits are concerning because they may hinder patients' ability to make informed decisions regarding treatment and lifestyle modification. The relatively low knowledge levels observed in this study may be related to factors previously identified in the literature, including lower educational attainment, inadequate patient education, and limited health literacy. In this study, educational level was significantly associated with knowledge, whereas health literacy and the quality of patient education were not assessed.

Medication adherence is essential for preventing thromboembolic events, stroke, heart failure, and other complications in patients with AF. In this study, more than half of the participants (81 [56.3%]) demonstrated poor adherence to pharmacologic treatment, highlighting an important gap in long-term disease management. Higher adherence rates have been reported in previous studies by Miyazaki et al[21] and Moudallel et al,[22] which may reflect differences in health care systems, patient education programs, follow-up practices, and access to specialized care. Although this study was not designed to identify determinants of medication adherence, the observed findings may also be influenced by contextual factors, such as health literacy, socioeconomic conditions, patients' beliefs about medications, and barriers to accessing health care services. These findings underscore the need for targeted educational and behavioral interventions to improve medication adherence among patients with AF.

Similarly, adherence to nonpharmacologic treatment and self-care behaviors was poor in most participants; less than one-fifth (26 [18.1%]) reported good adherence in these areas. This pattern mirrors findings from Shen et al,[23] Ding et al,[24] and Xu et al,[25] who documented inadequate self-management, poor symptom monitoring, and low engagement with recommended lifestyle changes in patients with AF. Previous studies have suggested that barriers such as low motivation, fatigue, lack of support systems, and comorbid conditions may contribute to these challenges. Improving self-care behaviors may require patient-centered strategies that incorporate motivational counseling, regular follow-up, and culturally appropriate educational materials.

ED visits and hospitalizations were common among study participants. Overall, 61 participants (42.4%) reported at least 1 ED visit because of AF during the previous 6 months, and 31 (21.6%) reported at least 1 hospitalization during the same period. These findings are broadly consistent with previous studies reporting frequent health care utilization among patients with AF, particularly in the presence of suboptimal disease management or recurrent symptoms.[26,27] The coexistence of limited disease knowledge, poor treatment adherence, and relatively high health care utilization highlights the need for interventions aimed at improving patients' understanding of AF and supporting long-term self-management. Frequent ED visits and hospitalizations not only reflect a substantial burden on patients and their families but also increase health care resource utilization. Previous studies have further suggested that psychological factors, including anxiety and depression, may contribute to increased health care utilization among patients with AF and should, therefore, be considered in comprehensive patient management strategies.

Although higher knowledge, pharmacologic treatment adherence, and self-care scores showed an inverse association with ED visits, these associations did not reach statistical significance after adjustment for age and sex. As a result, our findings do not provide sufficient evidence to support an independent association between these variables and health care utilization in the study population. Nevertheless, the direction of the observed associations suggests a potentially protective effect of better disease knowledge, pharmacologic treatment adherence, and self-care behaviors on ED utilization. The lack of statistical significance may be attributable to the relatively limited sample size and the low number of outcome events, which may have reduced the statistical power to detect modest associations.

Univariable and multivariable logistic regression analyses were performed to examine factors associated with ED visits and hospital admissions. The multivariable models included age and gender as clinically relevant covariates; however, residual confounding from other unmeasured factors cannot be excluded. Knowledge was analyzed using the total questionnaire score, whereas treatment adherence and self-care were analyzed using continuous mean item scores. These analytical considerations should be taken into account when interpreting the observed associations.

Despite its contributions, the present study has several limitations. First, its cross-sectional design precludes any inference of causal relationships between knowledge, treatment adherence, self-care behaviors, and health care utilization. Second, because data were collected through self-report, recall bias and social desirability bias cannot be excluded. Third, participants were recruited from a single tertiary referral center, which may limit the generalizability of the findings to other health care settings or the broader population of patients with AF. In addition, information on the duration of AF was not collected, which may have limited the ability to examine the influence of disease chronicity on knowledge, adherence, self-care behaviors, and health care utilization. Finally, the associations between demographic characteristics and the study outcomes were based on unadjusted bivariate analyses and should, thus, be interpreted cautiously, as potential confounding variables were not controlled for. Future studies employing multicenter designs and multivariable analytical approaches are warranted to confirm these findings.

Given these findings, there is a clear need for comprehensive, patient-centered educational programs for individuals with AF. Such programs should focus on improving patients' knowledge of AF and supporting better treatment adherence and self-care behaviors through contextually appropriate educational and supportive strategies.

Future longitudinal and interventional studies should evaluate the effectiveness of these strategies and examine whether improvements in knowledge, treatment adherence, and self-care are associated with better clinical outcomes, including reduced ED visits and hospitalizations.

Conclusion

This study found that many patients with AF had limited disease-related knowledge and demonstrated suboptimal treatment adherence and self-care behaviors. Although higher levels of knowledge, pharmacologic treatment adherence, and self-care were associated with lower odds of ED visits after adjustment for age and sex, these associations did not reach statistical significance. Likewise, none of the study variables was independently associated with hospital admissions.

These findings highlight the need for context-specific educational and behavioral interventions to strengthen patients' understanding of AF and support effective self-management. The results may also help inform the development of educational strategies at Tehran Heart Center and similar clinical settings to improve the quality of care and potentially reduce ED visits and hospital readmissions.

Declarations:
Ethical Approval

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of Tehran University of Medical Sciences (approval No. IR.TUMS.SPH.REC.1401.202). Verbal informed consent was obtained from all participants before data collection. Participants were informed about the purpose of the study, the voluntary nature of participation, their right to withdraw at any time without consequence, and the confidentiality of their responses. This study reports the baseline cross-sectional data collected before implementation of an educational intervention that was subsequently registered in the Iranian Registry of Clinical Trials (IRCT20250130064570N1; registered on July 26, 2025).

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Conflict of Interest

The authors declare no conflict of interest.

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