

A descriptive cross-sectional study of self-management in patients with nonvalvular atrial fibrillation

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Abstract

Self-management of non-valvular atrial fibrillation (NVAF) is characterized by complexity and diversity of content. Inadequate self-management exposes patients to the risk for complications such as stroke and bleeding. To assess the status and predictors of self-management in NVAF patients, a descriptive cross-sectional study was conducted. The self-management scales for atrial fibrillation were used to assess the status of self-management of patients who received Warfarin, NOAC, Aspirin, or No anticoagulant therapy. The general situation questionnaire was used to collect socio-demographic and clinical data from patients. A total of 555 participants completed the survey, with self-management score of 71.21 ± 12.33 , 69.59 ± 13.37 , 69.03 ± 12.20 and 66.12 ± 11.36 in Warfarin group, NOAC group, Aspirin group and No anticoagulant group, respectively. In Warfarin group lower educational status was associated with poor self-management; in Aspirin group, comorbidities and age < 65 years ($P = .001$) were associated with poor self-management; in No anticoagulant group, age < 65 years, single, poor sleep quality, and permanent AF were associated with poor self-management. Self-management was inadequate in patients with NVAF. Poor self-management might be related with the occurrence of cerebral embolism. For NVAF patients receiving anti-thrombotic therapy, relatively young age, comorbidities, and age can have a substantial impact on self-management performance; while age, type of AF, quality of sleep, married status are associated with self-management in patients with no anticoagulants.

Abbreviation: AF = atrial fibrillation, HRQoL = heart-related quality of life, INR = international normalized ratio, NOAC = novel oral anticoagulant, NVAF = non-valvular atrial fibrillation.

Keywords: determinants, management, non, self, valvular atrial fibrillation

1. Introduction

Atrial fibrillation (AF) is a major cardiovascular health problem and the most prevalent kind of cardiac arrhythmia encountered in clinical practice,^[1,2] affecting between 1% and 2% of the general population. Numerous regional studies indicate that the prevalence and incidence of AF are increasing as a result of aging populations.^[2-4] AF is associated with an elevated risk of stroke and death,^[5,6] and the majority of patients with AF are at risk of thromboembolic events. Thus, anticoagulation medication, including vitamin K antagonists (VKAs) and novel oral anticoagulants (NOACs), is a critical component of integrated care of AF. Warfarin has been shown to reduce stroke risk by 60%,^[7] but NOAC are being used more frequently due to their simplicity of administration and comparable efficacy in preventing thromboembolism and severe bleeding when compared to warfarin.^[8] Additionally, approximately 30% of AF patients with concurrent coronary artery disease who underwent

percutaneous coronary intervention with stenting received anti-platelet therapy with aspirin,^[9] and more than half of patients with middle and high-risk NVAF received anti-platelet therapy in the GARFIELD study's Chinese subgroup data.^[10] In comparison to Europe and America, China has a growing number of patients using antiplatelet therapy.^[10] Additionally, nearly one-fifth of patients with middle- and high-risk NVAF did not obtain anticoagulant medication due to concerns about bleeding episodes, drug costs, and dosing convenience.^[10]

Recent guidelines for the therapy of AF recommend that patients should be active partners in their care, and this has been acknowledged as a critical practice.^[11] The European Heart Rhythm Association and the Heart Rhythm Society have also emphasized the need of efficient self-management of AF,^[12,13] as this can help alleviate the burden of AF.^[14] Competence in self-management of AF has been shown to have the ability to minimize AF-related adverse events.^[12] Numerous meta-analyses comparing self-management to conventional care have demonstrated a significant

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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reduction in thromboembolic events and an overall mortality reduction in individuals who practice self-management.^[15-17] Self-management of warfarin-treated individuals can result in a 20% improvement in treatment control with an international normalized ratio (INR).^[18] In summary, self-management skill is critical for the development and prognosis of AF in patients. As a result, clinical attention should be placed on self-management practices. However, studies on self-management of AF have been mostly conducted in industrialized nations, and the majority of self-management content has been limited to monitoring embolism and bleeding in patients using warfarin.^[18-20] Wang et al^[21] investigated the self-management status of AF patients receiving warfarin in China and demonstrated that they had a low degree of self-management. Additionally, a healthy lifestyle is a critical component of AF patients' self-management, as it has been shown to be beneficial in preventing the development of AF.^[22] Thus, we included lifestyle monitoring in the self-management scales to provide a more thorough assessment of AF patients' self-management status. Based on our study team's development of "The self-management scales" for AF patients, we performed a preliminary survey of AF patients taking warfarin in 2018 and discovered that their degree of self-management is inadequate.^[23] Then, what is the status of self-management in patients with AF who are receiving NOAC, aspirin, or no anticoagulant? There are only a few studies available. The purpose of this study is to assess the state of self-management in other NVAF patients (those taking NOAC, aspirin, or no anticoagulants) than those on Warfarin, using reliable and valid measures, and to investigate the determinants of their self-management.

2. Methods

The purpose of this descriptive cross-sectional study was to assess self-management and the drivers of self-management in patients with NVAF using various antithrombotic therapies. The study was conducted in accordance with the Helsinki Declaration, with ethical permission acquired from the ethical committee of the First Affiliated Hospital of Soochow University and informed consent supplied by all patients.

Between December 2016 and October 2017, a purposive sample strategy was utilized to recruit hospitalized patients with NVAF from two third-grade class-A hospitals and four second-grade class-A hospitals. The study was authorized by the collaborating institutes' Independent Ethical Committees. Patients were included if they met the following criteria: they were over the age of 18 years; they had an electrocardiographically confirmed diagnosis of AF, which can be classified as paroxysmal AF, persistent AF, or permanent AF^[24]; and they had volunteered to participate in this study and were willing to provide informed consent. Patients were excluded from this study if they had: AF caused by reversible factors, such as cardiac surgery or uncontrolled hyperthyroidism^[25]; valvular AF; severe psychiatric disease, significant language barrier, poor visual acuity, or the primary care physician determined that the patient would be an unsuitable candidate for the study^[19]; and to ensure the accuracy of the results, we excluded participants who were currently enrolled in another study.

2.1. Regular education

All patients with NVAF received regular education. The main content was as follow.

(1) Symptoms of AF occurrence.

(2) Harm of AF including embolism of vital organs such as stroke, renal embolism and myocardial infarction. Insufficient antithrombotic therapy can lead to embolism of the brain, limbs and other organs. The early manifestations of cerebral embolism are hemiplegia, language impairment, and sometimes mild coma. Limb embolism manifests as sudden onset of pain, pallor, disappearance of distant arterial pulses, coldness, numbness,

and dyskinesia. If patients have the above situation, contact the doctor immediately to deal with the embolism in time.

(3) Patients with AF at high risk of stroke should receive standardized anticoagulation therapy. Precautions when receiving antithrombotic therapy: no matter what kind of antithrombotic drug was taken, liver and renal function should be tested regularly. Bleeding monitoring: daily monitoring skin petechiae, bleeding gums, nose and oral bleedings, the color of stool and urine. If any abnormality is found, please go to the hospital or consult relevant experts in time. Precautions when taking warfarin: Regularly monitoring the INR (CS-5100, Sysmex, Kobe, Japan) and maintaining an INR range of 2.0 to 2.5; According to the INR and bleeding manifestations, the doctor adjust the dosage in time; Taking warfarin regularly and quantitatively. If patients forget, they must not take double the amount at one time; Informing patients about foods that can increase/decrease effect of warfarin and instructing to maintain the stable diet; and Informing patients about drugs that can increase/decrease effect of warfarin, and instructing to adjust warfarin dose directed by the doctor; if these medicines must be taken. Precautions in daily life: using a soft toothbrush to clean mouth; avoiding nose and tooth picking; avoiding overworked and injury-prone activities, collisions; minimizing invasive inspection and treatment which should be gently performed.

2.2. General information questionnaire

Sociodemographic and clinical characteristics were included. Age, gender, height (m), weight (kg), BMI (BMI classification according to Chinese standards), education status, payment, married status, housing status, and quality of life (QoL) were all included in the demographic data. Clinical data included clinical diagnosis, duration and type of AF; severity of symptoms, current medication type, CHA₂DS₂-VASC score, comorbidities such as hypertension, diabetes, previous transient ischemic attack (TIA) or cerebral embolism, and whether they received radio frequency ablation or re-admission within 6 months. The VAS (Visual analog scale) was used to assess sleep quality.^[26] A VAS score of 3 indicated that the sleep was of good quality; 4 to 6 showed that the sleep was of average quality; and 7 to 10 suggested that the sleep was of bad quality.

2.3. The self-management scales for AF patients

The self-management scales for patients with AF: Our study team developed the scales. Scale 1 (Supplemental Digital Content, <http://links.lww.com/MD/H602>) was used to assess self-management in patients not taking anticoagulants; Scale 2 (Supplemental Digital Content, <http://links.lww.com/MD/H602>) was used to assess self-management in patients using NOAC and Aspirin; and Scale 3 (Supplemental Digital Content, <http://links.lww.com/MD/H602>) was used to assess self-management in patients receiving Warfarin. Cronbach's coefficients for the three scales were 0.732, 0.732, and 0.845, respectively, and the cumulative variation rate (percent) was 61.90 percent, 63.09 percent, and 66.11 percent, indicating that the self-management scales are reliable and valid. The first scale had three dimensions: harmful hobbies, daily routine and exercise, and monitoring embolism and AF symptoms. Scale 2 (Supplemental Digital Content, <http://links.lww.com/MD/H602>) included four variables and included a category for monitoring bleeding symptoms based on Scale 1 (Supplemental Digital Content, <http://links.lww.com/MD/H602>). Scale 3 (Supplemental Digital Content, <http://links.lww.com/MD/H602>) featured five dimensions and expanded on Scale 2 (Supplemental Digital Content, <http://links.lww.com/MD/H602>) by including a measure for warfarin-specific treatment. All response items in the scales were scored using the Likert four-grade system (always, frequently, occasionally, never), with a forward score of 0 to 3 and an opposing reverse score. All three scales' results were transformed to a percentage system. The higher the score, the more effectively AF sufferers self-managed their condition.

2.4. Chinese version of AF quality of life assessment tool

In 2016, Zhang et al^[27] adapted the Spertus J-developed Heart-Related Quality of Life (HRQoL) questionnaire for AF patients (AF-QoL-18) to AF-QoL-17. Cronbach's coefficient for the localized AF-QoL scale (AF-QoL-18) was 0.915, indicating that the tool was very reliable. The scale consists of 17 items, each representing a component of physical, psychological, or sexual existence. The measure's response items were scored using the Likert five-point scale (strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree), yielding a total score of 17 to 85. Prior to data processing, the score was converted to a percentage system (real score 85×100), with a higher score indicating a higher quality of life.

The CHA₂DS₂-VASc score,^[28] which has been validated in NVAf, was calculated for each patient: 2 points were assigned for a history of stroke/transient ischemic attack and an age ≥ 75 years; 1 point was assigned for a patient's age between 65 and 74 years, a history of hypertension, diabetes, recent cardiac failure, vascular disease (myocardial infarction, complex aortic pl.ue, and peripheral arterial disease), and female gender, for A score of one indicates a modest risk of thromboembolism, whereas a score of two indicates a significant risk of thromboembolism.

The study group's members underwent unified training. Prior to the inquiry, the researcher thoroughly described the study's objective and relevance to the patients and assured them that their privacy would be maintained. Informed consent was obtained from patients. To ensure the investigation's homogeneity, questionnaires were distributed with standardized language instructions. Patients answered questionnaires after being informed of the survey's goal. The researchers obtained data on clinical diagnosis, disease course, type of AF, severity of symptom, current medication, type of antithrombotic drug, CHA₂DS₂-VASc score, comorbidities, and whether the patient received radio frequency ablation or was readmitted within 6 months from patients' medical records and self-reports. The sociodemographic data, which included the patient's age, gender, height, weight, education status, employment status, marital status, dwelling status, sleep quality, and QoL, were completed by the patient. For some patients with limited education and weak vision, the researchers simply and plainly read the questions/items, and the patients chose. All questionnaires were collected on the spot and reviewed for omissions or nonconformance. If there were inaccuracies, the data were completed or corrected in a timely manner to assure the information's accuracy. Due to the patients' varying abilities and educational levels, it took 15 to 30 minutes to complete the surveys.

2.5. Statistical analysis

The descriptive statistics were conducted using the SPSS18.0 statistical analysis tool. Continuous variables were expressed in terms of means and standard deviations (SD), whereas categorical variables were expressed in terms of numbers and percentages. The one-way ANOVA was used to compare the means of multiple groups. The determinants of self-management were analyzed using multivariate linear regression. $P < .05$ was judged significant statistically.

3. Results

Out of the 603 questionnaires distributed, 555 individuals completed the survey (a response rate of 92% for valid surveys). 48 surveys were deleted due to the fact that they were not gathered on the spot and were incomplete. There were no significant demographic differences between the 555 respondents who completed the questionnaire and the 48 subjects who did not (data not shown). The majority of participants (97.3%, $n = 540$) were married, 65 years or older (77.5%, $n = 430$), and had a low level of education (illiteracy, primary,

and junior secondary) (77.3%, $n = 429$). A significant proportion (40.4%, $n = 224$) had a 5-year or longer history of NVAf. At least one comorbid condition was present in the great majority (82.3%, $n = 457$). A total of 448 patients were classified as having a CHA₂DS₂-VASc score ≥ 2 . Patients were classified into four groups based on the anticoagulant medication they were taking: warfarin (24.5%, $n = 136$), NOAC (11.4%, $n = 63$), aspirin only (25.0%, $n = 139$), and no anticoagulant (37.1%, $n = 206$). The rates of cerebral embolism and bleeding, and other bleeding were 60 (10.8%), 7 (1.3%), and 2 (0.4%), respectively. Only 6% ($n = 43$) of the sample underwent radiofrequency ablation. Nearly half (44.7%, $n = 226$) had been readmitted within 6 months. Table 1 summarizes

Table 1

Socio-demographic and clinical characteristics in patients with NVAf (N = 555).

Variables	Classification	N (%)
Gender	Male	296 (53.3)
Age (yr)	<65	125 (22.5)
BMI (kg/m ²)	<18.5	32 (7.3)
	18.5–23.9	267 (43.2)
	24–27.9	200 (39.0)
	≥ 28	56 (10.4)
Marital status	Married	540 (97.30)
Educational status	Illiteracy	153 (27.6)
	Primary and junior secondary	276 (49.7)
	Senior high school and above	126 (22.7)
Dwelling status	Live alone	44 (7.9)
Sleep quality	Other	511 (92.1)
	Good	45 (8.1)
	Average	259 (46.7)
Payment	Poor	251 (45.2)
	Medical insurance	427 (76.9)
	Self-paying	128 (23.1)
Severity of symptom	Asymptomatic	60 (10.8)
	Mild	320 (57.7)
	Moderate	151 (27.2)
	Severe	24 (4.3)
Type of AF	Paroxysmal	365 (65.8)
	Persistent	155 (27.9)
	Permanent	35 (6.3)
Comorbidities	0	98 (17.7)
	1	167 (30.1)
	≥ 2	290 (52.2)
	0	37 (6.6)
Current drug types	1–4	426 (76.8)
	≥ 5	92 (16.6)
	0	32 (5.8)
	1	75 (13.5)
	≥ 2	448 (80.7)
Antithrombotic agents	Warfarin	136 (24.5)
	Aspirin	139 (25.0)
	Dabigatran	44 (7.9)
	Rivaroxaban	7 (1.3)
	Aspirin + Rivaroxaban or Dabigatran	12 (2.2)
	Aspirin + Clopidogrel	11 (2.0)
	No anticoagulant	206 (37.1)
Course of disease (yr)	<1	116 (20.9)
	1–5	215 (38.7)
	>5	224 (40.4)
	High	471 (6.2)
Radio frequency ablation	Yes	43 (7.4)
Embolism (6 mo)	Yes	60 (10.8)
	Cerebral embolism	Yes
Bleeding (6 mo)	Yes	7 (1.3)
	Cerebral bleeding	Yes
Re-admission (6 mo)	Yes	226 (44.7)

AF = atrial fibrillation, BMI = body mass index (BMI grouping according to Chinese standards), NVAf = nonvalvular atrial fibrillation, QoL = quality of life, TIA = transient ischemic attack.

the sociodemographic and clinical characteristics of the study participants.

The self-management status of patients with NVAF was found to be inadequate in this study. There were significant variations ($P < .001$) in self-management scores across groups of NVAF patients. Self-management was much better in the warfarin group (71.21 ± 12.33). In comparison to the Warfarin group, the NOAC and Aspirin groups had mediocre self-management, while the No anticoagulants group had the worst degree of self-management (66.12 ± 11.36). The dimension “monitoring embolism and AF symptoms” obtained the lowest score across all groups. Table 2 summarizes the self-management scores for all dimensions in NVAF patients. Table 3 showed the status of item score of warfarin-specific management and the results indicated that the status of self-management in this dimension is poor. Among of them, the performance of item “monitoring INR as ordered by your doctor” was best, while the performance of item “increasing the times of INR monitoring during related medication adjustment” was worst.

Using Univariate Binary Logistic Regression, the relationship between the self-management and occurrences of embolism and bleeding was analyzed and the results indicated that there was significant difference between the level of self-management and the occurrence of cerebral embolism ($P = .042$), while we did not find the differences existed other indicators (Table 4).

Table 5 contains the results of one-way ANOVA analyses. Educational status ($P = .002$), symptom intensity ($P = .001$), and CHA_2DS_2 -VASc score ($P = .023$) were all associated with self-management in the Warfarin group. There were no significant predictors of self-management in the NOAC group. In the Aspirin group, self-management was associated with age ($P = .003$) and comorbidities ($P = .005$). While marital status ($P < .001$), educational level ($P = .047$), sleep quality ($P < .001$), type of AF ($P = .001$), quality of life (QoL) ($P = .027$), and re-admission within a half-year ($P = .004$) were all associated with self-management in the No anticoagulants group.

The independent variables related with self-management that were significantly different from zero in the one-way ANOVA were entered into multivariable linear regression.

Additionally, the multivariable linear regression model incorporated age, severity of symptoms, and educational status. Due to the fact that the sample size for the NOAC group was insufficient to satisfy the criteria for multivariable linear regression, the NOAC group’s multivariable linear regression results were omitted. Table 6 details the assignment of independent variables.

Multiple linear regression analysis revealed that the model explained 12.3%, 25.9%, and 10.1% of the variance in self-management in the Warfarin, Aspirin, and No anticoagulants groups, respectively. The results indicated that poorer self-management was associated with “low education status” ($P = .002$) in the Warfarin group, “age <65 years” ($P = .001$) in the Aspirin group, and “having comorbidities” ($P = .015$), “age < 65 years” ($P = .047$), “single” ($P = .006$), “having poorer sleep quality” ($P < .001$), and “with permanent AF” ($P = .009$) in the No anticoagulants therapy group. Table 7 summarizes the determinants of self-management in three categories.

4. Discussion

The bulk of participants in this study were old, accounting for 87.5%. Around 1/3 of the population was illiterate and 45.2% of patients reported having poor sleep quality, and 82% reported having comorbidities. About 37% did not receive any anticoagulant. There was 10% patients who underwent cerebral embolism during the past 6 months. Nearly 45% had a high rate of re-admission within 6 months.

The findings of this study indicated that self-management of patients with NVAF was inadequate, particularly in the dimension of “monitoring symptoms of embolism and AF”, of which the lowest score was obtained; and in the Warfarin specific-dimension, there was also much inadequate self-management, which is consistent with the findings of McCabe PJ.^[29] In addition, we found the relationship between the self-management and occurrences of embolism and bleeding and the results indicated that there might be fewer cerebral embolic events in the higher level of self-management.

Table 2

The scores of dimensions of self-management in patients with NVAF with different anti-thrombotic therapies (M ± S).

	Warfarin	NOAC	Aspirin	None	<i>F</i> / <i>t</i>	<i>P</i>
Total scores of self-management	71.21 ± 12.33	69.59 ± 13.37	69.03 ± 12.20	66.12 ± 11.36	5.366	.001
Adverse hobbies	88.65 ± 16.06	86.98 ± 17.19	88.30 ± 16.33	90.90 ± 14.36	1.300	.273
Daily routine and exercise	73.35 ± 20.12	79.69 ± 19.51	73.90 ± 17.09	75.06 ± 19.26	1.096	.350
Monitoring the symptoms of embolism and AF	56.96 ± 17.61	53.13 ± 19.29	51.49 ± 17.93	61.94 ± 19.65	10.516	<.001
Monitoring the symptoms of bleeding	76.72 ± 21.43	72.92 ± 25.49	75.73 ± 21.50		0.307	.673
Warfarin-specific management	74.31 ± 21.43					

AF = atrial fibrillation, NOAC = new oral anticoagulant, None = no anticoagulants therapy, NVAF = non-valvular atrial fibrillation.

Table 3

The status of item score of warfarin-specific management [N (%)].

	Always	Often	Sometime	Never
Item 1	66 (48.5)	29 (21.3)	22 (16.2)	19 (14.0)
Item 2	52 (38.2)	26 (19.1)	25 (18.4)	33 (24.3)
Item 3	51 (37.5)	30 (22.1)	19 (14.0)	36 (26.5)
Item 4	55 (40.4)	26 (19.1)	21 (15.4)	34 (25.0)

Item 1, monitor INR during I take warfarin according to doctors' order; Item 2, increase the times of INR monitoring when occurring some problems (trauma, infection, fever, hyperthyroidism, diarrhea, etc); Item 3, increase the times of INR monitoring during related medication adjustment; Item 4: make no excessive adjustments of my diet.

NOAC = new oral anticoagulant, None = no anticoagulants therapy.

Table 4

The relationship between the self-management and occurrences of embolism and bleeding by Univariate Binary Logistic Regression.

Dependent variables	Self-management		
	B	95% CI	<i>P</i>
Embolism	0.021	0.997, 1.047	.083
Cerebral embolism	0.027	-1.001, 1.054	.042*
Bleeding	0.044	0.982, 1.113	.166
Cerebral hemorrhage	0.030	0.963, 1.103	.382

* $P < .05$.

Table 5
Comparisons of the scores of self-management in NVAF patients undergoing different anti-thrombotic therapies at different socio-demographic and clinical characteristics.

Variables	Classification	Warfarin		NOAC		Aspirin		None		
		Scores of self management ability ($\bar{X} \pm S$)	F	Scores of self management ability ($\bar{X} \pm S$)	F	Scores of self management ability ($\bar{X} \pm S$)	F	Scores of self management ability ($\bar{X} \pm S$)	F	
Gender	Male	70.41 ± 12.46	0.792	66.40 ± 13.39	2.827	68.71 ± 14.48	0.125	65.25 ± 12.34	1.319	
	Female	72.32 ± 12.17		74.26 ± 12.38		69.37 ± 9.28		67.02 ± 10.22		
Age (yr)	<65	68.34 ± 11.75	2.010	65.19 ± 11.70	1.605	20.39 ± 11.48	9.301**	63.74 ± 11.31	3.021	
	≥65	71.99 ± 12.42		71.59 ± 13.85		63.34 ± 13.62		66.87 ± 11.30		
BMI (kg/m ²)	<18.5	73.61 ± 9.12	0.281	72.19 ± 11.34	1.543	66.88 ± 7.68	0.309	67.41 ± 11.69	0.413	
	18.5–23.9	70.92 ± 12.28				66.12 ± 13.27		68.79 ± 12.88		65.32 ± 11.63
	24–27.9	71.77 ± 12.75				67.31 ± 16.60		68.79 ± 12.70		66.67 ± 11.21
	≥28	69.19 ± 13.25				67.31 ± 16.60		67.42 ± 9.13		67.71 ± 10.52
Marital status	Married	71.46 ± 12.35	1.910	69.59 ± 13.37		69.08 ± 12.29	0.184	66.65 ± 11.01	12.895**	
	Single	62.85 ± 9.17				66.03 ± 6.18		52.34 ± 12.37		
Educa-tional status	Illiteracy	65.46 ± 11.45	6.542**	65.81 ± 12.23	0.538	70.43 ± 10.88	0.634	64.05 ± 10.91	3.099*	
	Primary and junior secondary	72.68 ± 12.58		70.33 ± 12.50		68.03 ± 13.16		65.75 ± 11.03		
	Senior high school and above	73.85 ± 11.78		72.22 ± 16.26		69.87 ± 11.35		69.17 ± 12.02		
Dwelling status	Live alone	69.25 ± 17.61	0.182	70.15 ± 12.35	0.139	67.75 ± 12.28	2.122	65.90 ± 13.86	0.012	
	Others	71.32 ± 12.06		68.16 ± 16.43		72.65 ± 10.89		66.15 ± 10.95		
Sleep quality	Good	69.21 ± 9.02	1.225	73.08 ± 24.47	0.136	69.15 ± 13.16	0.066	71.75 ± 12.63	13.906**	
	Average	72.89 ± 12.64		69.96 ± 12.05		69.08 ± 11.88		68.73 ± 10.66		
	Poor	69.62 ± 12.18		67.95 ± 15.77		67.79 ± 8.84		61.78 ± 10.25		
Payment	Insurance	71.94 ± 12.64	3.099	69.14 ± 14.94	0.077	69.38 ± 12.15	0.747	65.92 ± 10.84	0.144	
	Self-paying	66.80 ± 10.07		70.58 ± 9.68		67.16 ± 12.58		66.55 ± 12.45		
Severity of symp-toms	Asymptomatic	69.01 ± 14.79	25.634**	64.18 ± 11.81	2.436	64.05 ± 15.79	1.147	64.27 ± 8.87	2.582	
	Mild	91.77 ± 12.78		69.64 ± 12.33		68.79 ± 12.35		65.39 ± 11.26		
	Moderate	75.24 ± 13.59		78.12 ± 13.20		70.92 ± 10.32		68.84 ± 12.09		
	Severe	65.28 ± 8.10		56.73 ± 14.96		71.54 ± 12.86		60.77 ± 9.05		
Type of AF	Paroxymal	72.13 ± 12.39	0.740	67.38 ± 13.20	5.401	68.92 ± 13.32	0.366	67.74 ± 10.74	6.954**	
	Persistent	69.35 ± 12.37		81.54 ± 16.96		69.81 ± 10.44		62.78 ± 12.20		
	Permanency	71.94 ± 12.10				66.51 ± 9.04		56.77 ± 8.75		
Comorbid-ities	0	71.10 ± 13.89	2.544	70.73 ± 14.73	0.861	75.40 ± 8.35	3.054**	69.79 ± 10.41	2.955	
	1	66.86 ± 13.95		63.73 ± 13.20		68.47 ± 11.47		65.04 ± 12.83		
	≥2	72.81 ± 10.89		71.51 ± 12.78		67.71 ± 14.30		65.28 ± 10.22		
Current drug types	0		0.612		0.283		0.083	62.61 ± 10.54	2.194	
	1–4	71.62 ± 13.13		70.51 ± 14.03		69.17 ± 17.61		66.92 ± 11.68		
	≥5	69.55 ± 8.34		67.83 ± 12.46		68.52 ± 10.79		66.02 ± 8.50		
CHA ₂ DS ₂ -VASC score	0	59.90 ± 9.58	3.864*	51.92 ± 8.16	3.916	60.34 ± 17.11	2.296	64.73 ± 12.49	1.676	
	1	71.68 ± 12.15		62.50 ± 11.20		68.06 ± 14.62		62.90 ± 13.09		
	≥2	73.19 ± 12.45		72.84 ± 12.63		69.63 ± 11.48		66.81 ± 10.88		
Duration (yr)	<1	70.51 ± 12.42	0.466	69.23 ± 12.76	1.766	66.22 ± 12.61	1.274	64.06 ± 8.97	1.083	
	1–5	70.43 ± 13.05		64.68 ± 11.80		69.99 ± 11.63		66.05 ± 11.52		
	>5	72.60 ± 11.41		75.38 ± 14.61		69.61 ± 12.50		67.09 ± 12.15		
QoL	High	71.24 ± 12.52	0.003	72.55 ± 12.54	3.759	69.41 ± 15.02	0.024	66.80 ± 10.75	4.946*	
	Low	71.09 ± 11.58		63.08 ± 13.44		68.97 ± 11.79		61.88 ± 14.11		
Radio fre-quency ablation	Yes	72.69 ± 8.81	0.137	64.18 ± 9.02	1.790	73.08 ± 9.29	0.449	66.86 ± 9.98	0.104	
	No	71.11 ± 12.56		71.39 ± 14.24		68.93 ± 12.27		66.03 ± 11.52		
Re-ad-mission (6 mo)	Yes	72.39 ± 12.95	0.924	73.06 ± 15.89	0.718	69.67 ± 11.77	0.352	62.74 ± 11.46	9.300**	
	No	70.33 ± 11.85		68.43 ± 12.59		67.77 ± 13.34		67.70 ± 11.00		

BMI = body mass index, NOAC = new oral anticoagulant, None = no anticoagulants therapy, NVAF = non-valvular atrial fibrillation, QoL = quality of life.

*P < .05.

**P ≤ .01.

Meanwhile, our study discovered substantial disparities in self-management of NVAF patients amongst the four groups receiving different anticoagulation medications, with

the Warfarin group having the best self-management and the group receiving no anticoagulant therapy having the worst. The reason for this could be that warfarin is the most often

prescribed oral anticoagulant in clinical practice for the prevention of ischemic stroke in individuals with AF. Due to its small therapeutic window and long half-life, it is, however, susceptible to the effects of other medications or meals. As a result, it is required to monitor the coagulation function on a frequent basis and adjust the dose in accordance with the test results.^[30] Thus, patients typically receive more instruction from clinicians in the outpatient setting, which boosts their comprehension of AF and warfarin-related knowledge and has a positive effect on patients' self-management behavior.^[31] While patients with AF who did not receive anticoagulants had a low level of self-management,^[32] the dimension "monitoring the symptoms of embolism and AF" had the highest score, indicating that this group of patients paid more attention to the occurrence of embolic events due to the absence of anticoagulants.^[33]

Educational attainment has a substantial impact on the selection of appropriate therapy for AF, such as warfarin and NOAC administration, in order to avoid embolism events.^[34] Our study revealed a significant education-related difference in self-management, indicating that a low level of education was the sole independent risk factor affecting the self-management of patients on Warfarin. Patients who are more educated are better equipped to receive and process information concerning AF. According to the KAP model, "knowledge" is the foundation of behavior,^[35] and a lack of knowledge or misunderstanding may be the major cause of ineffective self-management behavior.^[36] It is possible that patients with a lesser educational background had a misperception about the disease as a result of insufficient

knowledge, which hampered their ability to apply self-management behaviors.

Except for isolated AF, the majority of cases of AF are due to other conditions (e.g., arterial hypertension, heart failure, valvular heart disease, and hyperthyroidism),^[37] making AF management and therapy highly complex. Comorbidities were an independent risk factor for poor self-management in the Aspirin group, which is consistent with earlier research by Ausili et al.^[38] and Ausili D et al.^[39] One possible explanation is that patients with comorbid diseases lacked confidence while making self-management decisions, as they were forced to assess two or more conditions concurrently, adding to the complexity of disease management.^[38]

Sleep efficiency was found to be strongly connected with a decreased risk of AF.^[40] Numerous investigations have established a link between abnormal total sleep time and AF.^[41,42] Meanwhile, poor sleep quality puts limits on self-management behavior implementation.^[43] Our study found that poor sleep quality is the most significant independent risk factor affecting participants' self-management in the group that did not take anticoagulants. Poor sleep quality has been shown to be strongly associated with daytime dysfunction, including fatigue, depression, anxiety, pain, excessive daytime sleepiness, and declines in functional performance,^[44] all of which contribute to the patient's inability to effectively implement self-management behaviors. Family support, particularly spouse support, is critical for patients' self-management behavior to be implemented.^[45] In comparison to single individuals, married individuals are more adept at self-management behaviors as a result of their spouses' care,^[46] which is consistent with this study's findings that marriage is a protective factor that promotes self-management in patients with AF who do not take anticoagulants.

Numerous studies have demonstrated that older patients have a higher level of self-management than younger patients.^[47,48] Age was also found to be a protective factor for self-management in our study, both in the Aspirin and No anticoagulation groups. Elderly patients have a reasonable amount of time to devote to disease self-management. While younger patients involved in employment or social activities had less time and energy to manage their disease on a consistent basis.^[49] As a result, it is critical for experts to educate younger patients about the need of paying attention to their problems.

The severity of a patient's sickness can be used to predict their self-management behavior.^[48] According to this study, patients with paroxysmal AF are more likely to engage in self-management than patients with permanent AF or persistent AF. Serious symptoms in patients with permanent AF may

Table 6**The assignment of variables.**

Variables	Assignment
Gender	Male = 1; female = 2
Age	≤65 = 1; >65 = 2
Educational status	Illiteracy = 1; primary and junior secondary = 2; senior high school and above = 3
Comorbidities	0 = 1; 1 = 2; ≥2 = 3
CHA ₂ DS ₂ -VASC score	0 = 1; 1 = 2; ≥2 = 3
Severity of symptom	Asymptomatic = 1; mild = 2; moderate = 3; severe = 4
Payment	Medical insurance = 1; self-paying = 2
Type of AF	Paroxysmal = 1; persistent = 2; permanent = 3
Sleep quality	Good = 1; Average = 2; Poor = 3
Marital status	Married = 1; single = 2
QoL	High = 1; low = 2
Re-admission (6 mo)	Yes = 1; no = 2

AF = atrial fibrillation, QoL = quality of life.

Table 7**The factors associated with the self-management in patients with NVAF with different anti-thrombotic therapies.**

Variables	Warfarin			Aspirin			None		
	B	95% CI	P	B	95% CI	P	B	95% CI	P
Gender	3.918	(−0.567, 8.403)	.086	0.400	(−3.253, 4.054)	.829	1.694	(−1.332, 4.709)	.269
Age	0.603	(−5.823, 7.029)	.459	8.310	(3.741, −12.979)	.001	4.651	(0.061, 9.241)	.047
Educational status	5.156	(1.977, 8.336)	.002	0.127	(−2.535, 2.789)	.925	1.252	(−0.792, 3.295)	.229
Comorbidities	0.587	(−2.230, 3.404)	.681	−3.303	(−5.702, −0.842)	.015	−0.978	(−2.946, 0.989)	.328
CHA ₂ DS ₂ -VASC score	2.014	(−3.354, 7.383)	.459				0.690	(−3.018, 4.398)	.714
Severity of symptom	1.672	(−1.199, 4.542)	.251				0.353	(−1.607, 2.312)	.723
Payment	−3.375	(−9.453, 2.702)	.274						
Type of AF							−3.682	(−6.441, −0.924)	.009
Sleep quality							−4.729	(−6.910, −2.548)	.000
Married status							−10.606	(−18.170, −3.024)	.006
QoL							−2.926	(−7.079, 1.227)	.166
Re-admission (6 mo)							1.803	(−1.403, 5.010)	.269

NOAC = new oral anticoagulant, none = no anticoagulants therapy, NVAF = non-valvular atrial fibrillation, QoL = quality of life.

increase their likelihood of perceiving themselves as “badly ill,” which may result in a passive attitude and subsequently poor self-management.^[50]

5. Conclusions

Self-management was inadequate in patients with NVAF. Poor self-management might be related with the occurrence of cerebral embolism. For NVAF patients receiving anti-thrombotic therapy, relatively young age, comorbidities, and age can have a substantial impact on self-management performance; while age, type of AF, quality of sleep, married status are associated with self-management in patients with no anticoagulants.

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Author contributions

QS and CZ performed data collection, formal analysis, and draft writing. TL, HZ, and ZZ performed data analysis. CL designed the research and revised the draft.

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