

Symptoms, acceptance of illness and health-related quality of life in patients with atrial fibrillation

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Abstract

Introduction: Acceptance of illness plays a key role, allowing the patient to adapt to the disease and its treatment, and to maintain their health-related quality of life (HRQOL) despite chronic conditions.

Aim: The aim of the study was to assess the relationship between severity of arrhythmia symptoms, acceptance of illness and HRQOL in patients with atrial fibrillation.

Methods: The study included 99 patients (mean age 64.6) treated for atrial fibrillation. Three standardized instruments were used: the World Health Organization Quality of Life (WHOQoL-BREF) questionnaire, the Arrhythmia-Specific Questionnaire in Tachycardia and Arrhythmia (ASTA) and the Acceptance of Illness Scale (AIS).

Results: Patients with high illness acceptance levels obtained better results in all WHOQoL-BREF domains: physical (57.0±8.9 vs. 51.1±12.5 vs. 42.0±6.2; $p<0.001$), social (62.6±19.8 vs. 52.5±20.0 vs. 45.7±16.0; $p=0.019$) and environmental (62.9±12.7 vs. 52.7±7.6 vs. 60.7±3.6; $p<0.001$), and in the ASTA HRQOL scale (10.5±5.4 vs. 16.1±7.6 vs. 20.3±0.5; $p<0.001$). Multiple-factor analysis showed AIS to be a statistically significant independent determinant of HRQOL in the physical domain of the WHOQoL ($\beta=0.242$) and in the overall HRQOL assessment in the ASTA HRQOL scale ($\beta=-0.362$). Other statistically significant independent predictors included: the negative impact of female sex on the physical ($\beta=-0.291$) and social ($\beta=-0.284$) domains of the WHOQoL-BREF, and the positive impact of urban residence on the physical WHOQoL-BREF domain and on symptom intensity in the ASTA symptom scale.

Conclusions: Acceptance of illness is an important factor which has been shown to impact on HRQOL in atrial fibrillation. Female sex is a predictor of worse HRQOL, while urban residence improves HRQOL in the physical domain and decreases symptom intensity (ASTA symptom scale).

Keywords

Atrial fibrillation, acceptance of illness, health-related quality of life, arrhythmia symptoms

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Introduction

Atrial fibrillation is associated with increased morbidity and mortality from heart failure, stroke and other haemorrhagic and thromboembolic complications.¹ The incidence of the disease varies with age. Men are more commonly affected.² Atrial fibrillation affects 3.7–4.2% of patients aged 60–70, and 10–17% of those aged 80 and above.³ Approximately most of the atrial fibrillation patients are aged between 65 and 85.⁴

Research by the European Society of Cardiology (ESC) indicates that the most common symptoms reported by

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atrial fibrillation patients are: weakness, heart palpitations, shortness of breath, chest pain, sleep difficulties and psychosocial distress. The intensity of symptoms is related to the subjective health-related quality of life (HRQOL). What is more, the antiarrhythmic drugs cause some side-effects, including vertigo, bradycardia and hypotonia.⁵

Atrial fibrillation patients have significantly lower HRQOL than healthy individuals. Research highlights significant limitations on daily activity and worse perceived health than in patients treated for other cardiovascular diseases.⁶

Despite numerous studies on HRQOL in medicine, a single, universally-accepted definition of the concept has yet to be established. The terminology in use is subjective, and assessment can be based on a variety of aspects, such as disease symptoms, functional status, perceived health, or patient experiences and expectations.⁷ Many authors rely on the World Health Organization (WHO) definition of quality of life (QOL), whereby:

‘individuals perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person’s physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.’⁸

Specific instruments evaluating the subjective HRQOL of atrial fibrillation patients are still lacking.

In chronic illness, the symptoms experienced, frequent hospitalizations, and adverse effects of medication are linked to worse HRQOL, negative emotions, and limitations in physical, psychological and social functioning, forcing the chronically ill to give up their professional and social roles. At present, the management of atrial fibrillation aims at reducing symptoms and preventing severe complications. It is important, however, that the management and treatment of arrhythmia take into account not only symptoms, but also individual patient-related factors, such as psychological well-being. The ESC guidelines for the management of atrial fibrillation 2016 state, with regard to planning care for patients, that explaining the expected benefits to each person at the start of atrial fibrillation management will prevent unfounded expectations and has the potential to optimize HRQOL.⁵

Nursing interventions might positively influence HRQOL. In the literature there are: care planning, empowering, social, activating and security interventions as interventions to support patients’ HRQOL.⁹

The acceptance of illness represents the factors that positively influence HRQOL. Acceptance of illness is a complex process affected by a number of factors such as: symptom intensity, satisfaction with treatment, personal preferences and coping strategies, family support, and socio-economic status.¹⁰ Acceptance of illness engenders a sense of security

and mitigates the negative reactions related to the illness and treatment. High acceptance of chronic disease not only decreases psychological stress, but also promotes active participation and the engagement of the patient in the treatment process,¹¹ thus contributing to treatment success.¹² Acceptance of illness is a compromise between sensitivity and resistance, required for effective coping with the consequences of chronic illness and significantly affecting HRQOL.¹³

Evaluation of HRQOL and acceptance of illness enables the identification of patient-specific problems and needs in atrial fibrillation, which in turn allows for providing optimized, patient-centred treatment.

Guidelines from the American College of Cardiology and the American Heart Association emphasize the need for assessing the HRQOL of atrial fibrillation patients in standard clinical practice¹⁴ and its importance as an endpoint in the assessment of treatment success.¹⁵

The published papers on the dependence between illness acceptance and HRQOL point out the strong dependence of illness acceptance as the independent predictor of the evaluation of quality of life in chronic diseases.¹³

Existing publications discuss HRQOL in atrial fibrillation with regard to treatment strategies^{16,17} or the impact of socio-demographic and clinical variables.^{18,19} However, to the best of our knowledge, none of the previous studies dealt with the relationship between acceptance of illness and HRQOL of atrial fibrillation patients.

Lately Mlynarska et al. published a study on illness acceptance in atrial fibrillation and proved the dependency between illness acceptance and the severity of the symptoms in atrial fibrillation. They showed that the more severe symptoms were the factors causing the lower level of illness acceptance. In the study a higher level of European Heart Rhythm Association (EHRA) score was connected with a smaller degree of the acceptance of the illness.²⁰

Therefore, the aim of this study was to analyse the associations between acceptance of illness and HRQOL and severity of symptoms of patients with atrial fibrillation.

Methods

Participants

Our study was a cross sectional study and it was performed between January 2015 and September 2016 on the Cardiology Ward of the Wrocław University Hospital. It involved 116 patients *consecutively* admitted to the hospital and selected by the cardiologist on the basis of the inclusion and exclusion criteria. They were hospitalized mainly due to arrhythmia. Out of 116 patients who met the inclusion criteria, 17 patients had not completed the questionnaires correctly, or refused participation in the study without giving any reason.

Inclusion criteria were: clinically confirmed atrial fibrillation; anticoagulant treatment; informed consent to participate in the study. Exclusion criteria were: lack of consent to

participate in the study; exacerbation of another cardiovascular disease; incorrect or incomplete filling in of the questionnaires; cognitive impairment indicative of dementia, which could affect the perceived HRQOL and acceptance of illness. Patients were included in the study by a panel consisting of a physician and a nurse specializing in cardiology. All patients were informed of the study purpose and course, and provided written informed consent to participate. On completing the surveys, the patients underwent health education, which focused on the disease, diagnosis of the symptoms, risk factor modifications and activities such as self-treatment and active participation in the treatment,⁵ and they were given a so called 'check list'²¹ containing information regarding the procedures and the necessity for follow-up during the oral anticoagulant therapy. The nursing interventions might improve QOL, according to the literature.

Ethical consideration

The protocol of the study was approved by the Local Bioethics Committee of the Wrocław Medical University (approval no. KB-53/2014), and written informed consent was obtained from all the participants.

Instruments

All the patients were examined using three validated instruments: the World Health Organization Quality of Life (WHOQoL-BREF) questionnaire, the Arrhythmia-Specific Questionnaire in Tachycardia and Arrhythmia (ASTA) and the Acceptance of Illness Scale (AIS). The instruments were distributed by a cardiac nurse within two days of admission at the clinic, but the patients answered the questions themselves.

The AIS is a standardized research instrument by Felton et al., adapted into Polish by Juczyński,¹² used for evaluating patient acceptance in various illnesses. It comprises eight statements regarding the difficulties and limitations imposed by the illness: lack of independence, sense of being dependent on others, decreased self-esteem. Answers are given using a five-item Likert scale. The maximum score of 40 points indicates high acceptance of illness, while a minimum score of eight points indicates low acceptance. AIS scores 30–40, 19–29 and 8–18 were used to reflect high, moderate and low acceptance, respectively. The reliability and internal consistency of the Polish version of AIS (Cronbach's alpha 0.82) are similar to those of the original instrument. Participants were categorized as having low, moderate and high self-reported acceptance of illness based on their mean AIS score in three consecutive surveys.¹²

The WHOQOL-BREF questionnaire is a short version of WHOQoL-100, comprising 26 items. It provides information on HRQOL in four domains: physical, psychological, social and environmental. The WHOQoL-BREF also

contains two additional questions on overall HRQOL and subjective perception of one's health. Higher questionnaire scores denote a higher HRQOL. Cronbach alpha values for each of the six domain scores ranged from 0.71 (for domain 4) to 0.86 (for domain 5), demonstrating good internal consistency.²² The questionnaire has been adapted for use in Polish settings by Wołowicka and Jaracz.²³

The ASTA is a specific questionnaire used for evaluating HRQOL in patients with atrial fibrillation. It comprises three sections. Part I evaluates the most recent arrhythmic episode. Part II (the ASTA symptom scale) deals with arrhythmia symptoms. The maximum score for part II is 27 points (the higher the score, the more distressing the symptoms). Part III (the ASTA HRQOL scale) comprises 13 items and describes the impact of arrhythmia on patients' daily functioning. The maximum score is 39 points (the higher the score, the worse the effects on the HRQOL). The possible scores for the physical and mental domains range between 0 and 21 and between 0 and 18, respectively. Each part of the questionnaire can be used independently.^{24,25}

All socio-clinical characteristics of the patients were obtained from hospital records.

All the research tools in our study were used according to the good clinical practice guidelines.

Statistical analysis

Statistical analysis was performed using Statistica 12 software from StatSoft, Inc. The study used a significance level of 0.05, that is, outcomes at $p < 0.05$ were considered statistically significant. QOL scores for subgroups of patients identified based on their acceptance of illness levels (low, moderate and high) were compared using the Kruskal–Wallis test. The power and direction of associations between acceptance of illness and HRQOL scores were determined using Pearson correlation coefficients (r). Variables identified as significant determinants of HRQOL scores in univariate analysis were included in multiple regression analysis. The significance of the differences between the HRQOL scores (WHOQoL, Table 3) was verified by the Kruskal–Wallis test.

Results

Participants' characteristics

The study included 99 patients (mean age 64.65 ± 10.63 years) treated for an episode of atrial fibrillation, of whom 55 were female. The socio-clinical characteristics of the patients are shown in Table 1.

High (30 points or more) acceptance of illness scores were obtained by 59 patients. Most patients had a college/university education, but were professionally inactive – mainly retired or receiving a disability pension (Table 1).

Table 1. Baseline characteristics of the patients.

Characteristic (variable) of 99 patients	Coding used	n	%	
Sex	Female	1	55	55.6
	Male	0	44	44.4
Age	< 60 years	0	34	34.3
	≥ 60 years	1	65	65.7
Level of education	Primary	1	17	17.2
	Vocational	2	19	19.2
	High School	3	29	29.3
	College/university	4	34	34.3
Relationship status	Single	0	13	13.1
	Married	1	54	54.6
	Divorced	0	12	12.1
	Widowed	0	20	20.2
Residence	Urban	1	58	58.6
	Rural	0	41	41.4
Professional activity	Active	1	44	44.4
	Not active	0	55	55.6
EHRA class	I – no symptoms	1	7	7.1
	II – mild symptoms	2	13	13.1
	III – severe symptoms	3	16	16.2
	IV – disabling symptoms	4	63	63.6
Duration of illness	< 5 years	0	49	49.5
	≥ 5 years	1	50	50.5
Number of hospitalizations due to atrial fibrillation	1–2	1	26	26.3
	3–5	2	44	44.4
	6–10	3	14	14.1
	More	4	15	15.2
Comorbidities	Arterial hypertension	1 – yes	52	52.5
	Diabetes mellitus	1 – yes	24	24.2
	Ischaemic heart disease	1 – yes	27	27.3
	Heart failure	1 – yes	23	23.2
Treatment	VKA	0	62	62.6
	NOAC	1	37	37.4
Strategy	Rate control	0	61	61.6
	Rhythm control	1	38	38.4
HAS-BLED score	Low bleeding risk (< 3 patients)	0	38	38.4
	High bleeding risk (≥ 3 patients)	1	61	61.6
AIS	Low (8–18 points)	1	6	6.1
	Moderate (19–29 points)	2	34	34.3
	High (≥ 30 points)	3	59	59.6

EHRA: European Heart Rhythm Association.; VKA: vitamin K antagonist; NOAC: novel oral anticoagulant; AIS: Acceptance of Illness Scale.

The severity of symptoms, as classified using EHRA scores,²⁷ was high: 63.6% of patients had symptoms forcing them to discontinue normal daily activity (EHRA IV), and nearly half had been hospitalized for atrial fibrillation between three and five times. In the study group, 61.6% of respondents were treated using the rate control strategy.

Most common comorbidities were: hypertension and ischaemic heart disease. The decisive majority of patients were treated with oral vitamin K antagonists and were classified as high-risk for bleeding using the HAS-BLED scale (≥ 3 points). The data are shown in Table 1.

QOL in relation to acceptance of illness. Analysis of HRQOL scores in the WHOQOL-BREF questionnaire based on acceptance of illness levels showed significantly higher HRQOL for high-acceptance patients in all domains except for the psychological one: physical ($p < 0.001$), social ($p = 0.019$) and environmental ($p < 0.001$). Additionally, comparative analysis demonstrated a statistically significant correlation between AIS scores on the one hand and arrhythmic symptom severity (ASTA symptom scale score, $p = 0.027$) and HRQOL measured by the specific questionnaire (ASTA

Table 2. Quality of life measured using the general and the specific questionnaire in relation to the Acceptance of Illness Scale.

WHOQoL-BREF		Acceptance of Illness Scale score			Test result
		Low <i>n</i> = 6	Moderate <i>n</i> = 34	High <i>n</i> = 59	
Physical domain	<i>M</i> ± <i>SD</i>	42.0 ± 6.2	51.1 ± 12.5	57.0 ± 8.9	<i>p</i> < 0.001
	<i>Me</i> (<i>Q</i> ₁ ; <i>Q</i> ₃)	38 (38; 50)	44 (44; 63)	56 (50; 63)	
	Min–max	38–50	31–69	38–69	
Psychological domain	<i>M</i> ± <i>SD</i>	64.7 ± 6.7	59.0 ± 6.4	61.0 ± 11.7	<i>p</i> = 0.373
	<i>Me</i> (<i>Q</i> ₁ ; <i>Q</i> ₃)	69 (56; 69)	56 (56; 63)	56 (50; 69)	
	Min–max	56–69	50–69	44–81	
Social domain	<i>M</i> ± <i>SD</i>	45.7 ± 16.0	52.5 ± 20.0	62.6 ± 19.8	<i>p</i> = 0.019
	<i>Me</i> (<i>Q</i> ₁ ; <i>Q</i> ₃)	56 (25; 56)	56 (31; 75)	69 (44; 81)	
	Min–max	25–56	19–75	25–100	
Environmental domain	<i>M</i> ± <i>SD</i>	60.7 ± 3.6	52.7 ± 7.6	62.9 ± 12.7	<i>p</i> < 0.001
	<i>Me</i> (<i>Q</i> ₁ ; <i>Q</i> ₃)	63 (56; 63)	50 (50; 56)	69 (50; 75)	
	Min–max	56–63	44–69	38–81	
ASTA symptom scale	<i>M</i> ± <i>SD</i>	8.0 ± 3.6	4.7 ± 2.9	5.8 ± 2.9	<i>p</i> = 0.027
	<i>Me</i> (<i>Q</i> ₁ ; <i>Q</i> ₃)	8.5 (5; 11)	4 (3; 6)	6 (4; 8)	
	Min–max	3–12	0–12	0–15	
ASTA HRQOL scale	<i>M</i> ± <i>SD</i>	20.3 ± 0.5	16.1 ± 7.6	10.5 ± 5.4	<i>p</i> < 0.001
	<i>Me</i> (<i>Q</i> ₁ ; <i>Q</i> ₃)	20 (20; 21)	19 (11; 21)	9 (8; 17)	
	Min–max	20–21	3–28	2–19	

WHOQoL-BREF: World Health Organization Quality of Life questionnaire; ASTA HRQOL: Arrhythmia-Specific Questionnaire in Tachycardia and Arrhythmia Health-Related Quality Of Life scale.

HRQOL scale $p < 0.001$) on the other. The data are shown in Table 2.

Pearson's r analysis was performed to establish the impact of selected variables on HRQOL, as measured by the general (WHOQoL-BREF) and specific (ASTA symptom scale and ASTA HRQOL scale) questionnaires.

The following factors were found to have a significant positive impact on the physical WHOQoL-BREF domain: female sex ($r = 0.444$; $p < 0.001$), college/university level of education ($r = 0.266$; $p = 0.008$), urban residence ($r = 0.635$; $p < 0.001$), duration of illness ≥ 5 years ($r = 0.212$; $p = 0.035$) and acceptance of illness ($r = 0.378$; $p < 0.001$). The number of hospitalizations had a negative impact ($r = -0.209$; $p = 0.037$).

The social domain of the WHOQoL-BREF was positively affected by: female sex ($r = 0.222$; $p = 0.027$), college/university level of education ($r = 0.480$; $p < 0.001$), living with a partner/spouse ($r = 0.229$; $p = 0.023$), urban residence ($r = 0.303$; $p = 0.002$), EHRA score ($r = 0.262$; $p = 0.009$) and acceptance of illness ($r = 0.280$; $p = 0.005$); and negatively affected by the number of hospitalizations ($r = -0.338$; $p = 0.001$).

A statistically significant positive impact on the environmental domain of the WHOQoL-BREF was found for: level of education ($r = 0.402$; $p < 0.001$), living with a partner/spouse ($r = 0.234$; $p = 0.020$), urban residence ($r = 0.478$; $p < 0.001$), professional activity ($r = 0.346$; $p < 0.001$) and acceptance of illness ($r = 0.291$; $p = 0.003$). A significant negative impact was found for age ≥ 60 ($r = -0.289$; $p = 0.004$) and the number of hospitalizations ($r = -0.329$; $p = 0.001$).

HRQOL scores in the ASTA HRQOL scale questionnaire were affected (i.e. HRQOL was decreased) by: duration of illness ≥ 5 years ($r = 0.199$; $p = 0.048$) and rhythm control strategy ($r = 0.209$; $p = 0.038$). The scores were affected negatively (i.e. HRQOL was increased) by acceptance of illness ($r = -0.465$; $p < 0.001$).

With regard to symptom severity as measured by ASTA symptom scale, scores were significantly negatively affected (i.e. the experienced symptoms were decreased) by urban residence ($r = -0.228$; $p = 0.023$) and EHRA score ($r = -0.496$; $p < 0.001$). The data are shown in Table 3.

Multiple-factor analysis for selected variables and HRQOL. The multiple-factor analysis included only variables found to be statistically significant in single-factor analysis. Multiple-factor analysis identified the following significant independent determinants of HRQOL scores in the physical domain of the WHOQoL-BREF questionnaire: female sex ($\beta = 0.291$), urban residence ($\beta = 0.442$), duration of illness ≥ 5 years ($\beta = 0.218$) and acceptance of illness ($\beta = 0.242$). The data are shown in Table 4.

Multiple-factor analysis of the impact of selected variables on the social HRQOL domain identified two significant independent determinants: female sex ($\beta = 0.284$) and level of education ($\beta = 0.514$). The data are shown in Table 5.

Multiple-factor analysis of the impact of selected variables on the environmental HRQOL domain identified urban residence as a significant independent determinant ($\beta = 0.423$). The data are shown in Table 6.

Multiple-factor analysis of HRQOL scores in the ASTA HRQOL scale questionnaire identified acceptance of illness

Table 3. Linear regression coefficients for quality of life measured by the general (WHOQoL-BREF) and specific (ASTA) questionnaires and the socio-demographic and clinical characteristics.

Factor (variable)	WHOQoL-BREF Physical domain	WHOQoL-BREF Social domain	WHOQoL-BREF Environmental domain	ASTA HRQOL scale ¹	ASTA Symptom scale
Female sex	$r = 0.444$ $p < 0.001$	$r = 0.222$ $p = 0.027$	$r = 0.160$ $p = 0.114$	$r = -0.073$ $p = 0.471$	$r = -0.119$ $p = 0.239$
Age ≥ 60 years	$r = -0.166$ $p = 0.101$	$r = -0.121$ $p = 0.235$	$r = -0.289$ $p = 0.004$	$r = 0.140$ $p = 0.167$	$r = -0.060$ $p = 0.558$
Level of education	$r = 0.266$ $p = 0.008$	$r = 0.480$ $p < 0.001$	$r = 0.402$ $p < 0.001$	$r = 0.046$ $p = 0.655$	$r = -0.019$ $p = 0.854$
Living with a partner/spouse	$r = 0.188$ $p = 0.062$	$r = 0.229$ $p = 0.023$	$r = 0.234$ $p = 0.020$	$r = -0.023$ $p = 0.824$	$r = 0.047$ $p = 0.647$
Urban residence	$r = 0.635$ $p < 0.001$	$r = 0.303$ $p = 0.002$	$r = 0.478$ $p < 0.001$	$r = -0.149$ $p = 0.141$	$r = -0.228$ $p = 0.023$
Professional activity	$r = 0.075$ $p = 0.462$	$r = 0.060$ $p = 0.558$	$r = 0.346$ $p < 0.001$	$r = -0.099$ $p = 0.330$	$r = 0.065$ $p = 0.521$
EHRA class I–II	$r = 0.091$ $p = 0.372$	$r = 0.262$ $p = 0.009$	$r = -0.027$ $p = 0.789$	$r = -0.023$ $p = 0.819$	$r = -0.496$ $p < 0.001$
Duration of illness ≥ 5 years	$r = -0.212$ $p = 0.035$	$r = -0.013$ $p = 0.902$	$r = 0.140$ $p = 0.166$	$r = 0.199$ $p = 0.048$	$r = 0.116$ $p = 0.255$
Number of hospitalizations	$r = -0.209$ $p = 0.037$	$r = -0.338$ $p = 0.001$	$r = -0.329$ $p = 0.001$	$r = 0.091$ $p = 0.366$	$r = 0.067$ $p = 0.512$
Treatment with NOACs	$r = 0.104$ $p = 0.304$	$r = -0.101$ $p = 0.319$	$r = -0.179$ $p = 0.076$	$r = 0.024$ $p = 0.813$	$r = -0.182$ $p = 0.071$
Rhythm control strategy	$r = 0.023$ $p = 0.820$	$r = 0.036$ $p = 0.723$	$r = 0.158$ $p = 0.119$	$r = 0.209$ $p = 0.038$	$r = 0.022$ $p = 0.832$
HAS-BLED	$r = 0.144$ $p = 0.155$	$r = -0.039$ $p = 0.700$	$r = 0.094$ $p = 0.357$	$r = -0.176$ $p = 0.081$	$r = -0.173$ $p = 0.087$
AIS	$r = 0.378$ $p < 0.001$	$r = 0.280$ $p = 0.005$	$r = 0.291$ $p = 0.003$	$r = -0.465$ $p < 0.001$	$r = 0.003$ $p = 0.979$

WHOQoL-BREF: World Health Organization Quality of Life questionnaire; ASTA HRQOL: Arrhythmia-Specific questionnaire in Tachycardia and Arrhythmia Health-Related Quality Of Life; ASTA: Arrhythmia-Specific questionnaire in Tachycardia and Arrhythmia.

Table 4. Linear regression coefficients for the physical WHOQoL-BREF domain and the analysed socio-demographic and clinical characteristics.

Predictor of HRQOL in the physical domain (WHOQoL-BREF)	Single-factor analysis b	Multiple-factor analysis β
Female sex	9.66	0.291
Level of education	2.64	NS
Urban residence	13.95	0.442
Duration of illness ≥ 5 years	4.59	-0.218
Number of hospitalizations	-2.29	NS
Acceptance of illness	6.73	0.242

$R^2 = 0.623$, $F(2, 96) = 43.8$; $p < 0.001$; **bold** shows coefficients significantly different from zero, at $p < 0.05$.

HRQOL: health related quality of life; WHOQoL-BREF: World Health Organization Quality of Life questionnaire.

as a statistically significant independent determinant of better HRQOL ($\beta = -0.362$), and rhythm control treatment strategy as a determinant of worse HRQOL ($\beta = 0.261$). The data are shown in Table 7.

Multiple-factor analysis for the selected variables and symptom intensity as assessed by the ASTA symptom scale questionnaire identified EHRA score as a statistically

significant independent determinant of atrial fibrillation symptoms ($\beta = -0.497$). The data are shown in Table 8.

Discussion

Like all chronic diseases, atrial fibrillation can lead to a deterioration in HRQOL.²⁶ According to estimates, 12% of

Table 5. Linear regression coefficients for the social WHOQoL-BREF domain and the analysed socio-demographic and clinical characteristics.

Predictor of QOL in the social domain (WHOQoL-BREF)	Single-factor analysis <i>b</i>	Multiple-factor analysis β
Female sex	9.03	0.284
Level of education	8.91	0.514
Living with a partner/spouse	9.29	NS
Urban residence	12.42	NS
EHRA class I/II	0.262	NS
Number of hospitalizations	-6.90	NS
Acceptance of illness	9.28	NS

$R^2 = 0.296$, $F(2, 96) = 21.6$; $p < 0.001$; **bold** shows coefficients significantly different from zero, at $p < 0.05$.

QOL: quality of life; WHOQoL-BREF: World Health Organization Quality of Life questionnaire; EHRA: European Heart Rhythm Association.

Table 6. Linear regression coefficients for the environmental WHOQoL-BREF domain and the analysed socio-demographic and clinical characteristics.

Predictor of HRQOL in the environmental domain (WHOQoL-BREF)	Single-factor analysis	Multiple-factor analysis
Age ≥ 60 years	-7.13	NS
Level of education	4.33	NS
Living with a partner/spouse	5.52	NS
Urban residence	11.39	0.423
Professional activity (active)	8.17	NS
Number of hospitalizations	-3.91	NS
Acceptance of illness	5.62	NS

$R^2 = 0.323$, $F(2, 96) = 24.4$; $p < 0.001$; **bold** shows coefficients significantly different from zero, at $p < 0.05$.

WHOQoL-BREF: World Health Organization Quality of Life questionnaire; HRQOL: health-related quality of life.

Table 7. Linear regression coefficients for ASTA HRQOL scale scores and the analysed socio-demographic and clinical characteristics.

Predictor of HRQOL (ASTA HRQOL)	Single-factor analysis	Multiple-factor analysis
Duration ≥ 5 years	2.73	NS
Diabetes mellitus	3.26	NS
Rhythm control	2.94	0.261
Acceptance of illness (AIS)	-5.23	-0.362

$R^2 = 0.440$, $F(4, 94) = 20.2$; $p < 0.001$; **bold** shows coefficients significantly different from zero, at $p < 0.05$.

ASTA HRQOL: Arrhythmia-Specific questionnaire in Tachycardia and Arrhythmia Health-Related Quality Of Life; HRQOL: health related quality of life; AIS: Acceptance of Illness Scale.

patients are treated ineffectively and 50–60% experience another arrhythmic episode within a year from sinus rhythm restoration.^{28,29} The severity of the specific symptoms and the discomfort they cause lead to numerous hospitalizations, thus disrupting the patient's daily activity and social life, and increasing treatment costs incurred by the health care system.²⁹

In recent years, evaluation of HRQOL in chronic disease, also in atrial fibrillation patients, has gained importance as an outcome in research, clinical studies and comprehensive treatment plan. The symptoms of the disease (weakness, heart palpitations, shortness of breath,

chest pain, sleep difficulties and psychosocial distress), frequent hospitalizations, polymorbidity and medication side effects may negatively affect the perceived HRQOL.^{30,31} The arrhythmia is most often accompanied by hypertension, heart failure, diabetes and coronary heart disease.³² It should be underlined that the heart and vascular diseases concomitant with atrial fibrillation might decrease the HRQOL and influence the symptoms.³³

In our paper acceptance of illness is an important factor which has been shown to impact on HRQOL in atrial fibrillation. Acceptance of illness is a statistically significant independent determinant of better HRQOL in the

Table 8. Linear regression coefficients for ASTA symptom scale intensity and the analysed socio-demographic and clinical characteristics.

Predictor of symptom intensity (ASTA symptom scale)	Single-factor analysis	Multiple-factor analysis
Urban residence	-1.39	NS
EHRA class I/II	-1.56	-0.497

$R^2 = 0.239$, $F(1, 97) = 31.7$; $p < 0.001$; **bold** shows coefficients significantly different from zero, at $p < 0.05$.

ASTA: Arrhythmia-Specific questionnaire in Tachycardia and Arrhythmia; EHRA: European Heart Rhythm Association.

physical domain of the WHOQOL-BREF and in the specific questionnaire – ASTA HRQOL scale.

The present paper studied the HRQOL and severity of symptoms of atrial fibrillation patients based on their acceptance of illness. Analysis of scores obtained in the general WHOQoL-BREF questionnaire showed that they have a moderate HRQOL, decreasing together with acceptance of illness.

Atrial fibrillation management guidelines emphasize the need for interventions contributing to better patient HRQOL.² The publications available identify a number of socio-demographic and clinical determinants of HRQOL in chronic cardiovascular diseases.³¹ Interest in the relationship between HRQOL and acceptance of illness is also growing,^{13,34} though, to the best of our knowledge, no papers are available on the impact of acceptance of illness on HRQOL in atrial fibrillation. Acceptance of illness can be affected by a number of extrinsic (treatment availability and quality, family support, financial status) and intrinsic (patient's character and personality, experienced symptoms) factors. Illness acceptance is a prerequisite for effective coping with the consequences of disease, and is a determinant of HRQOL.^{11,35}

In the present study, comparative analysis of HRQOL based on AIS scores showed that patients with high acceptance of illness also have higher HRQOL scores in the WHOQOL-BREF (physical, social and environmental domains) and ASTA HRQOL scale, and a lower intensity of symptoms as measured by the ASTA symptom scale. A positive impact of acceptance of illness on HRQOL has also been shown in single-factor analysis, improving scores in all WHOQOL-BREF domains except psychological and in the ASTA HRQOL scale. In multiple-factor analysis, the AIS score was a statistically significant independent determinant of better HRQOL in the physical WHOQOL-BREF domain and in the specific questionnaire (ASTA HRQOL scale). Other researchers proved a positive impact of acceptance of illness on perceived HRQOL in patients with other chronic diseases: diabetes,¹¹ heart failure,¹³ kidney failure,³⁶ chronic obstructive pulmonary disease³⁷ and chronic musculoskeletal disorders.³⁸ In the present study, multiple-factor analysis also identified being female as a statistically significant independent determinant of HRQOL, positively correlated with the physical and social domains of the WHOQOL-BREF questionnaire. Studies on atrial fibrillation patients remain equivocal on the issue, with a continuing discussion in the

literature regarding the impact of sex on HRQOL. Reported findings include both no significant differences between the sexes³⁹ and lower QOL in females with atrial fibrillation.⁴⁰ Hagens et al. could not explain the lower HRQOL experienced by female patients in their study.¹⁷ The literature suggests that personality traits such as somatization (the tendency to amplify benign bodily sensations) may mediate potential gender differences in HRQOL.⁴⁰

Another independent predictor of HRQOL in the social domain identified in the present study is level of education. The correlation between level of education and perceived HRQOL may be related to socio-economic status. Individuals with limited skills and competence are typically excluded from opportunities to work in well-paid jobs, which prevents them from achieving a secure financial standing in daily life.⁴¹ Barbareschi et al. demonstrated that less-educated patients with heart failure were predisposed to lower HRQOL in the physical and psychological domains.⁴² Better-educated patients are more compliant and active in the treatment process.

Urban residence was another predictor of better HRQOL in patients with atrial fibrillation. This association is likely due to easier access to specialized medical care and pharmaceuticals in urban areas. Moreover, urban residents are less likely to perform taxing physical work, thus potentially experiencing lower symptom intensity and fewer episodes of atrial fibrillation.

The patients with atrial fibrillation might not have any symptoms between the paroxysms of atrial fibrillation. However, it may restrict daily functioning. The available articles show that HRQOL may depend on the intensity of symptoms. The fear of the occurrence of arrhythmia and its influence on HRQOL decreases depending on the length of time from the last fibrillation seizure. It should be remembered that in asymptomatic patients HRQOL might be determined by other factors not connected with symptoms, diagnosis or treatment, for example, financial restrictions, drugs' side-effects or professional activity restrictions. There are patients who deny the arrhythmia symptoms, despite their occurrence, and patients who do not experience arrhythmia but their HRQOL is very limited.⁴³

In the present study, low EHRA scores (classes I and II) were identified as a statistically significant independent determinant of lower symptom intensity and higher HRQOL as measured by the ASTA HRQOL scale. These findings are corroborated by Freeman et al., who found HRQOL to be

strictly correlated with symptom severity according to the EHRA criteria, and reported a link between disease symptoms and lower HRQoL on the one hand, and a higher risk of hospitalization on the other.⁴⁴ Aliot states that EHRA is not sensitive enough to assess the HRQOL impact, but could be valuable in the future, both for assessing the impact of symptoms on HRQOL and for assisting in the selection of appropriate treatment.³⁰ Atrial fibrillation management is based on the choice of the appropriate strategy and oral anti-coagulant treatment. In the present study, the rhythm control strategy was a significant independent predictor of worse HRQOL. Studies conducted so far have not unambiguously identified the treatment strategy associated with better HRQOL in atrial fibrillation. It is certain that HRQOL is lower in atrial fibrillation patients than in healthy controls. The largest study comparing the two treatment strategies was the AFFIRM study (Atrial Fibrillation Follow-up Investigation of Rhythm Management), which showed no differences in the assessed HRQOL components based on three-year and six-year follow-up.⁴⁵

In the RACE study (Rate Control Versus Electrical Cardioversion), at study end, three subscales of the 36-Item Short Form Health Survey improved under rate control. Under rhythm control strategy, no significant changes occurred compared with baseline. At the endpoint, no impact of treatment strategy on patients' perceived HRQOL was found, either, with the reservation that patients may benefit from rhythm control strategy if sinus rhythm can be maintained.⁴⁶ The STAF⁴⁷ (Strategies of Treatment of Atrial Fibrillation) and PIAF⁴⁸ (Pharmacological Intervention in Atrial Fibrillation) clinical studies also showed no benefits of the sinus rhythm maintenance strategy over the ventricular rate control strategy.

Another statistically significant independent determinant of worse HRQOL in the physical domain identified in the present study was duration of illness ≥ 5 years. The decreased HRQOL in this patient group can be caused by the frequent and recurrent experience of the negative consequences of their illness.

Up to 50% of atrial fibrillation patients experience recurrences in six-month follow-up, which, combined with adverse effects of antiarrhythmic medication, lowers their HRQOL. The use of oral anticoagulants can be associated with a risk of haemorrhagic complications.³¹

In a study by Dorian et al.,⁴⁹ patients who had not experienced a new arrhythmic episode for more than three months had a higher HRQOL than those with a documented recurrence.

Study limitations

The present study has a few limitations. One limitation is the relatively small number of patients recruited at a single centre. Another is the fact that HRQOL in the population studied was assessed only once. The other limitation of our study was the lack of the information about the

used cardioversion (elective or pharmacological) as regards the treatment strategy 'rhythm control'. Another limitation was the lack of the evaluation of impact of the financial status of the population on their HRQOL and illness acceptance.

Conclusions

Acceptance of illness is a statistically significant independent determinant of better HRQOL in the physical domain of the WHOQOL-BREF and in the specific questionnaire ASTA HRQOL scale. Female sex, college/university level of education and urban residence are determinants of better perceived HRQOL, while duration of illness ≥ 5 years and the rhythm control treatment strategy are linked with worse perceived HRQOL. EHRA class I/II is the factor which positively influences the ASTA burden symptoms. The assessment of acceptance of illness and other related socio-clinical determinants of HRQOL is an extremely important aspect of treatment and should be included as an outcome in clinical studies and used in clinical routine.

Implications for practice

- The new concept of perceived impact of illness acceptance on quality of life can be significant to predicting outcomes in patients with atrial fibrillation and, hence, changing a patient's attitude toward illness acceptance has the potential to improve quality of life and decrease symptoms burden.
- Simply screening illness acceptance and other determinants of quality of life may be useful in clinical practice.
- Tailored interventions for improving illness acceptance and well-being and reducing symptoms in atrial fibrillation patients should be integrated into health care.

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Declaration of conflicting interests

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