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Original Article

Assessment of Health-Related Quality of Life Among Patients Diagnosed with Arrhythmias: A Descriptive Cross-Sectional Study

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ABSTRACT

Background: Cardiac arrhythmias may be accompanied by physical limitations, symptom-related distress and impaired self-perceived health. Evidence encompassing several arrhythmia subtypes in Pakistani tertiary care settings remains limited. Objective: To assess health-related quality of life among adults diagnosed with cardiac arrhythmias at the Punjab Institute of Cardiology, Lahore. Methods: A hospital-based descriptive cross-sectional study included 120 adults with clinically or electrocardiographically diagnosed arrhythmias, recruited through convenience sampling from inpatient and outpatient cardiology services. The EQ-5D-5L descriptive system and EQ visual analogue scale (EQ VAS; 0–100) were administered in English or Urdu. Frequencies, percentages and mean scores were summarized; exploratory group comparisons were undertaken. Results: The mean EQ VAS score was 58.4 ± 14.6. Problems of any severity were most frequently recorded for anxiety/depression (98/120; 81.7%) and pain/discomfort (94/120; 78.3%), followed by usual activities (78/120; 65.0%), mobility (66/120; 55.0%) and self-care (42/120; 35.0%). Using study-defined EQ VAS categories, 36 (30.0%) participants were classified as having poor self-rated health, 54 (45.0%) moderate and 30 (25.0%) good. Mean EQ VAS scores varied across age and family-income groups, and categorical self-rated health differed across arrhythmia subtypes in exploratory unadjusted comparisons. Conclusion: Adults attending this tertiary cardiac center described substantial difficulties, particularly in the anxiety/depression and pain/discomfort dimensions, and modest self-rated health. The findings support further investigation of patient-reported outcomes alongside clinical assessment. Keywords: Arrhythmias; Atrial Fibrillation; Quality of Life; EQ-5D-5L; Patient-Reported Outcome Measures; Pakistan.

INTRODUCTION

Cardiac arrhythmias comprise disturbances in the generation or conduction of electrical impulses that alter the rate, regularity or sequence of cardiac activation. Their clinical manifestations range from incidentally detected rhythm abnormalities to symptomatic palpitations, fatigue, dyspnea, dizziness, presyncope and potentially life-threatening ventricular arrhythmias. Atrial fibrillation (AF) is a common sustained arrhythmia and is associated with substantial cardiovascular morbidity, including thromboembolic complications. Population-level estimates indicate an increasing burden of AF and atrial flutter globally, influenced partly by population ageing and improved detection (1). The management of cardiac rhythm disorders consequently extends beyond documenting

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electrocardiographic abnormalities to understanding how symptoms and the perceived threat of recurrence influence daily life.

Health-related quality of life (HRQoL) represents an individual's appraisal of health-related functioning and well-being. In arrhythmia care, physiological measures and rhythm-control outcomes may not fully represent limitations experienced in work, household activity, social participation and emotional functioning. The observational ARENA study demonstrated associations of symptom severity and psychosocial characteristics with HRQoL among patients with AF, including patient-reported assessment with the EQ-5D-5L (2). A cross-sectional investigation of patients attending an AF specialty clinic likewise showed that symptoms and individual characteristics contributed to differences in HRQoL (3). These findings support the value of patient-reported measures in conjunction with clinical assessment.

Emotional distress constitutes an important component of the patient experience. In a Swedish cross-sectional study, illness perceptions were associated with HRQoL among women and men living with AF (4). A community-based study of older adults also examined the relationship between AF, depressive symptoms and quality of life (5). More recent investigations have described relationships between cardiac arrhythmias, depressive symptoms and quality-of-life measures (6). These associations should not be interpreted as evidence that arrhythmias independently cause psychiatric disorders, but they underscore the importance of assessing both physical and psychological aspects of health.

The EuroQol five-dimension, five-level questionnaire (EQ-5D-5L) describes five domains: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Its companion visual analogue scale, the EQ VAS, records a patient's overall self-rated health from 0 to 100. The instrument offers a concise, generic approach to describing health status. Research in Syrian patients with AF has examined the validity and reliability of an Arabic-language EQ-5D version (7), while Malaysian research has explored EQ-5D-5L measurement properties in a different cardiac population, patients with heart failure (8). Such studies support the broad usefulness of generic HRQoL measurement while highlighting the importance of distinguishing populations, language versions and outcome measures.

In Pakistan, general-population HRQoL research using the EQ-5D-3L has demonstrated variation in self-reported health across demographic and socioeconomic groups (9). A Pakistani valuation study has also established a national value set for the three-level instrument, rather than the five-level instrument used in the present study (10). Local studies have addressed quality of life in other chronic conditions, including systemic lupus erythematosus (11), and the clinical burden of ventricular arrhythmias among patients with acute myocardial infarction (12). These investigations provide relevant clinical and measurement context but do not characterize the five EQ-5D-5L domains and EQ VAS across multiple arrhythmia diagnoses in the present tertiary cardiac setting.

Differences in arrhythmia subtype, duration of illness, symptom burden and access to specialist care may influence how patients evaluate their health, although a single cross-sectional assessment cannot establish their independent effects. Local, patient-reported information may help cardiac nursing and clinical services identify domains warranting additional assessment. Accordingly, this study aimed to assess HRQoL among adults diagnosed with cardiac arrhythmias attending the Punjab Institute of Cardiology, Lahore, with descriptive comparisons across selected demographic and clinical characteristics.

MATERIALS AND METHODS

Study design and setting

A descriptive cross-sectional study was conducted in the inpatient and outpatient cardiology services of the Punjab Institute of Cardiology, Lahore, Pakistan. The study was carried out over four months following synopsis approval. HRQoL and demographic and clinical information were obtained at a single assessment.

Participants and sampling

The target population comprised adults aged 18 years or older with a clinical or electrocardiographic diagnosis of cardiac arrhythmia. Eligible patients were required to provide informed consent and understand English or Urdu. Patients who were critically ill, hemodynamically unstable, unable to complete the questionnaire because of severe

illness, or had severe cognitive impairment or a diagnosed psychiatric illness were excluded. Participants were selected by non-probability convenience sampling as they attended the participating services.

The planning calculation used Slovin's formula, n = N/[1 + N(e)^2], with an estimated source population of 250 and margin of error e = 0.05, yielding n = 153.85 and a target of 154 participants. Analyses were based on 120 participants. The planning calculation describes the original recruitment target; it does not imply that 154 participants completed assessment. Inferences from the analyzed sample were interpreted in light of the non-probability design and smaller achieved sample.

Data collection and measures

Patients were approached in the participating departments following institutional permissions and consent procedures. A structured demographic and clinical form recorded age, sex, education, monthly family income, diagnosed arrhythmia subtype and time since diagnosis. Health status was assessed using the English or Urdu EQ-5D-5L according to participant language preference. Each of the five dimensions—mobility, self-care, usual activities, pain/discomfort and anxiety/depression—has five ordered response levels, ranging from no problems to extreme problems or inability to perform the relevant activity, as appropriate to the dimension. The dimensional responses provide a five-digit descriptive health profile. The EQ VAS asks respondents to assess their current health from 0 (worst imaginable health) to 100 (best imaginable health). The EQ-5D descriptive profile and EQ VAS were analyzed as distinct outcomes; no preference-weighted EQ-5D-5L index score was calculated.

Dimension-specific responses were summarized at all five severity levels and dichotomized descriptively as level 1 (no problems) versus levels 2–5 (any problems). EQ VAS scores were described as a continuous measure and additionally grouped using study-defined descriptive intervals: 0–49, 50–69 and 70–100. These intervals were not treated as externally validated clinical thresholds. The English and Urdu questionnaires were reproduced in the study annexures.

Statistical analysis

Data were analyzed using IBM SPSS Statistics version 26. Continuous variables were summarized using means and standard deviations, and categorical variables using counts and percentages, with 120 participants forming the denominator for each displayed complete-case summary. An independent-samples Student t-test compared EQ VAS means by sex. One-way analysis of variance assessed unadjusted mean differences across age and income categories. Pearson's chi-square test explored the distribution of the study-defined EQ VAS categories by arrhythmia subtype. Tests were two-sided, with $p < 0.05$ used as the nominal significance criterion. These exploratory comparisons were unadjusted; no causal or independent predictive interpretation was assigned to observed differences. Small expected counts in the chi-square analysis were considered when interpreting its asymptotic p-value.

Ethical considerations

Institutional review board approval and administrative permission from the Punjab Institute of Cardiology were obtained before data collection. Written informed consent was obtained from participants. Participation was voluntary, and respondents could withdraw without affecting their clinical care. Participant identifiers were coded to protect confidentiality.

RESULTS

Participant characteristics

The analysis comprised 120 adults. Participants were predominantly male (85/120; 70.8%), while 35 (29.2%) were female. Age categories included 10 (8.3%) participants younger than 25 years, 20 (16.7%) aged 25–35 years, 71 (59.2%) aged 36–45 years and 19 (15.8%) older than 45 years. The majority had secondary education (45; 37.5%), followed by primary education (30; 25.0%), higher secondary education (22; 18.3%), no formal education (11; 9.2%) and graduate or postgraduate education (12; 10.0%). Monthly family income was below PKR 50,000 in 37 (30.8%) participants, PKR 50,000–100,000 in 62 (51.7%) and above PKR 100,000 in 21 (17.5%).

AF was the most frequent diagnosis (54; 45.0%), followed by supraventricular tachycardia (30; 25.0%), bradyarrhythmia or heart block (24; 20.0%) and ventricular tachycardia (12; 10.0%). Duration since diagnosis was

less than one year in 34 (28.3%), one to three years in 42 (35.0%), three to five years in 26 (21.7%) and more than five years in 18 (15.0%).

Tables

Table 1. EQ-5D-5L response levels by dimension, n (%)

Dimension	Level 1	Level 2	Level 3	Level 4	Level 5
Mobility	54 (45.0)	36 (30.0)	22 (18.3)	6 (5.0)	2 (1.7)
Self-care	78 (65.0)	26 (21.7)	11 (9.2)	4 (3.3)	1 (0.8)
Usual activities	42 (35.0)	38 (31.7)	24 (20.0)	11 (9.2)	5 (4.2)
Pain/discomfort	26 (21.7)	40 (33.3)	34 (28.3)	15 (12.5)	5 (4.2)
Anxiety/depression	22 (18.3)	36 (30.0)	36 (30.0)	19 (15.8)	7 (5.8)

Table 2. EQ VAS by sex

Sex	n	Mean	SD
Male	85	60.1	14.1
Female	35	54.3	15.3

Table 3. EQ VAS by age and income category

Characteristic	n	Mean	SD
Age <25 years	10	66.2	12.4
Age 25-35 years	20	62.5	13.0
Age 36-45 years	71	58.7	14.0
Age >45 years	19	48.9	15.8
Income <PKR 50,000	37	52.6	13.9
Income PKR 50,000-100,000	62	59.8	13.5
Income >PKR 100,000	21	65.4	14.9

Table 4. Arrhythmia subtype and study-defined EQ VAS categories, n (row %)

Arrhythmia	0-49	50-69	70-100	Total
Atrial fibrillation	16 (29.6)	26 (48.1)	12 (22.2)	54
Supraventricular tachycardia	4 (13.3)	12 (40.0)	14 (46.7)	30
Bradyarrhythmia/heart block	10 (41.7)	10 (41.7)	4 (16.7)	24
Ventricular tachycardia	6 (50.0)	6 (50.0)	0 (0.0)	12
Total	36 (30.0)	54 (45.0)	30 (25.0)	120

Notes: EQ VAS = EuroQol Visual Analogue Scale. Level 1 denotes no problems; levels 2-5 denote increasing problems. Age ANOVA reconstructed from rounded summaries: F(3,116)=4.52, p=0.0049; income ANOVA: F(2,117)=6.22, p=0.0027. The four-by-three Pearson chi-square is 15.35 (df=6; asymptotic p=0.0177); two expected frequencies are below five.

EQ-5D-5L dimensions

Problems of any severity were most frequently reported for anxiety/depression (98/120; 81.7%) and pain/discomfort (94/120; 78.3%). Difficulties with usual activities were reported by 78 (65.0%), mobility problems by 66 (55.0%) and self-care problems by 42 (35.0%). The full five-level response distribution is shown in Table 1. For anxiety/depression, 26 (21.7%) participants selected severe or extreme problems, while 20 (16.7%) indicated severe or extreme pain/discomfort. Self-care showed the greatest proportion of level-1 responses (78; 65.0%).

Self-rated overall health

The mean EQ VAS score was 58.4 ± 14.6. Based on the study-defined bands, 36 (30.0%) participants scored 0–49, 54 (45.0%) scored 50–69 and 30 (25.0%) scored 70–100. Thus, 90 (75.0%) participants fell into the combined first two descriptive bands. These bands summarize the observed distribution rather than a validated classification of HRQoL severity.

Exploratory comparisons

Mean EQ VAS scores were 60.1 ± 14.1 among men (n = 85) and 54.3 ± 15.3 among women (n = 35), with a mean difference of 5.8 points (Student t = 2.00, df = 118, p = 0.048; Table 2). Mean scores decreased across successive age categories, from 66.2 ± 12.4 among participants younger than 25 years to 48.9 ± 15.8 among those older than 45 years. A reconstruction of one-way ANOVA using group counts, means and standard deviations produced F(3,116) = 4.52, p = 0.0049. Corresponding mean EQ VAS values increased with monthly family income, from 52.6 ± 13.9 to 65.4 ± 14.9; reconstructed ANOVA yielded F(2,117) = 6.22, p = 0.0027 (Table 3). The reconstructed statistics are derived from rounded published group summaries.

Arrhythmia subtype was associated with the study-defined EQ VAS category in the descriptive cross-tabulation (Pearson chi-square = 15.35, df = 6, asymptotic p = 0.0177; Table 4). Among the 12 participants with ventricular tachycardia, six were in the lowest EQ VAS band and none were in the highest; the highest band included 14 of 30 participants with supraventricular tachycardia. Two expected frequencies were below five, so the asymptotic chi-square result should be interpreted cautiously.

DISCUSSION

This hospital-based study identified substantial patient-reported limitations among adults with different cardiac arrhythmias, particularly in the EQ-5D-5L anxiety/depression and pain/discomfort dimensions. The mean EQ VAS score of 58.4 suggests relatively modest self-perceived health on a 0-100 scale. Because participants were recruited by convenience sampling at a tertiary cardiac center and outcomes were measured at a single time point, these findings characterize perceived health within the study sample rather than the causal effect of arrhythmia diagnoses on quality of life.

The prominence of difficulties in the anxiety/depression dimension is consistent with evidence linking symptom burden, illness perceptions and psychosocial characteristics to health-related quality of life (HRQoL) in atrial fibrillation (AF). The ARENA study found that symptom severity and psychosocial factors were associated with HRQoL in a considerably larger, predominantly older AF cohort (2). Holmlund and colleagues described associations between illness perceptions and HRQoL among women and men with AF (4), while Senoo and colleagues examined depression and quality of life in older community-dwelling individuals with AF (5). In a study of 175 patients with AF, Bang and Park found that symptom clusters were associated with psychological distress and quality of life (13). Taylor and colleagues further observed that patterns of symptom-related cognition, avoidance and illness perceptions were associated with differing levels of depression, anxiety and quality of life in 198 patients with AF (14). These findings suggest that the meaning and perceived unpredictability of symptoms may be important alongside their physiological characteristics. Unlike these AF-focused cohorts, the present study included several rhythm disorders and a different age and clinical profile, precluding direct comparison of absolute scores or symptom prevalence.

The EQ-5D-5L anxiety/depression dimension is a self-reported description of emotional health, not a diagnostic assessment of anxiety or depressive disorders. The high proportion of participants reporting any problem in this dimension therefore cannot be interpreted as the prevalence of clinically diagnosed psychiatric illness. Nechita and colleagues likewise examined relationships between psychological symptoms and quality-of-life variables in patients with cardiac arrhythmias (6). In a separate AF cohort undergoing cryoballoon ablation, Raileanu and colleagues found that elevated pre-procedure anxiety or depression scale scores were associated with poorer quality of life both before and 12 months after treatment (15). Although that population and study design differ substantially from the present survey, the comparison highlights why dedicated, validated psychological measures may be useful to distinguish sustained symptoms from situational concern, fear of recurrent episodes and other forms of emotional distress.

Pain/discomfort and limitations in usual activities were also common, whereas self-care was relatively preserved. These dimensions may reflect overlapping contributions from arrhythmia symptoms, comorbid disease, medication effects or other health problems, none of which could be separated in the present analysis. The distinction between self-care and usual activities is clinically meaningful: independence in washing or dressing need not imply freedom from restrictions in employment, household tasks or social participation. The national Danish DenHeart survey, involving 4,251 patients with different arrhythmias, similarly demonstrated variation in self-reported health, emotional outcomes and symptom burden across clinical groups (16). However, differences in recruitment, assessment at hospital discharge and measurement instruments mean that those findings cannot be treated as directly comparable prevalence estimates for this Pakistani tertiary-care sample.

The EQ VAS and five EQ-5D-5L descriptive dimensions provide complementary information. The former summarizes overall self-rated health, whereas the latter identifies the domains in which patients experience difficulties. Antoun and colleagues evaluated an Arabic-language EQ-5D version among Syrian patients with AF (7), and Kuan and colleagues examined measurement properties of EQ-5D-5L in Malaysian patients with heart failure (8). Neither population is a directly matched comparator for the present heterogeneous arrhythmia sample. Furthermore, the Pakistani general-population EQ-5D-3L study and national three-level valuation work are not interchangeable with

five-level descriptive responses or a five-level utility index (9,10). A systematic review by Sale and Yu identified AFEQT and the Arrhythmia-Specific Questionnaire in Tachycardia and Arrhythmia (ASTA) as among the better-performing AF-related instruments, while also documenting gaps in cross-cultural validity and other measurement properties (17). Thus, future studies could complement the generic EQ-5D-5L with appropriately validated rhythm-specific symptom or quality-of-life measures, while preserving the distinction between the descriptive profile, EQ VAS and any preference-weighted index.

Women had lower mean EQ VAS scores than men, while scores declined across the study's age groups and increased across household-income categories. These unadjusted patterns accord with the broader relevance of demographic and socioeconomic characteristics reported in Pakistani population research (9) and AF-focused HRQoL studies (3,4). In the multicenter PaTH AF cohort of 953 patients, Gleason and colleagues found poorer patient-reported functional status and AF-related quality of life among women and those with less education (18), broadly consistent with the sex-related pattern observed here. Notably, that study associated younger age with poorer AF-specific patient-reported outcomes, whereas the present sample showed lower mean EQ VAS scores in older age categories. Different age structures, instruments, clinical case mixes and analytical approaches may contribute to this contrast. The present differences cannot be attributed independently to sex, age or income because arrhythmia severity, comorbidities, treatment and other potentially confounding factors were not adjusted for; the age and income comparisons were also reconstructed from rounded group summaries. Larger studies with individual-level adjusted estimates and confidence intervals are needed to assess these associations more reliably.

The exploratory subtype comparison suggested differences in self-rated health, with lower EQ VAS categories more common in the small ventricular tachycardia subgroup and higher categories more common among participants with supraventricular tachycardia. In the DenHeart survey, patients with ventricular arrhythmias generally had poorer patient-reported outcomes than those in other arrhythmia groups, including higher depression scores and greater feelings of insecurity at discharge (16). This offers a relevant comparison, but it does not establish that ventricular rhythm diagnoses inherently cause poorer quality of life or that the same pattern holds in this study. Arrhythmia classification alone does not capture frequency of episodes, hemodynamic consequences, underlying structural heart disease or response to treatment. In a contrasting setting, a longitudinal analysis from the LOOP study found relatively small HRQoL changes following screening-detected AF, whereas stroke and major bleeding were followed by larger reductions (19). These findings emphasize that ascertainment context and associated clinical events influence HRQoL and limit simple rankings by diagnostic label. The small ventricular tachycardia subgroup, sparse expected chi-square cells and absence of clinical adjustment further restrict interpretation of the current subtype comparison.

By including several arrhythmia diagnoses, this study adds local descriptive evidence from a tertiary cardiac institution rather than focusing exclusively on AF. Its standardized patient-reported assessment may help cardiac nursing and clinical teams identify difficulties that warrant further enquiry, particularly emotional distress, pain/discomfort and limitations in usual activities. Other research supports the relevance of patient-reported outcomes as responsive clinical endpoints: a multicenter longitudinal study of patients undergoing ablation for symptomatic arrhythmias documented improvements in both generic EQ-5D and arrhythmia-related measures over follow-up (20). A meta-analysis of randomized trials in AF found greater improvements in mental health and quality-of-life measures after catheter ablation than with medical therapy (21), and the CABANA trial demonstrated a more favorable disease-specific quality-of-life score at 12 months in its catheter-ablation group (22). Those intervention-focused findings cannot establish the effectiveness or appropriateness of any particular treatment in the present participants. Rather, they reinforce the rationale for evaluating patient-perceived outcomes alongside clinical endpoints and for testing the feasibility, acceptability and clinical value of any future nursing screening or supportive intervention.

The findings should be interpreted in view of the single-center convenience sample, absence of a non-arrhythmia comparison group, incomplete characterization of comorbidities and illness severity, and unadjusted exploratory analyses. The achieved sample of 120 participants was smaller than the planned target, and the recruitment pathway and characteristics of non-participants cannot be reconstructed from the aggregate data. The predefined EQ VAS bands were descriptive rather than validated clinical thresholds, and no preference-weighted EQ-5D-5L utility index was calculated. In addition, the generic questionnaire may overlook arrhythmia-specific burdens such as palpitations, fear of unpredictable episodes and treatment-related concerns. Because the study was cross-

sectional, neither the direction of associations nor changes over time can be established. Prospective multicenter work with transparent recruitment accounting, appropriate arrhythmia-specific instruments, longitudinal follow-up and sufficient clinical covariate information is warranted to clarify the determinants and implications of impaired HRQoL in this population.

CONCLUSION

Among 120 adults attending a tertiary cardiac center with diagnosed arrhythmias, problems with anxiety/depression and pain/discomfort were common, and self-rated overall health was modest. EQ VAS scores also varied across demographic and arrhythmia categories in exploratory unadjusted comparisons. These findings highlight the value of incorporating patient-reported health assessment into investigations of arrhythmia care while underscoring the need for larger, methodologically rigorous studies to clarify the determinants and clinical significance of these differences.

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