Factors Influencing Health-Related Quality of Life in Warfarin Patients at a Tertiary Care Hospital: Assessment and Measurement

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Abstract

Background: Warfarin is a crucial anticoagulant for CVDs (mechanical valve replacement, atrial fibrillation, pulmonary embolism and deep vein thrombosis). The complicated dosing schedules and frequent side effects of warfarin can negatively impact the health-related quality of life (HRQoL) of patients. **Objectives:** To assess the overall health-related quality of life (HRQoL) among patients on warfarin therapy and to identify the predictors associated with variations in HRQoL, using the WHOQOL-BREF and EQ-5D-5L instruments. **Methods:** A one year prospective observational study was conducted at KIMS Al Shifa Super Speciality Hospital .The study evaluated the quality of life of 93 patients taking warfarin using WHO-BREF and EQ-5D-5L scales. Patients received counselling and informational leaflets, with their knowledge evaluated before and after counseling. The study analyzed HRQoL ratings using descriptive statistics, such as mean and standard deviation. SPSS software version 25 was utilized to identify predictors of these scores. **Result:** The average EQ-VAS score was 75.69 ± 9.57, and the average EQ-5D index was 0.87 ± 0.12. The physical, psychological, social, and environmental domains had mean WHOQOL-BREF domain ratings of 20.36 ± 2.89, 18.52 ± 2.41, 10.92 ± 19.64, and 29.40 ± 3.17, respectively. Age, comorbidities, work status, and patient knowledge all showed significant disparities in HRQoL scores. **Conclusion:** Scores from the WHOQOL-BREF and EQ-5D-5L indicate that age, comorbidities, employment status, and patient knowledge significantly impact HRQoL, highlighting the need for personalized management and education for long-term warfarin users.

Key words: HRQOL,WHOQOL- BREF scale,EQ-5D-5L

Introduction

Globally, cardiovascular diseases (CVDs) are a major cause of mortality, with a significant impact on India. These diseases not only result in premature mortality but also significantly deteriorate patients' quality of life. To address this global health crisis, the WHO and UN have set ambitious goals to reduce CVD-related deaths. While the overall CVD burden has increased globally, low- and middle-income countries like India have experienced the most dramatic rise due to population growth and aging. Therefore, prioritizing cardiovascular health promotion and prevention strategies in these countries is essential for achieving global progress against non-communicable diseases (NCDs).[1]

Warfarin, an anticoagulant utilized for treating various cardiovascular diseases such as deep vein thrombosis, atrial fibrillation, pulmonary embolism, and mechanical valve replacement. Managing blood thinners, like warfarin, presents challenges due to individualized dosing, frequent INR monitoring, potential interactions with medications or supplements, and an increased risk of internal bleeding. Long-term use also requires lifestyle adjustments, including dietary restrictions, particularly with vitamin K, as it can affect the medication's efficacy. As a result, anticoagulant therapy often necessitates lifelong treatment and regular hospital visits for monitoring, impacting patients' quality of life.[2][3][4]

Because of its regular monitoring, dose modifications, and ongoing risk of bleeding episodes, warfarin can have a substantial influence on Health-Related Quality of Life (HRQoL). Key factors affecting HRQoL include inconvenience, fear, and psychological distress. By measuring HRQoL, healthcare providers can gain valuable insights into patients' experiences and inform policies that improve overall well-being.[5]

HRQoL goes beyond medical data to consider how a patient's health impacts their overall well-being. It encompasses physical, mental, emotional, social, and overall life satisfaction. Different assessment strategies are needed to explore these diverse domains. HRQoL instruments can differentiate between patients and assess changes in health status over time, aiding in therapy evaluation and patient stratification. HRQoL measurement tools must be valid to accurately measure the intended aspect. Effective strategies involve an external benchmark that is understandable and correlated with changes in questionnaire scores. A proposed taxonomy distinguishes between generic and specific HRQoL instruments, enhancing clarity and comparability in HRQoL research. Generic instruments assess overall HRQoL across various populations. Health profiles and utility measures are two methods within this category. Health profiles provide comprehensive assessments, while utility measures capture overall well-being through a single score. Specific instruments focus on issues directly related to a particular disease or treatment. They offer increased responsiveness but may be less suitable for cross-

condition comparisons. No single set of instruments can fulfill all HRQoL measurement objectives, necessitating the use of multiple tools.[6]

Patient counselling is essential for optimizing warfarin therapy. By providing patients with education and support, we can reduce medication errors, improve treatment outcomes, and enhance patient satisfaction.[7]Patientcounselling can be enhancedby using patient information leaflets. PIs provide essential information to support patients in making informed decisions about their medications.[8][9]

In our study, we will investigate how various factors influence the HRQoL of patients taking warfarin in our population. Previous research has not explored HRQoL in this specific demographic, and we aim to fill this knowledge gap. By examining factors like gender, age, marital status, education, other health conditions, and the duration and effectiveness of warfarin treatment, we can identify key factors affecting HRQoL and develop targeted support strategies for patients on warfarin.

Methods

Study design

KIMS Al Shifa Hospital, a tertiary care facility in Perinthalmanna, Kerala, India, was the site of this prospective observational study. Outpatients on warfarin medication for a minimum of two months were the study's primary focus. Patients who were 18 years of age or older were included; those who had acute illnesses that could be fatal, disabilities, or cognitive impairment were not. The KIMS Al Shifa Hospital's Institutional Ethics Committee (IEC) accepted the study on November 27, 2023, issuing letter number KAS:ADM:IEC:0109E:23. Every patient who took part gave their informed consent.The study ran from October 2023 to October 2024, for a total of one year.

Sample size calculation

Using the procedure for estimating sample size for proportions, the study's sample size was determined to be 93. A predicted prevalence of 40%, a significance threshold of 5%, and a target precision of 10% served as the foundation for this computation.

Statistical analysis

Frequency/percentage analysis and descriptive statistics (mean, standard deviation, and range) were used in the data analysis. Independent sample t-tests evaluated mean differences between groups for data that was normally distributed. One-way ANOVA was applied to non-normal data. Statistical significance was indicated by P-values below 0.05. SPSS v25 and Microsoft Office 2021 were used for data analysis and presentation.

Study procedure

Patients receiving warfarin medication in outpatient department of cardiology participated in the trial. Patients were interviewed in-person while they awaited the physician. EQ 5D 5L and WHOQOL-BREF were used to measure HRQoL. A 26-item self-report survey, the WHOQOL-BREF is a condensed form of the WHOQOL-100. It evaluates a person's general health and well-being throughout the previous two weeks. Each item is rated by participants on a scale of 1 to 5, where 1 denotes significant disagreement and 5 denotes strong agreement. Higher scores indicate greater well-being.[10][11] A visual analog scale and a descriptive system were included in EQ 5D 5L. Each of the following dimensions—mobility, self-care, usual activities, pain/discomfort, and anxiety/depression—had five items in the descriptive system. Patients were given a five-point rating system for each dimension: no problem, slight problem, moderate problem, severe problem, or extreme problem/unable to execute. These answers were aggregated using country-specific variables to create a single score known as the EQ-5D-5L index. On a visual analog scale that went from 0 (worst imaginable) to 100 (best possible), participants also evaluated their general health. As a result, EQ-VAS scores ranged from 0 to 100.[12][13]

The EQ-5D index was calculated using the country-specific value set developed by Gaurav Jyani et al. in their study, "Development of an EQ-5D Value Set for India Using an Extended Design (DEVINE) Study: The Indian 5-Level Version EQ-5D Value Set.[14]

The study examined the relationship between the EQ-5D indexes, EQ-VAS and WHOQOL-BREF domain scores, and socio-demographic, and disease characteristics were.

A questionnaire was provided to the patient to assess their knowledge about the use of warfarin. Patient counselling was given with the help of PILs (Patient Information Leaflets). The patient's knowledge was then reassessed.

Results
Demographic and Disease Characteristics:
Figure 1: socio-demographic characteristics
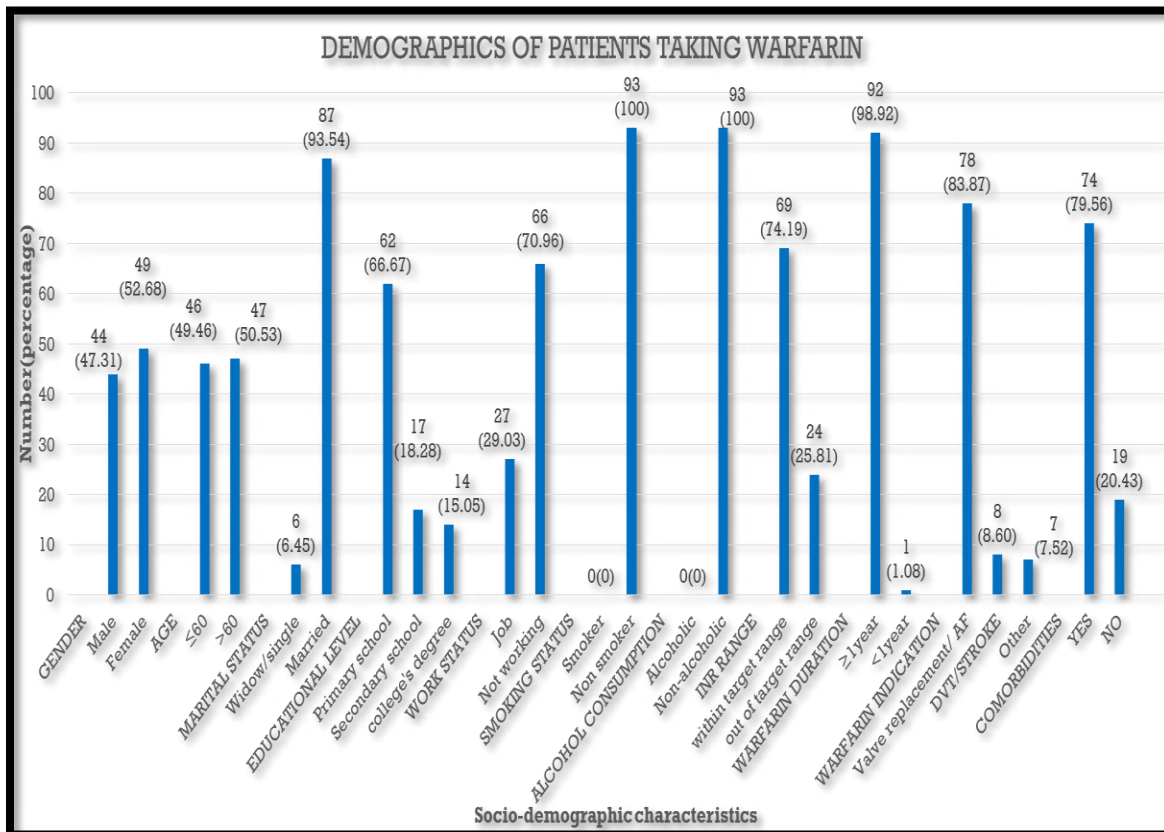
The study population was predominantly female (52.7%) and consisted primarily of older adults (50.5% over 60). Most participants (93.5%) were married, and a significant majority (71%) were not currently working. The primary reason for taking warfarin was to prevent valve replacement/atrial fibrillation (83.9%).A significant portion (79.6%) have comorbidities, while 20.4% do not. All participants were non-smokers and non-alcoholics, and the majority (74.2%) had INR levels within the target range. The majority of participants (98.9%) had been taking warfarin for over a year.

WHOQOL-BREF scale:

Table 1: Descriptive Analysis of the WHOQOL-BREF Responses with 4 domain Scores

WHOQOL BREF ITEMS	Count (%)				
	Not at all	Not much	Moderately	A great deal	Completely
QoL GENERAL					
Quality of life rating (Q1)	0(0.0)	36(38.7)	12(12.9)	45(48.4)	0(0.0)
Satisfied with health (Q2)	2(2.2)	62(66.7)	7(7.5)	22(23.7)	0(0.0)
Physical					
Pain(Q3)	38(40.9)	23(24.7)	28(30.1)	4(4.3)	0(0.0)
Dependence on medical aids(Q4)	0(0.0)	0(0.0)	7(7.5)	57(61.3)	29(31.2)
Energy (Q10)	6(6.5)	32(34.4)	41(44.1)	14(15.1)	0(0.0)
Mobility(Q15)	14(15.1)	32(34.4)	37(39.8)	10(10.8)	0(0.0)
Sleep (Q16)	2(2.2)	40(43.0)	8(8.6)	42(45.2)	1(1.1)
Activities of daily living (Q17)	2(2.2)	31(33.3)	15(16.1)	44(47.3)	1(1.1)
Work capacity (Q18)	2(2.2)	38(40.9)	21(22.6)	32(34.4)	0(0.0)
Psychological					
Positive feeling (Q5)	1(1.1)	9(9.7)	38(40.9)	44(47.3)	1(1.1)
Personal belief (Q6)	0(0.0)	8(8.6)	41(44.1)	43(46.2)	1(1.1)
Concentration (Q7)	4(4.3)	25(26.9)	34(36.6)	29(31.2)	1(1.1)
Bodily-image (Q11)	0(0.0)	2(2.2)	8(8.6)	82(88.2)	1(1.1)
Self-esteem (Q19)	0(0.0)	20(21.5)	28(30.1)	45(48.4)	0(0.0)
Negative feeling (Q26)	57(61.3)	16(17.2)	18(19.4)	2(2.2)	0(0.0)
Social					
Personal relationship	0(0.0)	1(1.1)	11(11.8)	76(81.7)	5(5.4)

(Q20)					
Sexual activity (Q21)	2(2.2)	0(0.0)	69(74.2)	22(23.7)	0(0.0)
Social support (Q22)	1(1.1)	3(3.2)	13(14.0)	71(76.3)	5(5.4)
Environmental					
Security (Q8)	3(3.2)	41(44.1)	34(36.6)	15(16.1)	0(0.0)
Physical environment (Q9)	0(0.0)	0(0.0)	11(11.8)	77(82.8)	5(5.4)
Financial support (Q12)	0(0.0)	2(2.2)	29(31.2)	54(58.1)	8(8.6)
Accessibility of needed information ((Q13)	0(0.0)	1(1.1)	25(26.9)	59(63.4)	8(8.6)
Leisure activity (Q14)	1(1.1)	8(8.6)	42(45.2)	38(40.9)	4(4.3)
Home environment (Q23)	1(1.1)	3(3.2)	6(6.5)	78(83.9)	5(5.4)
Health care (Q24)	0(0.0)	0(0.0)	3(3.2)	85(91.4)	5(5.4)
Transport (Q25)	0(0.0)	1(1.1)	4(4.3)	83(89.2)	5(5.4)

The table 1 displays thatmost patients responded "A great deal" to the WHOQOL-BREF items. However, the lowest scores were observed for Q2 - Quality of Life Rating (66.7%), Q8 - Security (44.1%), and Q18 - Work Capacity (40.9%).

Table 2: **WHO BREF four dimension score**

Scores	Mean	Std. Deviation	Range
Physical	20.3656	2.89972	13-27
Psychological	18.5269	2.41189	13-24
Social	10.9247	1.27890	6-14
Environmental	29.4086	3.17338	22-39
QOL General	5.6237	1.6346	3-8

The table 2 shows the average scores in the four dimensions are as follows: physical well-being: 20.36 ± 2.89, psychological well-being: 18.52 ± 2.41, social well-being: 10.92 ± 1.27, and environmental well-being: 29.40 ± 3.17

EQ 5D 5L

From the responses to EQ 5D 5L dimensions as per figure 2 the majority of participants reported no problem for self-care, usual activities, and anxiety/depression with minimal difficulty (score of 1).However majority of patients (46.2%) reported experiencing moderate difficulties (score of 2) with mobility. A significant proportion experienced some level of pain/discomfort, with 53.8% reporting moderate levels (score of 2).Overall, the data suggests that while most participants were able to perform daily activities with minimal difficulty, a significant number faced challenges related to mobility, and pain/discomfort
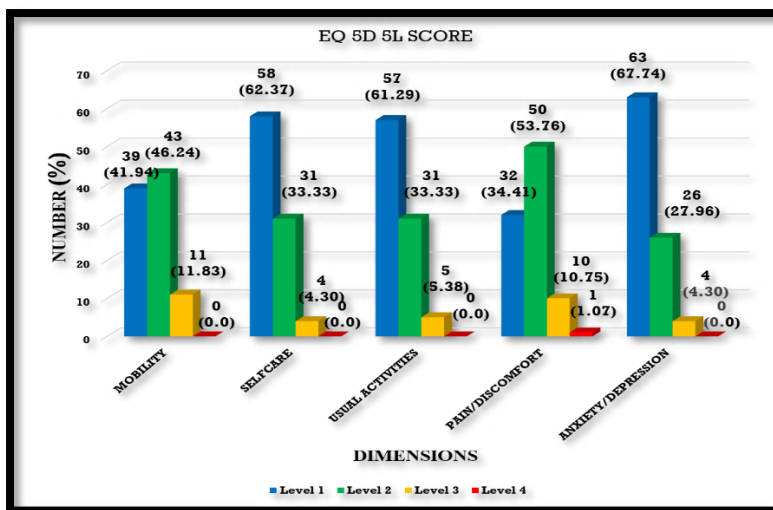
Figure 2: EQ 5D 5L

Table 3: EQ 5D index and EQ VAS

Scores	Mean	Std. Deviation	Range
EQ index	0.87010	0.12472	0.494-1
EQ-VAS	75.6989	9.57213	50-90

Table 3 displays the average EQ-5D-5L index, which is 0.87 ± 0.12, and the EQ-VAS score, which is 75.69 ± 9.57.

Table 4: Relationships between sociodemographic and disease factors and the WHOQOL-BREF domain scores, EQ-VAS, and EQ-5D index

	EQ Index	EQ-VAS	QoL GENERAL	PHYSICAL	PSYCHOLOGICAL	Social	environmental	TOTAL QoL
Gender								
Female	0.85 ± 0.11	73.77 ± 10.68	5.63 ± 1.64	20.16 ± 3.00	18.20 ± 2.45	10.71 ± 1.29	28.97 ± 2.91	83.69 ± 9.33
Male	0.88 ± 0.13	77.84 ± 7.73	5.61 ± 1.64	20.59 ± 2.78	18.88 ± 2.33	11.15 ± 1.23	29.88 ± 3.40	86.13 ± 9.87
p-value	0.317 NS	0.04 *	0.956 NS	0.481 NS	0.175 NS	0.094 NS	0.17 NS	0.223 NS
Age								
≤ 60	0.92 ± 0.10	79.78 ± 7.60	6.20 ± 1.53	21.61 ± 2.60	19.37 ± 2.10	11.33 ± 1.14	30.28 ± 2.78	88.78 ± 8.43
> 60	0.82 ± 0.13	71.70 ± 9.68	5.06 ± 1.55	19.15 ± 2.67	17.70 ± 2.43	10.53 ± 1.30	28.55 ± 3.33	81.00 ± 9.21
p-value	0.000 *	0.000 *	0.001 *	0.000 *	0.001 *	0.002 *	0.008 *	0.000 *
Marital status								
Single/ Widow	0.84 ± 0.12	66.67 ± 18.89	5.00 ± 1.79	18.83 ± 4.40	17.00 ± 2.53	10.00 ± 1.67	27.17 ± 3.31	78.00 ± 10.70
Married	0.87 ± 0.13	76.32 ± 8.44	5.67 ± 1.63	20.47 ± 2.77	18.63 ± 2.38	10.99 ± 1.23	29.56 ± 3.12	85.32 ± 9.42
p-value	0.611 NS	0.016 *	0.337 NS	0.182 NS	0.109 NS	0.067 NS	0.073 NS	0.071 NS
Education level								
Primary school	0.85 ± 0.13	73.87 ± 9.89	5.50 ± 1.72	19.94 ± 3.08	18.16 ± 2.44	10.73 ± 1.40	28.84 ± 3.32	83.16 ± 10.15

Secondary school	0.89 ± 0.11	78.57 ± 7.70	5.50 ± 1.45	20.93 ± 2.76	19.21 ± 2.58	11.12 ± 0.60	30.00 ± 1.94	88.06 ± 6.17
College degree	0.94 ± 0.09	80.00 ± 8.10	6.18 ± 1.42	21.47 ± 1.94	19.29 ± 1.93	11.57 ± 1.09	31.21 ± 3.09	88.43 ± 9.15
p-value	0.014 *	0.029 *	0.308 NS	0.112 NS	0.117 NS	0.064 NS	0.027 *	0.055 NS
Work status								
Not working	0.85 ± 0.12	74.09 ± 9.84	5.52 ± 1.67	19.97 ± 3.01	18.23 ± 2.38	10.74 ± 1.23	28.98 ± 3.03	83.44 ± 9.34
Job	0.91 ± 0.12	79.63 ± 7.71	5.89 ± 1.55	21.33 ± 2.39	19.26 ± 2.38	11.37 ± 1.31	30.44 ± 3.33	88.30 ± 9.58
p-value	0.029 *	0.011 *	0.320 NS	0.039*	0.061 NS	0.031 *	0.043 *	0.026 *
Warfarin Indications								
VR/AF	0.87 ± 0.13	75.71 ± 9.63	5.68 ± 1.68	20.32 ± 3.00	18.53 ± 2.52	10.92 ± 1.35	29.45 ± 3.20	84.90 ± 9.88
DVT/Stroke	0.86 ± 0.11	77.50 ± 8.02	5.38 ± 1.41	20.63 ± 2.20	18.38 ± 1.60	10.88 ± 0.83	29.50 ± 1.20	84.75 ± 5.78
Other	0.84 ± 0.13	73.57 ± 11.44	5.29 ± 1.50	20.57 ± 2.76	18.71 ± 2.14	11.00 ± 1.00	28.86 ± 4.56	84.43 ± 11.21
p-value	0.763 NS	0.734 NS	0.754 NS	0.944 NS	0.964 NS	0.982 NS	0.893 NS	0.992 NS
Comorbidities								
Yes	0.85 ± 0.13	73.92 ± 9.55	5.34 ± 1.56	19.77 ± 2.81	18.07 ± 2.32	10.78 ± 1.34	29.03 ± 3.27	82.99 ± 9.37
No	0.94 ± 0.08	82.63 ± 5.86	6.74 ± 1.48	22.68 ± 1.97	20.32 ± 1.92	11.47 ± 0.84	30.89 ± 2.28	92.11 ± 6.83
p-value	0.004 *	0.000 *	0.001 *	0.000 *	0.000 *	0.035 *	0.021 *	0.000 *
INR								

Within target	0.89 ± 0.12	77.25 ± 8.77	5.78 ± 1.62	20.61 ± 2.94	18.88 ± 2.33	10.96 ± 1.37	29.38 ± 3.29	85.61 ± 9.86
Out of target	0.82 ± 0.14	71.25 ± 10.56	5.17 ± 1.63	19.67 ± 2.73	17.50 ± 2.40	10.83 ± 1.01	29.50 ± 2.86	82.67 ± 8.69
P-value	0.034 *	0.007 *	0.112 NS	0.172 NS	0.015 *	0.687 NS	0.871 NS	0.198 NS
Patient's knowledge								
Low (9)	0.728 ± 0.168	65.00 ± 8.29	4.33 ± 0.71	19.11 ± 1.62	16.33 ± 2.87	10.67 ± 1.12	26.56 ± 2.35	77.00 ± 7.18
Medium (31)	0.861 ± 0.110	74.52 ± 9.86	5.45 ± 1.65	19.58 ± 3.04	18.13 ± 2.55	10.61 ± 1.54	28.90 ± 3.24	82.68 ± 10.35
High (53)	0.900 ± 0.109	78.21 ± 8.27	5.94 ± 1.63	21.04 ± 2.83	19.13 ± 1.99	11.15 ± 1.10	30.19 ± 2.96	87.45 ± 8.57
p value	0.000 *	0.000 *	0.017 *	0.032 *	0.002 *	0.145 NS	0.003 *	0.003 *

The table 4 displays the univariate analyses examining the connections between the WHOQOL-BREF domain scores, EQ-VAS, and EQ-5D indexes and sociodemographic and disease factors. According to the analysis, the major characteristics influencing HRQoL were gender, age, marital status, education level, employment status, comorbidities, and INR level.

The results indicate that female patients reported significantly lower scores only in the EQ-VAS (73.77 ± 10.68) compared to male patients (77.84 ± 7.73). Similarly, Single/Widowed patients had significantly lower scores only in the EQ-VAS (66.67 ± 18.89) compared to married patients (76.32 ± 8.44). In terms of education, patients with a primary school education reported significantly lower scores only in both the EQ-INDEX (0.85 ± 0.13) and EQ-VAS (73.87 ± 9.89), compared to those with a secondary school education (EQ-INDEX: 0.89 ± 0.11; EQ-VAS: 78.57 ± 7.70) and a college degree (EQ-INDEX: 0.94 ± 0.09; EQ-VAS: 80.00 ± 8.10). No significant relationship was observed between warfarin indication and scores. However, patients with an INR outside the target range reported significantly lower scores only in both the EQ-INDEX (0.82 ± 0.14) and

EQ-VAS (71.25 ± 10.56), compared to patients with an INR within the target range (EQ-INDEX: 0.89 ± 0.12; EQ-VAS: 77.25 ± 8.77).

Older patients (aged > 60 years) reported significantly lower HRQoL scores in EQ-5D indexes (0.82 ± 0.13), EQ-VAS (71.70 ± 9.68), and WHOQOL-BREF domain scores (81.00 ± 9.21)compared to younger patients (aged ≤ 60 years) having a score of 0.92 ± 0.10,79.78 ± 7.60 and 88.78 ± 8.43 respectively ($p < 0.05$). Likewise, patients with comorbidities exhibited significant lower HRQoL in EQ-5D indexes (0.85 ± 0.13), EQ-VAS (73.92 ± 9.55), and WHOQOL-BREF domain scores (82.99 ± 9.37) than those without comorbidities having a score of 0.94 ± 0.08,82.63 ± 5.86, and 92.11 ± 6.83 respectively ($p < 0.05$). Additionally, patients without employment demonstrated significantly lower HRQoL scores in EQ-5D indexes (0.85 ± 0.12), EQ-VAS (74.09 ± 9.84), and WHOQOL-BREF domain scores (83.44 ± 9.34) than employed patients having a score of 0.91 ± 0.12, 79.63 ± 7.71, and88.30 ± 9.58 respectively ($p < 0.05$)

Based on the assessment of patient knowledge, individuals with a low level of understanding about warfarin (score <5 out of 10) exhibited significantly lower HRQOL scores in EQ-5D indexes (0.728 ± 0.168), EQ-VAS (65.00 ± 8.29), and WHOQOL-BREF domain scores (77.00 ± 7.18)compared to those with moderate (5-7) having a score of 0.861 ± 0.110, 74.52 ± 9.86, and 82.68 ± 10.35 respectively to high knowledge (>7) having a score of 0.900 ± 0.109, 78.21 ± 8.27, and 87.45 ± 8.57 respectively ($p < 0.05$).(Table 4)

Discussion

Patients receiving warfarin therapy frequently express concerns about complications, dietary restrictions, limited travel freedom, and the need for frequent and regular physician and laboratory appointments. These factors may contribute to a decreased quality of life[15]

The study population was predominantly female (52.7%) and consisted primarily of older adults (50.5% over 60). Most participants were married (93.5%) and not employed (71%). Warfarin was primarily used for valve replacement or atrial fibrillation (83.9%), and comorbidities were common (79.6%). All participants were non-smokers and non-alcoholics, with 74.2% having stable INR levels. Nearly all had been on warfarin for over a year (98.9%).

In WHO BREF scale majority of patients indicating "A great deal" in their answers like the results in the study conducted byIqbal MS et al., 2020. The average scores in the four dimensions are as follows: physical well-being: 20.36 ± 2.89, psychological well-being: 18.52 ± 2.41, social well-being: 10.92 ± 1.27, and environmental well-being: 29.40 ± 3.17.

The EQ-5D-5L assessment revealed that while most patients reported minimal difficulty with daily activities, a significant portion experienced challenges related to pain, discomfort, and mobility. Specifically, pain/discomfort and mobility were identified as the

most problematic areas, with 65.59% and 58.06% of patients reporting problems, respectively. A prior study consistently showed similar results.[2]Other dimensions, such as usual activities (UA), self-care (SC), and anxiety/depression (AD), had lower percentages of reported problems. The average EQ-5D-5L index was 0.87 ± 0.12, and the EQ-VAS score was 75.69 ± 9.57.

There were significant effects of gender, age, marital status, education level, job status, comorbidities, INR level, and patient knowledge on HRQoL, according to an analysis of the correlations between the EQ-5D indexes, EQ-VAS, WHOQOL-BREF domain scores, and sociodemographic and disease characteristics. Age, comorbidities, employment status, and patient knowledge were the characteristics that significantly impacted health ratings as determined by the WHOQOL-BREF and EQ-5D-5L scales.

It was observed that older patients (aged > 60 years) reported significantly lower HRQOL score compared to younger patients (aged ≤ 60 years). Previous studies have also yielded similar results.[2] This may be attributed to a combination of factors, such as chronic health conditions, socioeconomic challenges, limited healthcare access, and psychological issues. Enhancing social and community support, implementing economic and social policies, and providing counseling can help improve the quality of life for older adults.

When compared to patients without comorbidities, patients with comorbidities reported much poorer HRQoL scores.This may be attributed to factors such as overlapping symptoms, medication side effects, and functional limitations. Managing medications, educating patients, screening for drug interactions, coordinating care, and promoting self-management can help address these challenges and improve HRQoL. Previous studies have consistently demonstrated comparable outcomes, reinforcing the association between comorbidities and lower HRQoL. [2][5] [11]

Unemployed patients reported significantly lower HRQoL scores than employed ones, likely due to financial hardship, social isolation, and reduced self-esteem. Addressing these issues calls for economic support, improved social networks, better healthcare access, skill development, and policy reforms. Previous studies have consistently echoed these findings.[2][15]

Patients with low warfarin knowledge had lower HRQoL scores, but improved after counseling. Addressing inadequate education, anxiety, and poor adherence through personalized education and regular monitoring can enhance HRQoL.

Conclusion

Warfarin therapy, essential for preventing thromboembolism, can negatively impact Health-Related Quality of Life (HRQoL). This study found that factors like age, comorbidities, employment status, and patient knowledge significantly influence HRQoL outcomes, affecting physical, psychological, social, and environmental well-being. EQ-5D-

5L results indicated mobility and pain/discomfort as the most problematic areas. These findings underscore the need for personalized patient management, education, and enhanced social and healthcare support to improve HRQoL for individuals on long-term warfarin therapy.

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