ORIGINAL ARTICLE

Knowledge and Health-Related Quality of Life Link Assessment in Warfarin Patients: A Saudi Arabian Experience

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Abstract

Purpose: The aim of this study was to elaborate on warfarin therapy knowledge and health-related quality of life (HRQoL) association among Saudi Arabian warfarin-using patients. **Methods:** The study involved 387 warfarin patients from an outpatient anticoagulation clinic of the University Hospital in Al-kharj, Saudi Arabia. A self-developed and pre-validated questionnaire was used to assess warfarin therapy knowledge, whereas World Health Organization Quality of Life Brief Version (WHOQOL-BREF) was used to estimate HRQoL. Patients' demographic characteristics and different variables' correlations were established through descriptive and inferential statistics. **Results:** A total of 387 patients (Males = 130, 33.6% and Females = 257, 66.4%) participated in the study. The study population presented a mean knowledge score of 9.94 ± 2.48. Environment, social relationships, psychological, and physical health domains had mean HRQoL scores of 63.43 ± 17.60, 64.46 ± 26.19, 68.20 ± 16.11, and 62.11 ± 15.53, respectively. The correlation coefficients of these WHOQOL-BREF domains were noted as −0.121, −0.112, −0.160, and −0.111 in relation to warfarin therapy knowledge total score, which indicated a weak negative association among these domains. **Conclusion:** The negative association between warfarin therapy knowledge and warfarin patients' HRQoL indicates that warfarin therapy knowledge does not necessarily improve their HRQoL.

Key words: Health-related quality of life, Saudi Arabia, warfarin, warfarin therapy knowledge, World Health Organization Quality of Life Brief Version

INTRODUCTION

Patients' daily activities could be hindered by poor warfarin therapy knowledge, leading to compromised health-related quality of life (HRQoL). Warfarin characteristics (modified lifestyle, frequent international normalized ratio (INR) checks, diet alterations, fear of excessive hemorrhages, and activity restrictions) could potentially impact treatment satisfaction and alleviate HRQoL of patients.[1,2] HRQoL depicts individuals' self-satisfaction and perception of quality of life (QoL), which is modified by their general health status.[1,3,4] Health care professionals often employ the HRQoL approach to explain patients' health-related factors other than diseases.[1,3,4] HRQoL is also measured in healthy individuals to assess society's health status, which helps in devising and implementing healthcare policies for an improved overall health of the society.[5,6]

Several studies have linked insufficient warfarin therapy knowledge with compromised HRQoL and bleeding complications.[7] Different aspects of warfarin therapy knowledge have been investigated in association with overall HRQoL.[8] Multiple factors (insufficient precise dose understanding, limited health literacy rate, advancing age, adverse drug effects, little awareness of drug-food interactions high hemorrhagic episodes, and strict anticoagulation control of warfarin) correlate with warfarin knowledge, ultimately leading to poor HRQoL.[1,2,9-11] On the other hand, better disease understanding, positive perceptions, and good

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knowledge improve warfarin therapy compliance and alleviate complications of anticoagulation therapy, which could potentially affect HRQoL.[4,5,8]

During the past two decades, the literature has frequently reported a rising demand for patient education regarding potential side effects of drugs, precise drug doses and usage patterns, and food and drug interactions.[5-9] Therefore, appropriate warfarin knowledge for patients is considered an ideal practice. However, its effect on Saudi Arabian patients' HRQoL remains unclear.[10,12] Moreover, the literature is limited regarding warfarin knowledge in relation to warfarin patients' HRQoL in Saudi Arabia.[8,13] Therefore, this study was aimed at a World Health Organization Quality of Life Brief Version (WHOQOL-BREF)-based investigation of warfarin knowledge and its association assessment with warfarin patients' HRQoL in Saudi Arabia.

METHODS

Study design

The study (prospective, cross-sectional, and descriptive) was conducted at a regional outpatient anticoagulation clinic affiliated with the university in Al-kharj, Saudi Arabia. The study followed the international clinical guidelines and Helsinki Declaration (version 2013) principles,[14] for which the approval was granted by the Institutional Review Board at the university. The individuals' information and study protocol were kept confidential and used only for the research purpose.

Sampling technique

The questionnaire was filled out by the respondents (405), whereas questionnaires[15] with >20% of missing data were excluded. The remaining 387 questionnaires were subjected to data analysis. The study included subjects aged 18 years and older who were patients on warfarin therapy for a minimum duration of 2 months and attended the clinic for follow-up visits. The 2-month period represents the average time for warfarin dose adjustment.[4] The study mainly involved patients familiar with the Arabic language. The exclusion criteria included immigrants, pregnant individuals, aged under 18 years, mental illness, documented psychological issues, and those who did not sign the consent form. A written consent form and research tools were provided to the participants.

Data collection

A novel research tool (warfarin knowledge measuring scale) was designed in the English language to evaluate warfarin knowledge, which contained 15 items under 5 different domains (A, B, C, D, and E). The domains included the missed dose domain, basic drug information domain, drug interactions domain, INR monitoring domain, and adverse drug reactions (ADR)/side effects domain. A forward-backward translation method (two independent translations) was adopted to translate tool items into the Arabic language. The filled Arabic questionnaire was again back-translated into English (two independent translators). The Arabic Language Center and English Language Center of the University, Saudi Arabia, facilitated the questionnaire translations. The correct answer was represented by a score of 1, whereas the score of the incorrect answer was considered 0. The scores of each patient were added to obtain a total score within a range of 15–0. Based on the scores, patients were considered to have poor knowledge (≤8 correct answers), moderate knowledge (9–12 correct answers), and good knowledge (13–15 correct answers) of warfarin therapy.

The WHOQOL-BREF research tool of the World Health Organization (WHO) was employed to assess HRQoL. HRQoL is a self-administered, cross-culturally sensitive tool with established psychometric features. The WHOQOL-BREF tool contains four domains, including environmental, social, physical, and psychological domains. This tool elaborates on respondents' perceptions about their life aspects in relation to total HRQoL, either as problematic or satisfactory. Demographic characteristics included marital status, gender, employment status, age, educational level, non-cardiovascular diseases (CVDs) comorbidities, and warfarin usage duration and indications. Each question's score was utilized in summarizing the domain score. Finally, the scores were subjected to linear transformation by following the scaling guidelines (0–100) for WHOQOL-BREF questionnaire.[16,17] Higher scores represented upper HRQoL levels and vice versa. The questionnaire WHOQOL-BREF Arabic format was provided by the WHO officials. An expert panel reviewed and reconfirmed the face validity and content of the research instrument. This study presents a novel approach to evaluating warfarin knowledge effects on patients' HRQoL through the WHOQOL-BREF tool.

Statistical analysis

Patients' disease and demographic characteristics were evaluated through descriptive statistics. Categorical variables were represented using percentages and frequencies, whereas means and standard deviations were estimated for continuous variables. Cronbach's alpha revealed the tool's internal consistency, whereas the Q-Q plots and Shapiro-Wilk test were employed to assess the data's normality distribution. Pearson's correlation coefficient and independent samples *t*-test evaluated the correlations (agreements) of knowledge and demographics, and knowledge and HRQoL domains. The Statistical Packages for the Social Sciences (20.0) was employed to analyze the research data.

RESULTS

Table 1 depicts the demographic data of the investigation. The ratio of female participants (n = 257, 66.4%) was higher than that of males (n = 130, 33.6%). Out of the total 387 participants, the age of 246 (63.6%) participants was >35 years, whereas the age of 144 (36.4%) participants was <35 years. Three hundred and seventy-eight (97.7%) participants had an advanced education level, whereas primary education was noted in only 9 (2.3%) participants. Two hundred and seventy-two participants did not present the comorbidity, whereas 115 (29.7%) participants reported comorbidities other than CVDs. HRQoL mean scores of the four WHOQOL-BREF domains among respondents are demonstrated in Table 2. The highest mean score of 68.20 ± 16.11 was observed for the psychological domain, whereas mean scores of 64.46 ± 26.19, 63.43 ± 17.60, and 62.11 ± 15.53 were noted for social relationships, environment domains, and physical health domains, respectively.

Table 1: Participants' (n = 387) demographic characteristics

Description	Frequency	Percentage
Gender		
Male	130	33.6
Female	257	66.4
Age		
<35 years	141	36.4
>35 years	246	63.6
Marital status		
Single/separated	166	42.9
Married	221	57.1
Education level		
Primary	09	02.3
Secondary or higher	378	97.7
Work status		
Job/business	244	63
Not working	143	37
Comorbidities other than CVDs		
Yes	115	29.7
No	272	70.3
Warfarin indication		
Atrial fibrillation/ valve replacements	180	46.5
DVTs/PEs	207	53.5
Warfarin duration		
<1 year	165	42.6
>1 year	222	57.4

CVDs: Cardiovascular diseases, DVTs/PEs: Deep vein thrombosis/pulmonary embolism

Table 2: WHOQOL-BREF HRQoL scores

Domains	HRQoL scores (Mean±SD)
Physical domain	62.11±15.53
Psychological domain	68.20±16.11
Social relationships domain	64.46±26.19
Environment domain	63.43±17.60

WHOQOL-BREF: World Health Organization Quality of Life Brief Version, HRQoL: Health-related quality of life, SD: Standard deviation

Table 3: Overall scores of warfarin therapy knowledge domains

Domains	Warfarin knowledge measuring scale	Yes n (%)	No n (%)
A	Basic drug info domain		
1	Why are you taking warfarin	275 (71.1)	112 (28.9)
2	Daily dose of warfarin	262 (67.7)	125 (32.3)
3	Best time to take warfarin	207 (53.5)	180 (46.5)
4	Drinks decrease warfarin effectiveness	225 (58.1)	162 (41.9)
B	Missed dose domain		
5	Know what to do if missed out a dose of warfarin	261 (67.4)	126 (32.6)
6	Consequences of missing a dose of warfarin	248 (64.1)	139 (35.9)
C	INR monitoring domain		
7	Why PT/INR test is done	252 (65.1)	135 (34.9)
8	Normal INR values	292 (75.5)	095 (24.5)
9	What to do if INR is high	239 (61.8)	148 (38.2)
D	Drug interactions domain		
10	Drug and food interactions	274 (70.8)	113 (29.2)
11	How much Spinach/Broccoli can be consumed in a week	222 (57.4)	165 (42.6)
12	Warfarin interacts with common cold medicines/ supplements	284 (73.4)	103 (26.6)
13	Warfarin interacts with antibiotics/pain killers/ multivitamins	276 (71.3)	111 (28.7)
E	Adverse drug reactions/side effects domain		
14	Most likely side effects of warfarin	225 (58.1)	162 (41.9)
15	How and where to seek immediate medical attention in an emergency	306 (79.1)	081 (20.9)

PT/INR: Prothrombin time/INR, INR: International normalized ratio

Table 3 represents the level of warfarin knowledge in warfarin patients. The findings revealed good warfarin therapy knowledge (13–15 correct answers) among 53 patients. A moderate level of knowledge (9–12 correct answers) was noted in 249 patients, whereas 85 patients had poor warfarin therapy knowledge (≤8 correct answers). Two hundred and seventy-five patients (71.1%) had an understanding of their warfarin therapy, whereas 112 patients (28.9%) were unaware. Warfarin daily dose knowledge was noticed among 67.7% of the participants, while 53.5% of patients had an understanding of the best warfarin intake time. About 64.1% presented awareness regarding the outcome of missing a warfarin dose, whereas 67.4% had awareness regarding appropriate measures in case of a missing dose. Data demonstrated mixed findings regarding the studied domains of the warfarin knowledge questionnaire. The study population had median and mean knowledge scores of 10 and 9.94 ± 2.48, respectively. Cronbach's alpha depicted an internal consistency value of 0.792 for the developed tool.

Table 4 displays the correlation of study participants' sociodemographic attributes and knowledge scores. The knowledge scores of 9.96 ± 2.54 and 9.90 ± 2.37 were observed for females and males, respectively. Higher educational level of participants improved the knowledge score, but the difference between both groups was non-significant (09.96 ± 2.47 and 09.22 ± 2.94). Patients over 35 years of age demonstrated higher warfarin therapy knowledge (10.00 ± 2.53) than participants below 35 years (09.83 ± 2.39, $P = 0.525$). The working (job/business) participants presented a higher knowledge score (10.12 ± 2.47) than the non-working participants (09.63 ± 2.48). In Table 5, we expressed scores of the Spearman Rank order correlation coefficient, linking the HRQoL domains with the comprehensive scores of warfarin therapy knowledge. The association coefficient values remained −0.121, −0.112, −0.160, and −0.111 between environment, social, psychological, and physical WHOQOL-BREF domains and total warfarin knowledge scores. Statistical analysis revealed significantly negative correlations ($P \leq 0.05$) between WHOQOL-BREF domains and total warfarin therapy knowledge.

Table 4: Differential knowledge scores under various demographic characteristics

Variable	*n*	Mean±SD	*P*-value
Gender			
Male	130	09.90±2.37	0.808
Female	257	09.96±2.54	
Age			
<35 years	141	09.83±2.39	0.525
>35 years	246	10.00±2.53	
Marital status			
Single/separated	166	09.86±2.52	0.576
Married	221	10.00±2.46	
Educational level			
Primary	09	09.22±2.94	0.379
Secondary or higher	378	09.96±2.47	
Work status			
Job/business	244	10.12±2.47	0.063
Not working	143	09.63±2.48	
Comorbidities other than CVDs			
Yes	115	10.14±2.23	0.293
No	272	09.85±2.58	
Warfarin indication			
Atrial fibrillation/ valve replacements	180	09.94±2.56	0.992
DVTs/PEs	207	09.94±2.41	
Warfarin duration			
<1 year	165	09.87±2.56	0.661
>1 year	222	09.99±2.43	

CVDs: Cardiovascular diseases, DVTs/PEs: Deep vein thrombosis/pulmonary embolism, SD: Standard deviation

Table 5: Association of warfarin therapy knowledge and HRQoL

HRQoL domains	Total knowledge score	
	r-value	*P*-value
Physical domain	−0.111	0.028
Psychological domain	−0.160	0.002
Social domain	−0.112	0.027
Environment domain	−0.121	0.017

HRQoL: Health-related quality of life

DISCUSSION

Warfarin therapy knowledge among patients is crucial for optimum therapy outcomes, minimal drug interactions, and alleviated drug side effects.[12] This study evaluated warfarin knowledge in relation to the HRQoL of warfarin patients. Patients' warfarin knowledge scores revealed overall moderate knowledge level about warfarin therapy and poor HRQoL. The study examined the knowledge and HRQoL association within the Saudi population. Kaal *et al.* revealed that good warfarin knowledge was unable to achieve better anticoagulation control, which might impact total HRQoL.[3] Despite complications and narrow therapeutic applicability, warfarin has served as the key oral anticoagulant for decades.[3,8,9] Multiple factors could impact coagulation control in warfarin patients.[12] The findings of this study are in agreement with Lancaster *et al.*, who reported moderate to good warfarin knowledge among 75% of patients.[13] Patient's warfarin therapy knowledge varied among diverse age groups during this study. The older participants (age >35 years) demonstrated non-significantly ($P = 0.525$) better warfarin therapy knowledge (10.00 ± 2.53) than comparatively

younger patients (≤35 years). Total knowledge score also remained non-significantly different (P = 0. 576) between single (09.86 ± 2.52) and married (10.00 ± 2.46) patients. These findings are in line with the results of Taylor *et al*.[16]

Multiple factors (knowledge of warfarin activity duration, adverse effects, food and drug interactions, regular INR checks, and dietary cautions) contribute to its improved therapeutic efficacy.[8,9,13,17] During this study, almost 70% of patients displayed total warfarin therapy knowledge; however, 30% of patients lacked warfarin therapy knowledge regarding various aspects. Therefore, treatment guidelines should be extensively disseminated to the medical staff for warfarin patients' APT counseling. Patient's poor understanding regarding potential warfarin side effects and interactions might be another key factor.[10,18] Efficient communication, suitable pharmaceutical care plans, and enhanced knowledge of patients' treatment could significantly contribute to better outcomes and HRQoL. Moreover, better drug-disease information through improved patient counseling along with appropriate written materials could facilitate higher warfarin therapy knowledge among patients.[8] Non-physician counselors (clinical pharmacists) could be employed to enhance patients' drug-disease knowledge and treatment outcomes.[8,13]

The association between poor warfarin therapy knowledge among patients and poor anticoagulation control and HRQoL has been established.[6,8,9,13] Similarly, better warfarin knowledge facilitates enhanced compliance with warfarin therapy, leading to improve anticoagulation control and HRQoL.[1,6,11,17] During the present study, most of the warfarin patients had awareness regarding daily dose, which aligns with the findings of Johnson.[17] They reported good warfarin usage knowledge among 74.1% of patients. Their INR and ADR values are also comparable to the results of this study.[15] The results of some factors differentiated from Johnson J.A., which included warfarin interactions with food and other medicines.[15] Most of the participants of this study were aware of warfarin interactions with food and other drugs. Contrarily, Johnson, J. A. found warfarin therapy-related satisfactory knowledge scores in only 56% of patients.[15]

HRQoL refers to an individual's perceived QoL regarding satisfaction in health status-related life aspects.[6,10] This study identifies a slight negative correlation between knowledge of warfarin therapy and the HRQoL of patients on warfarin. Knowledge deficiencies were observed in certain aspects, which included optimum warfarin intake time, quantity of weekly broccoli consumption, interaction of over-the-counter vitamins with warfarin therapy, safe intake of other warfarin-interacting medications, and missing a warfarin dose. These results are in agreement with Saifan *et al*., who studied anticoagulants' knowledge and satisfaction in Saudi Arabia. Davis *et al*., have also reported an overall moderate knowledge about anticoagulants and INR control among 53.2% of patients.[8,9]

The findings of this study necessitate proper patient counseling for their enhanced warfarin therapy knowledge. Several factors could contribute to poor warfarin therapy knowledge among patients. In this regard, the lack of a standardized healthcare education program for warfarin patients is considered a key element.[8,18] Moreover, Saudi Arabian healthcare staff attend to each patient for a shorter time, thus impacting patient counseling.[16] During the study, highly educated patients exhibited a better knowledge score than primary-level/non-educated patients. Interestingly, working patients demonstrated non-significantly (P = 0.063) better warfarin therapy knowledge in comparison to non-working patients. Al-Omair *et al*., have reported similar findings and noted good warfarin therapy knowledge among most of the patients. They also observed an education-based significantly different warfarin knowledge among patients.[8] Similarly, Taylor *et al*., have also demonstrated better warfarin therapy knowledge among highly educated patients.[16,19] Thus, education regarding proper warfarin usage could significantly improve patients' perceptions and overall therapy knowledge about thromboembolic disorders.[18,15,20-22]

Different chronic diseases-associated significantly alleviated HRQoL have been reported in various studies of different countries; however, none of these investigations utilized WHOQOL-BREF to assess the association between warfarin therapy knowledge and patients' HRQoL. Ismael *et al*., conducted a study on Malaysian hepatitis B patients and demonstrated that poor disease knowledge negatively impacted the overall HRQoL of patients.[6,7,9] Multiple aspects could be attributed to the weak negative association and reduced HRQoL among warfarin patients. HRQoL approach analyzes various environmental, social, physical, and psychological attributes and individuals' behavior, which are crucial for disease management.[4,9] However, impartial assessment of HRQOL is a complicated task as it depends on several patient-associated irreversible factors such as varying intelligence level and personality traits, socio-economic status, country's political conditions, and disease duration and nature.[6,9]

Two previous studies on another disease support the findings of this study, which noted participants' poor HRQoL despite average disease-related knowledge.[6,9] The present study establishes either no or little effect of warfarin therapy knowledge on Saudi Arabian warfarin patients' HRQoL. Moreover, a higher disease or drug-related knowledge could also alleviate overall HRQoL.[6,8,9] This could be due to over-consciousness among patients about drug and disease conditions, leading to further worries and abnormalities to reduce their HRQoL.[1] The studies on liver, hypertensive, and hepatitis B patients have documented the fear of disease and drug-linked complications. It could be related to patients'

daily routine that ultimately decreases their overall health status and HRQoL.[1,3,4,6,23] HRQoL is generally considered a social sciences-related factor in Saudi Arabia that is applied to patient care-associated studies. Although Saudi Arabian public healthcare setups are good; however, more facilities and sophisticated interventions are needed for better counseling of warfarin patients.

Limitations of the study

WHOQOL-BREF is considered a self-reported study tool like other HRQoL questionnaires. The questionnaire of illiterate patients was completed by the investigators/nurses with the help of patients' caregivers, which might add some bias. These biases could be confounding factors in this study. The absence of a control group for comparison is another limitation of the study.

CONCLUSION

The study documents a negative association between warfarin therapy knowledge and HRQoL, which could be influenced by several factors. This investigation could assist healthcare professionals, pharmacists, physicians, and warfarin patients' family members in understanding their environmental, physical, social, and psychological issues. Moreover, it further recommends a detailed psychological investigation through qualitative probe, multivariate analysis/factor analysis to precisely identify total HRQoL-affecting factors among Saudi Arabian warfarin patients.

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CONTRIBUTION OF AUTHORS

We declare that this work was done by the author named in this article, and all liabilities pertaining to claims relating to the content of this article will be borne by the author.

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