Journal of Multidisciplinary Healthcare

Dovepress
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ORIGINAL RESEARCH

Determinants of Health-Related Quality of Life in Outpatients with Myocardial Infarction

Anan S Jarab[1–3], Razan Z Mansour[3], Suhaib Muflih[3], Walid Al-Qerem[4], Shrouq R Abu Heshmeh[3], Karem H Alzoubi[5,6], Yazid N Al Hamarneh[7], Salah Aburuz[8], Enaam M Al Momany[9]

[1]College of Pharmacy, Al Ain University, Abu Dhabi, United Arab Emirates; [2]AAU Health and Biomedical Research Center, Al Ain University, Abu Dhabi, United Arab Emirates; [3]Department of Clinical Pharmacy, Faculty of Pharmacy, Jordan University of Science and Technology, Irbid, 22110, Jordan; [4]Department of Pharmacy, Faculty of Pharmacy, Al-Zaytoonah University of Jordan, Amman, 11733, Jordan; [5]Department of Pharmacy Practice and Pharmacotherapeutics, University of Sharjah, Sharjah, United Arab Emirates; [6]Faculty of Pharmacy, Jordan University of Science and Technology, Irbid, Jordan; [7]Department of Pharmacology, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Canada; [8]Department of Pharmacology and Therapeutics, College of Medicine and Health Sciences, United Arab Emirates University, Al Ain, United Arab Emirates; [9]Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmaceutical Sciences, The Hashemite University, Zarqa, Jordan

Correspondence: Karem H Alzoubi, Department of Clinical Pharmacy, Faculty of Pharmacy, Jordan University of Science and Technology, P.O. Box 3030, Irbid, 22110, Jordan, Email khalzoubi@just.edu.jo; kelzoubi@sharjah.ac.ae

Background: The health-related quality of life (HRQOL) of patients with myocardial infarction (MI) is suboptimal because of the disease's life-threatening nature, the requirement for long-term lifestyle modifications, and the treatment regimens following MI. This study aimed to evaluate HRQOL and its associated factors in MI patients.

Material and Methods: This study was conducted on patients with MI who attended the outpatient cardiology clinic at a major teaching hospital in Jordan. The EQ-5D-3L questionnaire was used to assess HRQOL of the study participants. Quantile regression analysis was conducted to identify the variables associated with HRQOL.

Results: The study included 333 patients with a history of MI, with a median age of 58 (57–60). The median of the total EQ-5D score was 0.65 (0.216–0.805). Regression results revealed that male patients (Coefficient= 0.110, 95%CI (0.022–0.197), P=0.014) and not being diagnosed with diabetes (Coefficient= 0.154, 95%CI (0.042–0.266), P=0.007) were associated with increased HRQOL. On the other hand, low income (Coefficient= −0.115, 95%CI (−0.203 - −0.026), P=0.011), not receiving DPP-4 (Dipeptidyl Peptidase −4) inhibitors (Coefficient= −0.321 95%CI (−0.462 - −0.180), P<0.001), and having low (Coefficient= −0.271, 95%CI (−0.395 - −0.147), P<0.001) or moderate (Coefficient= −0.123, 95%CI (−0.202 - −0.044), P=0.002) medication adherence was associated with decreased HRQOL.

Conclusion: The current study demonstrated diminished HRQOL among patients with MI, highlighting the necessity of tailoring interventions to tackle medication adherence barriers in this population. Personalized interventions such as educational programs, counseling, and reminders that consider each patient's needs and circumstances can greatly enhance medication adherence and, thus, the HRQOL of MI patients. Individuals with lower income levels, female patients, and those with diabetes should be the specific targets of these interventions.

Keywords: health-related quality of life, myocardial infarction, EQ-5D, factor, Jordan

Introduction

Myocardial infarction (MI), commonly known as a heart attack, occurs when the blood supply to a portion of the heart muscle is inadequate.[1] In the US, about 1.0 million MIs occur annually and result in death for 300,000 to 400,000 people.[2] The World Health Organization (WHO) placed Jordan at number 65 in the world, with 5248 coronary heart disease fatalities recorded in 2017.[3] In Jordan, the prevalence of MI stands at 5.9%,[4] contributing to 54.7% of all annual deaths.[5] The Economic burden of MI originates from decreased productivity at work, fatalities, first-time hospitalizations, or readmissions.[6] Hospitalization rates were estimated to be 222 per 100,000 patients,[7] and in 2016 currency, the estimated total annual cost of MI was $84.9 billion.[8]

Received: 11 February 2024
Accepted: 29 April 2024
Published: 7 May 2024

The most important risk factors for the development of MI are physical inactivity, smoking, dyslipidemia, diabetes mellitus, hypertension, and obesity.[9] The treatment of MI involves a combination of lifestyle changes, medications, and medical procedures that seek to relieve symptoms, minimize complications, and improve long-term outcomes and HRQOL of MI patients. Lifestyle modifications include a low-fat, low-salt diet, regular exercise, smoking cessation, routine blood pressure checks, and weight reduction. Medications mainly include Aspirin, Nitroglycerin, Beta-blockers, ACE inhibitors or ARBs, Calcium Channel Blockers, and Statins. Medical procedures like percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) may be necessary to open blocked arteries.[10] However, several challenges hinder receiving optimal care and support among MI patients in Jordan, including limited access to healthcare in rural and remote areas and financial constraints, which could lead to delays in timely treatment for MI.[11,12]

In clinical trials and observational studies intended to assess the level of care provided to patients with acute MI, health-related quality of life (HRQOL) is being employed as an outcome measure more frequently. "HRQOL" refers to a multi-dimensional concept encompassing areas associated with social, emotional, mental, and physical functioning. It focuses on the effect of health status on quality of life rather than only direct indicators of population health, life expectancy, and causes of death.[13] Patients' HRQOL is frequently decreased as a result of the disease's life-threatening nature, the requirement for long-term lifestyle modifications, and the treatment regimens following MI.[14]

Previous studies emphasized the significant frequency of psychological distress and the poor quality of life experienced by MI patients.[15] In addition to the negative impact of MI on the emotional state manifested by depression and anxiety symptoms,[16,17] MI causes severe pain,[18] difficulties in making physical activity,[19] and poor overall health, which leads to poor HRQOL.

Inconsistent findings regarding factors associated with poor HRQOL in MI patients have been identified in the literature. An earlier study from China revealed that various factors, such as older age, heart failure, anxiety, and depression, influenced the overall HRQOL of MI patients.[20] Another study indicated that while anxiety and depression were predictors of mental HRQOL, they showed no association with physical HRQOL.[21] In Poland, female gender and the presence of diabetes were found to have a significant association with poor HRQOL in patients with MI.[22] Financial issues, older age, prior coronary artery bypass graft surgery, and depressive symptoms were all independently linked to poor HRQL following acute MI in another study.[23] Therefore, newer research is necessary to narrow down the factors affecting HRQOL. Identifying such factors is a preliminary step for developing future interventions and disease management programs to enhance health outcomes, including HRQOL in patients with MI.

Materials and Methods

Study Design and Subjects

This cross-sectional study was conducted on 333 patients with a history of MI attending the outpatient cardiology clinic at King Abdullah University Hospital (KAUH) in Jordan from April 2022 to August 2022. The diagnosis of MI was established by a cardiologist based on the American Heart Association/American College of Cardiology (AHA/ACC) guideline for evaluating and diagnosing chest pain.[24] The study included patients who were 18 years or older, had a confirmed diagnosis of MI for at least 6 months, and provided a signed consent form. Patients with cognitive impairment were excluded from the study. Eligible participants were approached conveniently and informed that participation was voluntary and they could withdraw at any time. They were also assured that the collected data would be kept confidential and only used for research. During the clinic visits, the research pharmacist (RM) used a customized questionnaire to collect socio-demographic information. RM utilized the medical files to collect information about other comorbidities, such as hypertension, diabetes, dyslipidemia, heart failure, arrhythmia, and chronic kidney disease, in addition to medication-related information. The collected data also included biomedical parameters such as low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), triglycerides (TGs), total cholesterol, glycosylated hemoglobin (HbA1c), systolic blood pressure (SBP), and diastolic blood pressure (DBP).

Study Instruments

The 4-Item Medication Adherence Scale

The validated Arabic version of this survey was used to evaluate medication adherence.[25] The four items were: Do you forget to take your medications? Are you careless about the time you take your medications? Do you stop taking your medications when you feel better? Do you stop taking your medications when you feel worse? Each affirmative response received a score of one, while negative responses were assigned a score of zero, with a total score ranging from 0 to 4. Adherence was categorized into three groups: low for patients with three or more "yes" responses, moderate for those with one or two "yes" responses, and high for those with four "no" responses.

The Specific Beliefs About Medicines Questionnaire (BMQ)

The validated Arabic version of the BMQ was used to assess common personal beliefs regarding the necessity and concerns associated with the use of prescription drugs.[26,27] The BMQ-specific questionnaire comprises 10 items divided into two scales, with 5 items each. Participants responded to the questionnaire using a five-point Likert scale, where 1 represented strong agreement, 2 indicated agreement, 3 denoted uncertainties, 4 indicated disagreement, and 5 represented strong disagreement. The necessity scale items were as follows: 1) My medicine protects me from becoming worse; 2) My health, at present, depends on medicine; 3) My health, in the future, will depend on my medicines; 4) My life would have been impossible without my medicines; 5) Without my medicines, I would be very sick. The concerns scale items were as follows: 1) I sometimes worry about becoming too dependent on medicine; 2) My medicine disrupts my life; 3) I sometimes worry about the long-term effects of medicine; 4) Having to take medicine worries me; 5) My medicine is a mystery to me.

The EQ-5D-3L Questionnaire

The EQ-5D is a commonly used standardized instrument for assessing HRQOL in several contexts, including cardiovascular diseases (CVDs).[28] The validated Arabic version of this instrument[29] was used to evaluate HRQOL in the following five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Patients choose the most relevant statement that represents their health status from three options for each dimension: "no problem", "some problem", and "extreme problem". Due to the absence of a specific value set developed for Middle Eastern populations, the UK time trade-off (TTO) values were utilized. The responses to the five dimensions were represented by standard values ranging from 1.0, indicating full health without any problems in any dimension, to 0.111, indicating severe issues in all five dimensions. Every element of the survey was self-reported, and patients who had trouble answering the questions had the questions read to them without any explanation.

Sample Size Calculation

The following equation was used to compute the minimum sample size required for quantile regression: 50 + 8P, where p is the number of predictors. The original aim of the study was to evaluate the association of the 33 variables with HRQOL. Therefore, the minimum required sample size was 314.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 28. Categorical variables were presented as frequencies and percentages. The normality of the continuous variables was evaluated using Q-Q plots, which indicated a departure from the normal distribution, and therefore, continuous variables were presented as medians with a corresponding 95% confidence level (Cl). To determine the associations between different variables and HRQOL, bivariate analyses were conducted using the Mann–Whitney *U*-test for dichotomous categorical variables, Kruskal–Wallis's test for multinomial categorical variables, and Spearman's Rank correlation for continuous variables. Subsequently, a quantile regression was conducted to identify the variables associated with health-related quality of life. The independent variables with p-values less than 0.2 in the bivariate analysis were included in the regression analysis. A P value of < 0.05 was considered statistically significant.

Results

The study included 333 patients with a history of MI. The median age was 58 years (57–60). The majority of patients were males (75.4%), married (95.8%), physically inactive (82.2%), had low education (64.7%), had low monthly income (68.2%), obese (45.6%) and had a family history of CVD (69%). The sociodemographic characteristics of the study patients are presented in Table 1.

Most of the patients had comorbidities other than MI. The majority of patients had hypertension (92.2%), nearly half of them had diabetes (54.1%) or dyslipidemia (47.7%), while only a few patients had heart failure (12%), arrhythmia (9.3%), and chronic kidney disease (6%). The medians for SBP and DPB were 125 (124–129) and 80 (80–83), respectively. The medians for the patients' lipid profiles were: 4.29 mmol/L (4.15–4.44) for total cholesterol, 1.78

Table 1 Sociodemographic Characteristics of the Study Patients (n=333)

Characteristics		Median 95% (Lower-Upper) or Frequency (%)
Age		58 (57–60)
Gender	Male	251 (75.4%)
	Female	82 (24.6%)
Marital status	Other [a]	14 (4.2%)
	Married	318 (95.8%)
Educational level	Low (less than college/university)	214 (64.7%)
	High (college/university)	117 (35.3%)
Currently employed	No	212 (63.9%)
	Yes	120 (36.1%)
Monthly income	Less than 500 JDs	223 (67.0%)
	More than 500 JDs	110 (33.0%)
Residency	Countryside	141 (42.5%)
	City	191 (57.5%)
Performing regular [b] physical activity	No	272 (82.2%)
	Yes	59 (17.8%)
Smoking	No	192 (57.7%)
	Yes	141 (42.3%)
BMI (Kg/m^2)	<24.9	51 (15.3%)
	25–29.9	130 (39%)
	>30	152 (45.6%)
Family history of CVD	No	103 (31%)
	Yes	229 (69%)
Having comorbidities other than MI	No	71 (21.3%)
	Yes	262 (78.7%)

(*Continued*)

Table 1 (Continued).

Characteristics		Median 95% (Lower-Upper) or Frequency (%)
Comorbidities	Hypertension	307 (92.2%)
	Diabetes	180 (54.1%)
	Dyslipidemia	159 (47.7%)
	Heart failure	40 (12%)
	Arrhythmia	31 (9.3%)
	Chronic kidney disease	20 (6%)

Notes: [a]Single, separated, divorced, or widowed, CVD: Cardiovascular Disease. [b]Regular physical activity refers to the engagement in physical activities, sports, exercise, or other forms of movement on a regular basis—for example, 30 minutes a day, five days a week.
Abbreviation: BMI, Body Mass Index.

mmol/L (1.69–1.95) for TG, 1 mmol/L (0.98–1.04) for HDL-C, and 2.38 mmol/L (2.22–2.56) for LDL-C. Lastly, the median for the HbA1c level was 6.23% (6.10–6.45).

As shown in Table 2, the median for the number of MI medications was 4 (4–5). The median for the total number of patients' medications was 7 (7–8). The most common medication administration frequency was twice daily, accounting

Table 2 Medications Prescribed for the Study Patients (n=333)

Medications		Median 95% (Lower-Upper) or Frequency (%)
Number of MI medications		4 (4–5)
Total number of medications		7 (7–8)
Frequency of drug administration	Once	52 (15.7%)
	Twice	191 (57.5%)
	Thrice or more	89 (26.8%)
Medications for Blood Pressure Control		
Beta-blockers	No	57 (17.1%)
	Yes	276 (82.9%)
ACEIs	No	220 (66.1%)
	Yes	113 (33.9%)
ARBs	No	218 (65.5%)
	Yes	115 (34.5%)
CCBs	No	241 (72.4%)
	Yes	92 (27.6%)
Diuretics	No	198 (59.5%)
	Yes	135 (40.5%)

(*Continued*)

Table 2 (Continued).

Medications		**Median 95% (Lower-Upper) or Frequency (%)**
Vasodilators	No	261 (78.4%)
	Yes	72 (21.6%)
Medications for Lipid control		
Statins	No	15 (4.5%)
	Moderate intensity	76 (22.8%)
	High intensity	242 (72.7%)
Fibrates	No	314 (94.3%)
	Yes	19 (5.7%)
Medications for Blood Glucose Control		
Metformin	No	212 (63.7%)
	Yes	121 (36.3%)
Sulfonylurea	No	286 (85.9%)
	Yes	47 (14.1%)
DPP-4 inhibitors	No	306 (91.9%)
	Yes	27 (8.1%)
Insulin	No	273 (82%)
	Yes	60 (18%)
Antiplatelets		
Antiplatelet	No	20 (6.0%)
	Yes	313 (94.0%)
Aspirin	No	29 (8.7%)
	Yes	304 (91.3%)
Clopidogrel	No	170 (51.1%)
	Yes	163 (48.9%)
Dual antiplatelet therapy	No	179 (53.8%)
	Yes	154 (46.2%)
Anticoagulants		
Warfarin	No	322 (96.7%)
	Yes	11 (3.3%)
Anti-arrhythmic drugs		
Amiodarone	No	323 (97%)
	Yes	10 (3%)

(*Continued*)

Table 2 (Continued).

Medications		Median 95% (Lower-Upper) or Frequency (%)
Digoxin	No	322 (96.7%)
	Yes	11 (3.3%)
Other medications		
PPIs	No	69 (20.7%)
	Yes	264 (79.3%)

Abbreviations: MI, Myocardial Infarction; ACEIs, Angiotensin Converting Enzyme Inhibitors; ARBs, Angiotensin Receptor Blockers; CCBs, Calcium Channel Blockers; DPP-4 inhibitors, Dipeptidyl Peptidase-4 inhibitors; PPIs, Proton Pump inhibitors.

for 57.5% of the patients. The results indicated that the majority of patients received antiplatelet therapy (94.0%), including aspirin (91.3%), clopidogrel (48.9%), or dual antiplatelet therapy (46.2%). At the same time, the least commonly prescribed medications were amiodarone, digoxin, and warfarin (3%, 3.3%, and 3.3%, respectively).

The most commonly reported adherence level was high (45.3%), followed by moderate (43.5%), and lastly low (11.1%). The most reported medication necessity was "My medicines protect me from becoming worse" (84.3%), followed by "Without my medicines, I would be very sick" (71.1%). On the other hand, the least agreed/strongly agreed medication necessity was "My health in the future will depend on my medicines" (36%). The most common medication-related concern was "I sometimes worry about the long-term effects of my medicines" (34.2%), while the least was "My medicines disrupt my life" (14.1%) and "My medicines are a mystery to me" (17.4%). The median for the medication necessity score was 18 (17–20) out of a maximum score of 25, and the median for the medication-related concerns score was 10 (10–11) out of a maximum possible score of 25.

The median of the total EQ-5D score was 0.65 (0.216–0.805) out of a maximum possible score of one. The patients reported moderate or severe pain in pain and discomfort (77.2%), mobility (73.9%), usual activity (64.5%), anxiety and depression (58.5%), and self-care (14.4%) (Figure 1).

As presented in Table 3, Quantile regression revealed that male patients (Coefficient= 0.110, 95%Cl (0.022–0.197), P=0.014) not being diagnosed with diabetes mellitus (Coefficient= 0.154, 95%Cl (0.042–0.266), P=0.007) were associated with increased HRQOL. On the other hand, having the low income (Coefficient= −0.115, 95%Cl (−0.203 -

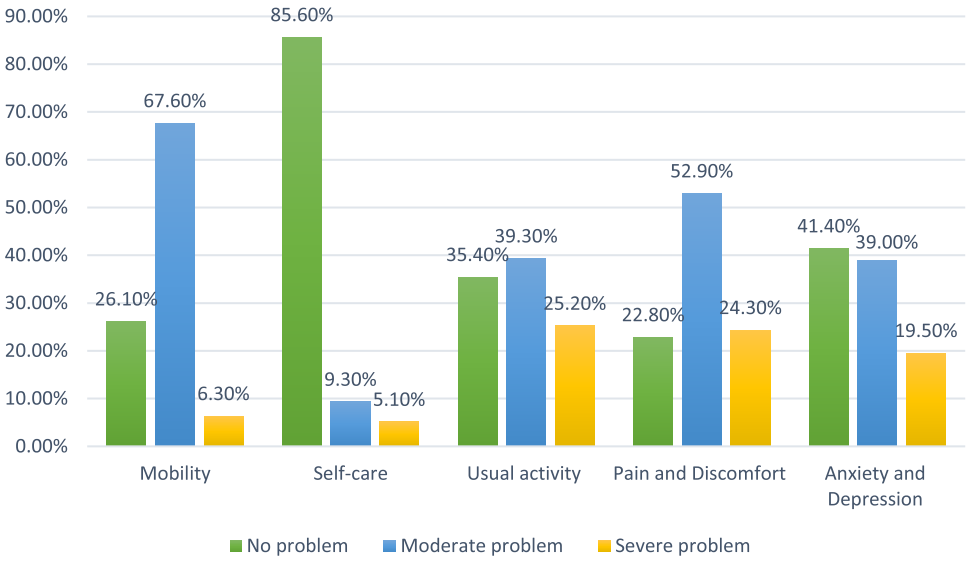

Figure 1 Distribution of the HRQOL of the study participants according to EQ-5D.

Table 3 Multivariate Analysis of the Factors Associated with Health-Related Quality of Life

Variables		Coefficient	95% CI		P value
			Lower Bound	Upper Bound	
Age		−0.003	−0.007	0.001	0.149
Gender	Male	0.110	0.022	0.197	0.014
	Female (REF)	0			
Educational level	Less than college/university	−0.024	−0.115	0.066	0.594
	College/university (REF)	0			
Monthly income	Less than 500 JDs	−0.115	−0.203	−0.026	0.011
	More than 500 JDs (REF)	0			
Performing regular physical activity	No	−0.009	−0.110	0.092	0.861
	Yes (REF)	0			
BMI	<24.9	0.034	−0.079	0.147	0.554
	25–29.9	0.044	−0.038	0.126	0.288
	>30 (REF)	0			
Having diabetes	No	0.154	0.042	0.266	0.007
	Yes (REF)	0			
Presence of heart failure	No	0.084	−0.035	0.203	0.168
	Yes (REF)	0			
Presence of arrhythmia	No	0.133	−0.003	0.268	0.056
	Yes (REF)	0			
Receiving ACEIs	No	−0.020	−0.101	0.061	0.622
	Yes (REF)	0			
Receiving diuretics	No	0.067	−0.014	0.148	0.105
	Yes (REF)	0			
Receiving metformin	No	0.029	−0.077	0.136	0.585
	Yes (REF)	0			
Receiving insulin	No	0.096	−0.011	0.204	0.079
	Yes (REF)	0			
Receiving DPP-4 inhibitor	No	−0.321	−0.462	−0.180	<0.001
	Yes (REF)	0			
Receiving aspirin	No	−0.027	−0.160	0.107	0.693
	Yes (REF)	0			
Receiving PPIs	No	0.088	−0.006	0.182	0.067
	Yes (REF)	0			

(*Continued*)

Table 3 (Continued).

Variables		Coefficient	95% CI		P value
			Lower Bound	Upper Bound	
LDL-C (mmol/L)		−0.030	−0.112	0.052	0.469
Medication-related concerns		−0.008	−0.018	0.001	0.087
Total cholesterol (mmol/L)		0.051	−0.023	0.126	0.176
Adherence level	Low	−0.271	−0.395	−0.147	<0.001
	Moderate	−0.123	−0.202	−0.044	0.002
	High (REF)	0			

Abbreviations: BMI, Body Mass Index; ACEIs, Angiotensin Converting Enzyme Inhibitors; DPP-4 inhibitors, Dipeptidyl Peptidase-4 inhibitors; PPIs, Proton Pump Inhibitors; LDL-C, Low-Density Lipoprotein Cholesterol.

−0.026), P=0.011), not receiving DPP-4 (Dipeptidyl Peptidase-4) inhibitors (Coefficient= −0.321 95%Cl (−0.462 - −0.180), P<0.001), and having low (Coefficient= −0.271, 95%Cl (−0.395 - −0.147), P<0.001) or moderate (Coefficient= −0.123, 95%Cl (−0.202 - −0.044), P=0.002) medication adherence was associated with decreased HRQOL.

Discussion

The present study revealed that patients with MI experienced a significantly diminished HRQOL, as evidenced by a median EQ-5D score of 0.65 (0.216 to 0.805). The majority of participants reported significant impairments in various aspects, including pain and discomfort, mobility, usual activity, and anxiety and depression. Better HRQOL scores were observed among MI patients in studies conducted in different regions worldwide, including China,[30] Thailand,[31] UK,[32] Europe, North America, Latin America, Asia, and Australia.[33] Furthermore, a literature review focusing on HRQOL in patients with different CVD reported EQ-5D mean scores ranging from 0.45 to 0.88 among patients with ischemic heart disease, indicating a consistent pattern of impaired HRQOL.[34] These findings underscore the prevalence of poor HRQOL among patients with MI, emphasizing the need to address this issue effectively. Hence, exploring the contributing factors and developing targeted strategies tailored to their specific needs is imperative.

In alignment with earlier research findings,[33,35–39] the current study results similarly revealed that female patients had significantly lower HRQOL than males. This observation suggests that the psychosocial resources available to women might not be adequate to manage MI effectively alongside their considerable responsibilities at work and within their households. Consequently, this strain could impact their perceptions and coping mechanisms related to cardiac events, potentially leading to a further decline in their HRQOL.[40] Based on these findings, it is crucial for healthcare professionals to become aware of the gender differences in HRQOL among post-MI patients. To address this problem, tailored interventions must be developed to provide women with enhanced psychosocial support, particularly those managing occupational and domestic responsibilities.

The current study observed a significant relationship between diabetes and poor HRQOL among patients with MI. Consistent results were reported in previous studies.[37,41] A study conducted in Jordan among patients with angina reported that elevated fasting blood glucose level was significantly associated with poor HRQOL.[38] According to a study conducted in Malaysia, individuals with type 2 diabetes and CVD exhibited significantly lower HRQOL in comparison to those without CVD.[42] Individuals living with both diabetes and MI often face complex treatment protocols that include medications, dietary modifications, and lifestyle changes. Navigating these demands can lead to increased stress, anxiety, and depression, resulting in a decrease in HRQOL.[43] Moreover, it is recognized that diabetes can exacerbate cardiovascular complications, which can contribute to poor overall health and lower HRQOL.[44] Given the well-established relationship between these two conditions and their negative impact on HRQOL, healthcare professionals must develop tailored treatment plans that include medication management, dietary guidance, and lifestyle modifications while also

providing psychological support to manage the increased stress, anxiety, and depression that often accompany coexisting diabetes with MI, leading to enhanced HRQOL for these patients.

Consistent with the results reported in the previous research,[21,45–48] the current study established a clear association between lower income and lower HRQOL in individuals with MI. This relationship can be justified by the recognition that low-income people face an increased vulnerability to financial stress. While their income may cover basic needs, it often fails to provide a buffer against unexpected medical expenses and other incidental costs.[49] These financial pressures can amplify stress levels and thus reduce the overall HRQOL of patients with MI. This underscores the crucial need to focus on this specific subgroup of patients when designing targeted interventions to enhance HRQOL for patients with MI.

Patients receiving DPP-4 inhibitors in the present study had significantly better HRQOL than those not. A case-control study involving over 180 thousand individuals discovered that DPP-4 inhibitor therapy improved long-term survival in diabetic patients following their first MI.[50] Various animal studies have highlighted the cardioprotective benefits of DPP-4 inhibitors, including the reduction of reperfusion injury, an elevation in the ventricular fibrillation threshold during ischemic periods, stimulation of antiapoptotic mechanisms, mitigation of oxidative stress, diminishment of infarct size, inhibition of atherosclerosis, and suppression of vascular smooth muscle cell proliferation.[51–54] Further prospective randomized trials have revealed that DPP-4 inhibitors can enhance coronary flow reserve and left ventricular ejection fraction. These studies also demonstrated their potential to lead to regression of coronary artery plaques and a decrease in major cardiovascular events.[55,56] While these advantageous effects might indirectly contribute to the improved HRQOL of diabetic patients post-MI, a direct correlation necessitates further investigation.

The current investigation discovered a strong association between medication non-adherence and a lower quality of life related to health (HRQOL). An earlier study observed a clear link between adhering to medication schedules and physical HRQOL in patients with MI, though no such link was found with mental HRQOL. Nevertheless, patients with higher levels of depressive symptoms were less likely to stick to medication plans.[57] Another study following a group of MI patients found a significant correlation between medication adherence and HRQOL.[58] Similarly, a study involving heart failure patients noted that those who did not adhere to their prescribed medications had lower HRQOL and a higher likelihood of experiencing heart-related issues.[59] Adhering to medication plans is influenced by several crucial factors for consistent treatment adherence. Among these factors, individuals' perspectives regarding their medications have a significant impact, especially regarding how vital they perceive the medications to be and their concerns about potential side effects.[60,61] This study revealed that merely 36% of the participants believed that their future well-being relied on the prescribed medications, and an additional 34.2% expressed concerns about the potential long-term effects of these medications. These findings emphasize the importance of addressing medication-related beliefs and concerns to optimize medication adherence and, thus, HRQOL for MI patients. Accomplishing this objective involves providing accurate information about the necessity of medications, addressing concerns about long-term effects, and involving patients in shared decision-making.

Despite allowing for the investigation of multiple factors and relationships between several variables to provide insights for interventions, the cross-sectional design in this study does not guarantee the cause-and-effect relationship as it is a snapshot in timing. In a cross-sectional study, subjects may be asked to recall past experiences, opinions, or feelings, resulting in a recall bias. On the other hand, a prospective cohort design tracks participants and collects data over time. This design can yield more precise and accurate data with less reliance on participant recall. In addition, patients were recruited from one hospital in the north of Jordan, which can affect the sample representation. Furthermore, the accuracy of patients' responses may have been impacted by the social desirability bias associated with using a self-reported questionnaire. This can lead participants to give responses they think are more desirable or socially acceptable than those that accurately reflect their beliefs or behaviors. Moreover, selection bias may have resulted from this study's convenient sampling method. Finally, patients with ST-elevation MI made up the majority of the study sample, whereas the percentage of patients with non-ST elevation MI was relatively low. Due to the small sample size in each group, classifying them as STEMI and NSTEMI may not offer meaningful subgroup analysis. Consequently, rather than comparing HRQOL between patients with STEMI and NSTEMI, the present study focused on evaluating HRQOL in a general MI population.

Conclusions

The present study has highlighted a decline in HRQOL among patients with MI. Being female, having diabetes, lower income, not using DPP-4 inhibitors, and non-adherence to prescribed medications emerged as significant contributors to this diminished HRQOL. Male-female differences in psychosocial factors and coping mechanisms with MI, complex health needs and a higher risk of complications from diabetes, financial constraints limiting access to healthcare services, lack of potential cardioprotective effects from DPP-4 inhibitors, poor treatment outcomes and a higher risk of complications from non-adherence to medication can all justify the impact of these factors on HRQOL. Future pharmaceutical care services must tackle obstacles to medication adherence following an MI, and customized interventions need to be developed to effectively address these challenges, aiming to establish an optimal HRQOL in patients with MI, particularly among female patients, diabetic patients, and those with low income. As for forthcoming research directions, it is imperative to directly investigate the effect of the utilization of DPP-4 inhibitors on HRQOL in this population of patients.

Abbreviations

ACEIs, angiotensin-converting enzyme inhibitors; AHA/ACC, American heart association/American college of cardiology; ARBs, angiotensin receptor blockers; BMI, body mass index; BMQ, beliefs about medicines questionnaire; CCBs, calcium channel blockers; Cl, confidence level; CVD, cardiovascular disease; DBP, diastolic blood pressure; DPP-4, dipeptidyl peptidase −4; HbA1c, glycosylated hemoglobin; HDL-C, high-density lipoprotein cholesterol; HRQOL, health-related quality of life; KAUH, king Abdullah university hospital; LDL-C, low-density lipoprotein cholesterol; MI, myocardial infarction; PPIs, proton pump inhibitors; SBP, systolic blood pressure; SPSS, statistical package for the social sciences; TG, triglyceride; TTO, time trade-off; WHO, world health organization.

Data Sharing Statement

All data generated and/or analyzed in the current study will be available from the corresponding author upon reasonable request.

Ethics Approval

The study was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving human subjects. Ethical approval was obtained from the Institutional Review Board (IRB) of KAUH at Jordan University of Science and Technology on 02/03/2022 (Ref. #97/147/2022).

Consent to Participate

An informed consent was obtained from all the subjects who agreed to participate in the study.

Disclosure

The authors declare that they have no competing interests.

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