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Predictors for Health-Related Quality of Life among Jordanian Patients with Coronary Artery Disease

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Abstract

Background: Coronary Artery Disease is a disease with high morbidity and mortality worldwide. A range of factors, including sociodemographic characteristics, health literacy, and social support, are linked to the disease prognoses in patients with coronary artery disease, which affect the health-related quality of life for patients. The purpose of this study was to examine the impact of socio-demographic, health literacy, and social support as predictors of health-related quality of life among Jordanian patients with Coronary Artery Disease after one month of being discharged from hospital.

Methods: Using a correlational design, a consecutive sample of patients with acute coronary artery disease treated by medical intervention (n = 180) was recruited in 2023, from a military hospital in Amman and surveyed through self-administered questionnaires that included sociodemographic characteristics, health literacy questionnaires, medical outcome social support survey, and a health-related quality of life survey (RAND-36 SF).

Results: The participants of this study generally perceived their physical and mental health-related quality of life as low (46.16 ± 18.86; 43.82 ± 15.72,0ut of 100 respectively). There was a significant relationship between health-related quality of life, health literacy, and social support. In the final multiple linear regression model, the predictors for physical health-related quality of life were educational level(P= .001), chronic disease(P=.03), social support(P= .001), and health literacy(P= .001). The predictors for mental health were educational level(P= .002), gender(P= .020), and health literacy(P= .036).

Conclusions: Directed clinical and administrative efforts toward assessing and enhancing health literacy and social support levels with consideration for sociodemographic characteristics are required and must be followed with an intervention plan to address barriers to wellbeing in this population.

Keywords: Health Related Quality of Life, Health Literacy, Social Support, Coronary Artery Disease, Jordan.

Introduction

Coronary Artery Disease (CAD) is a global disease with high morbidity and mortality rates Lu et al., 2020)., Coronary artery disease is the leading cause of death globally, causing nine million fatalities in 2019 and requiring long-term treatment and patient education to manage (Choo et al., 2019). Treatment can halt CAD progression, while lifestyle changes and medication use can reduce risk. However, sustaining health promotion practices may be challenging (Roth et al., 2020).

Jordan's rank in the world related to death from cardiac disease is 111. Jordan recorded 4.856 deaths from coronary heart disease, which equals 18.6% of the total deaths (WHO, 2020). According to the Institute for Health Metrics and Evaluation (IHME), Jordan has a high prevalence of ischemic heart disease, which is responsible for 54.7 % of the country's annual deaths (IHME, 2017).

Health related Quality of Life (HRQoL) is a crucial indicator of how well a treatment is working, but it's unclear what factors influence the HRQoL in patients with CAD due to physical, social, and emotional constraints. It cannot be predicted based on illness severity, treatments, or clinical condition post-discharge (Ahn, 2016). Health Related Quality of Life includes psychological, biological, emotional, cognitive, personal, and environmental factors (Etxeberria et al., 2019). Current management of CAD should prioritize improving HRQoL and reducing morbidity and death. Stressful life events and lack of social support for patients with CAD, particularly women, are significant. Targeted care for patients with high stress levels and lack of social support is crucial for designing cardiac rehabilitation programs. Improved HRQoL should be the goal of successful public health initiatives (González-Chica et al., 2016).

Health Literacy (HL) refers to cognitive and social skills that enable individuals to effectively understand and apply health information (Hong, 2015). Research shows that HL correlates with increased physical activity, healthier diet, and better self-reported health status in people with CAD, and with active engagement with healthcare practitioners (Hong, 2015). Health literacy significantly impacts patients' ability to manage illness and care for themselves. Inadequate HL leads to higher hospitalization, illness development, and fatality rates (Barton et al., 2018). Chronic diseases, low income, and inadequate education are more likely to affect the HL level (Aaby et al., 2017). Patients with chronic CAD need adequate HL to manage risk factors and improve their quality of life. Poor physical functioning is due to inadequate HL, and adequate HL can enhance HRQOL (Nelson and Doust, 2014).

Social support (SS) is widely defined as the availability or presence of others on whom one may rely and result in feeling valued, appreciated, and loved (Vaglio et al., 2004). Social support has several positive effects on individuals' general health and wellbeing. In particular, among older persons with prior life stressors like illness, SS from a range of sources (family, friends, and community) has been linked to better physical health outcomes and better mental health (Wang et al., 2018). Additionally, research has indicated that persons who have sufficient SS are less likely to experience the negative long-term impacts of life stressors (such as poor emotional health, a pessimistic attitude, hospitalization, and poor survival) (Bouchard et al., 2017). Importantly, a risk factor for people that may be modified is a lack of SS, but a thorough examination of the social environment is necessary before intervention can be developed (Moser et al., 2012).

A wide range of health outcomes, including death rates, are improved by SS (Pushkarev et al., 2019). It enhances psychological and emotional functioning, healthy lifestyles, work functioning, and post-traumatic growth (Alaloul et al., 2021). Social support may assist patients and survivors in enhancing their psychological functioning by motivating them to adhere to their therapies more closely and changing their health alterations in their immune system and behavior (Gonzalez-Saenz et al., 2017).

Adaptation to cardiovascular disease varies based on factors like psychological makeup, stress vulnerability, socioeconomic variables, and HL levels. This study aimed to determine the predictors for the HRQoL among patients with CAD in Jordan.

Method

Design: A descriptive correlational design was used for the purpose of this study.

Settings

The Queen Alia Heart Institute(QAHI)within the royal medical health services was the setting for this study because it is a referral center for all governorates in Jordan, which means researcher can find a representative sample from all Jordanian patients. One of the region's specialized cardiac centers, Queen Alia Heart Institute offers medicinal and surgical therapies for patients with cardiac disease that are both diagnostic and therapeutic. It can accommodate 193 patients and has a greater than 95% occupancy rate. It has six cardiac surgery theaters for both adults and children, as well as five cardiac catheterization labs. The Queen Alia Heart Institute has a 24-bed Coronary Care Unit (CCU), an adult post-cardiac surgery intensive care unit with 16 beds and a pediatric post-cardiac surgery intensive care unit with 8 beds. The facility comprises four floors, including medical-surgical wards for men, women, and children. Different cardiac patients from Jordan and other nations are treated in these wards. Patients with acute coronary artery disease were chosen for this study from the CCU.

Population and Sample

The target population of this study was all adult Jordanian patients with CAD. The accessible population was adult Jordanian patients who had been admitted to the center. A consecutive sample of all eligible adult patients who have CAD and were admitted to the center during the period of data collection (from the middle of November 2022 to the end of March 2023) were recruited. Patients who met the inclusion criteria were contacted on admission after stabilization, a consent form was obtained; and then they were asked to answer questions about their sociodemographic characteristics, HL, and SS surveys on the day of discharge. After one month of being discharged, patients were contacted by phone to answer the questionnaire to assess HL, SS and HRQoL levels.

The proposed sample size was calculated using G*Power 3.1.9.2 for Windows. The power was chosen at 0.90, with an alpha of 0.05, a medium effect size of 0.15, and a number of predictors of 11. The estimation was based on “Linearmultiple regression: Fixed model, R2 deviation from zero." The minimum sample size for this study was 152. The researcher increased the sample by at least 20% to compensate the attrition to 182 participants. For this study, there were 180 participants.

Inclusion and Exclusion Criteria

Jordanian Patients hospitalized with CAD for medical interventions, aged 18 years or above, able to read and understand the Arabic language, and able to provide informed consent and have access to a phone were included in the study. Any patients with cognitive impairment, discharged to another health care facility and/ or who had physical limitations that would make it

impossible to fill out forms (e.g., blindness, deafness) were excluded.

Ethical Considerations

Approval was obtained from the Institutional Review Board (IRB) at the University of Jordan and the hospital ethical committee before data collection. After that, a brief summary was presented to the hospital manager and head nurse. Then, the researcher contacted the participants who were admitted at the time of data collection and who met the eligibility criteria to explain the goal of the study, how to obtain data, and how to sign a consent form. Patients also had the opportunity to ask questions regarding this study. Participation was voluntary, and participants had the right to withdraw from the study at any time. participants confidentiality was guaranteed during the study. The patient's data was protected and saved on the researcher's personal computer, soft copy materials were stored on a password-protected computer; and the study's hard copy materials were stored in a locked cabinet in a locked office. Only the researcher had access to the participants' data.

Measurement and Instruments

There were four main instruments used in the study: socio-demographic, health literacy questionnaire, medical outcome social support survey, and RAND SF-36 item health survey. In the current study, the researcher measures health related quality of life. The Short Form-36 (SF-36) health status survey RAND version 1 was used, which includes eight subscales: physical functioning, social functioning, role limitations due to physical health, role limitations due to emotional problems, emotional well-being, energy/fatigue, pain, and general health perception. The HRQoL subscales are divided into two health dimensions: physical health and mental health. Each item is scored on 0 to 100 scale; the higher score, the higher level of HRQoL among participants (Ware and Sherbourne, 1992).The medical outcome social support survey19 items are divided into five subscales. tangible support, affectionate (three items, positive social interaction, emotional or informational support and mindset with the following response possibilities on a 5-point scale: never = 1, hardly ever = 2, occasionally = 3, frequently = 4, and always = 5. After that, subscale and overall scale scores were transformed to a 0-100 A higher score indicates greater support (Martín-Carbonelland Pérez-Díaz, 2022; Sherbourne and Stewart, 1991).

The 44 items of the Health Literacy Questionnaire cover nine conceptually separate areas of health literacy as subscales. Feeling understood and supported by healthcare providers, having sufficient information to manage my health, managing my health actively, social support for health, appraisal of health information, ability to actively engage with healthcare providers, navigation the healthcare system, ability to find good health information, understand health information well enough to know what to do. The nature and content of the items influence the range of answers for each scale. Strongly disagree = 1, disagree = 2, agree = 3, and strongly agree = 4 are the four-point ordinal response options for subscales one to five, while cannot do = 1, very difficult = 2, quite difficult = 3, quite easy = 4, and very easy = 5 are the five-point ordinal response possibilities for subscales six to nine (Beauchamp et al., 2015).

Data Collection Procedure

Patients with CAD were recruited and screened for eligibility. The study objectives were explained to eligible participants, who completed a socio-demographic survey, HL, and SS questionnaires. The researcher contacted participants after one month of

discharge and asked questions about the three scales. If participants declined, another patient was chosen until the target sample size was reached. Participants were sincerely thanked and informed of the study findings.

Data Management

The entered data were checked for accuracy through performing ascending and descending sorting for each variable. Screening and cleaning the data were completed by running the frequencies for every variable and examining those frequencies carefully for invalid, unusual values, missing data, and adequate variability. There was no missing data. The study scale variables in terms of normality, skewness, and kurtosis were evaluated using frequency tables, histograms, and scatterplots. The results showed that all variables had no outliers. Actively checking for skewness, the results showed that all scales variables had no skewness and were normally distributed, ranging between + 2 and - 2 (George and Mallery, 2010).

Results

Sociodemographic Characteristics of the Sample

A total of 180 questionnaires were completed by the patients with coronary artery disease, with a desirable response rate of 96%. Results Table 1 indicated that the participants had a mean age of 54.32 (SD = 9.13) years. The majority of participants were males 86.1% (n = 155). married 94.4% (n = 170) and had at least one chronic disease 68.3% (n = 123). Regarding educational level, 49.4% (n = 89) of participants held a secondary school degree, 21.7% (n = 39) held a bachelor's degree, 17.8% (n = 32) held a primary school degree, and 11.1% (n = 20) held a diploma degree. for working status, 55% (n = 99) of participants were not working, while 45% (n = 81) were working. The participants' monthly income ranged from 34.4% (n = 62) for the 601–800 JD category to 15% (n = 27) for the 200–400 JD category.

Table 1: Characteristics of the Study Participants (N= 180).

Characteristics	M ± SD	n	(%)
Age	54.32± 9.13		
Gender			
Male		155	86.1
Female		25	13.9
Education			
Primary		32	17.8
Secondary		89	49.4
Diploma		20	11.1
Bachelor		39	21.7
Marital Status			
Single		10	5.6
Married		170	94.4
others		0	0
Work			
No		99	55
Yes		81	45
Income			
200-400 JD		27	15
401-600 JD		31	17.2
601-800 JD		62	34.4
801-1000 JD		32	17.8
More than 1000 JD		28	15.6
Chronic Disease			
No		57	31.7
Yes		123	68.3

M= mean, SD= standard deviation, n= number, % = percentage.

In this study, the physical health related quality of life total score mean was 46.16 ± 18.86 higher than the mental health related quality of life total score means 43.82 ± 15.72.

The SS total score mean is 82.12 (SD = 17.71). Mindset is the highest subscale, with a mean of 87.22 (SD =

12.78). the lowest subscale is affectionate support, with a mean of 79.54 (SD = 19.58). The highest subscale of health literacy nine subscales is "Social support for health," with a mean of 3.18 (SD = 0.51). the lowest subscale is "Actively managing my health," with a mean of 2.58 (SD = .60).

Health Related Quality of Life Predictors

Multiple linear regression was used to predict the value of dependent variable (mental table 2and physical health related quality of life) based on the provided values of independent variables (predictors).

Table 2: Predictors of Mental Health Related Quality of Life.

Variables	B	β	t	Toleranc	VIF	p
Model	29.069		3.107			< 0.001
bachelor	- 8.663	-.228	-3.112	.934	1.071	.002
gender	- 7.803	-.172	-2.342	.925	1.081	.020
HL	5.495	.175	2.345	.902	1.109	.020

Analysis revealed that the final four factors model (regression equation) was significant $F_{(4,175)}$ = (6.303, P <.001). The overall model fits ΔR^2 = 0.106, which indicate that this model has explained about 10.6% of the variance of mental HRQoL among patients with CAD. Mental HRQoL among patients with coronary artery disease decreased by 8.663 point for the bachelor degree compared to the secondary degree (B = - 8.663, P =.002). Also, mental HRQoL was significantly predicted by participant gender (B = - 7.803, P =.020). Female patients have lower mental health score by 7.803 than male (the code: male = 1, female = 2). Moreover, quality of life among patients with CAD was significantly predicted by their HL level (B = 5.495, P =.020). when the HL increased by one point, the mental health increased by 5.495 point as well.

To predict the physical HRQoL for patients with acute CAD. Backward stepwise regression was used Table 3 by entering the significant independent variables (HL, SS, chronic disease and education) to determine the most predictable variables.

Table 3: Predictors of Physical Health Related Quality of Life.

Variables	B	β	t	Tolerance	VIF	p
Model	27.599		3.183			.002
Diploma	14.860	.248	3.587	.989	1.011	< 0.001
Social support	.258	.263	3.738	.959	1.043	< 0.001
HL	7.818	.276	3.988	.986	1.014	< 0.001
Chronic disease	- 8.560	-.212	-3.034	.973	1.027	.003

Analysis revealed that the final four factors model (regression equation) was significant $F_{(4,175)}$ = (9.016, P <.001). The overall model fits ΔR^2 is 0.152, which indicate that this model has explained about 15.2 % of the variance of physical HRQoL among patients with CAD. Physical HRQoL was significantly predicted by educational level (B = 14.860, P < .001), which means patients with diploma degree have increased in their physical health by 14.860 units than patients with secondary degree. Social support level is positive predictor (B = .258, P <.001), when SS increased by one unit, the physical health increased by .258 units. Also, quality of life among patients with CAD was significantly predicted by their HL level (B = 7.818, P <.001). which mean increasing HL by one unit increased physical health by 7.818 unit. As well, physical HRQoL was significantly predicted by presence of chronic disease (B = - 8.560, P = .003). Presence of chronic disease has decreased physical health by 8.560 unit.

Discussion

The demographic characteristics of the participants in this study are similar to those of the general population. In terms of gender, 86.1% of the participants were male. This percentage is congruent to the studies finding

conducted on Jordanian patients with CAD (Aljabery et al., 2022; Nemer; Al-Motassem and AbuRuz.2008; Malak, 2022; Raffee et al., 2020; Tawalbeh et al., 2015). This finding might be explained by the fact that men are more likely than women to develop CAD due to physiological differences, but women can get the condition after menopause (Kanderet al. 2017).

The participant mean age was 54.32% ± 9.13 years. This result is congruent to Tawalbeh et al. (2015) result; the mean for the patient's age was 54 ± 11.49years. Al-Motassem et al. (2008) found that patients had an average age of 57.6 years. And in Aljabery et al., (2022) results, the participant mean age was around 55.20 ±10.45 years.

The educational level of the current study participants varied from primary to bachelor's degree. Secondary school is the highest category (49.4%), followed by bachelor's degree (21.7%). This finding is similar to Jordanian study that recruited patients with CAD, in the same current study setting, researchers found that the educational levels of the participants varied from secondary (52.6%) to higher than secondary (47.4%) (Nemer and Malak. 2022). While Tawalbeh et al. (2015) found that participants with a secondary level were 27.50% and participants with more than a secondary level were 29.50%. Aljabery et al. (2022) found that participants with secondary school grades below 42.7% and high school grades below 26.3%. The observed result might be attributed to several factors. Firstly, it is important to consider that educational opportunities before 63 years in Jordan are not uniformly accessible to all citizens, which may have influenced the participants' educational levels. Additionally, the age distribution of the participants in this study aligns with the fact that older individuals typically have limited opportunities to pursue advanced degrees due to various life circumstances. More than half 55% of the study participants were not working (mainly retired). This finding is similar to Tawalbeh et al. (2015) finding of around 58.43% of participants not working and not similar to Aljabery et al. (2008) findings of around 59.7% of participants working.

The majority of participants were married 94.4%. This finding is consistent with Nemer and Malak. (2022) finding that around 90.8% of participants were married. And Tawalbeh et al. (2015) study found that around 65% of participants were married. And around 86.8% of participants were married (Aljabery et al., 2008). The majority of participants 68.3% have chronic diseases; this result is congruent to Al-Motassem et al. (2007) findings, in which 86.3% of participants have hypertension and 93.3% have diabetes. Furthermore, more than half of the participants 54.8% had hypertension, 40.6% were diabetic, and 54.0% had dyslipidemia (Aljabery et al., 2017).

The current study result revealed that the predictors for HRQoL among patients in Jordan with coronary artery disease after one month of being discharged are educational level, HL level, and gender for mental health. while education, SS level, HL level, and the presence of chronic disease predicted physical health.

The current study result is congruent with recent studies results (Santoso et al. 2017; Yujeong, 2022). where researchers found that patients who have difficulties in daily tasks due to the presence of chronic diseases have a low quality of life in comparison to those who did not previously have health problems. Patients with significant functional impairments and those receiving family care need intervention measures aimed at enhancing quality of life (Santoso et al. 2017;Yujeong, 2022).

Chronic diseases, such as diabetes, hypertension, arthritis, etc. have a significant impact on physical HRQoL. Having a chronic disease can affect patients daily functioning, mobility, and overall well-being. The presence of a chronic disease can also influence one's access to healthcare, social support, and self-management abilities (Al-Azzam, et al., 2016). Understanding and considering chronic disease as a predictor helps identify patients who may have specific needs and require targeted interventions to enhance their physical well-being and quality of life (Al-Azzam, et al., 2016; Doocyet al., 2015).

Patients who had a high level of social and tangible support had a higher quality of life. Low SS levels significantly and independently increased the risk of death in CAD patients after PCI and were correlated with age and gender (Jo et al., 2020; Santoso et al. 2017).Social support plays a crucial role in maintaining physical health and well-being. Having strong social connections and a support network can provide practical assistance, encouragement, and emotional support, which can positively impact patients' physical health (Jo et al., 2020). Social support can help patients adhere to treatment plans, engage in healthy behaviors, and manage stress, all of which contribute to improved physical HRQoL (Santoso et al. 2017) .

Among Jordanian patients with cardiac disease researchers found that SS defined 60% of the variation in healthy lifestyle observance (Tawalbeh et al. 2015). Evidence indicates that family members—especially married ones—support one another. (Rambod & Rafii, 2010)

health literacy and SS explained 22% of the variance in self-care behaviors. Researchers found that a lower level of HRQoL was associated with low social support, female patients, and the presence of disease (Pushkarev et al., 2019).

Gender is a sociocultural factor that can influence mental health experiences and outcomes (Al-Shannaqetal., 2021). In this study men have better mental health than women participants, this result might be explained by the nature of Jordanian society since men and women may have different social roles, expectations, and societal pressures that can impact their mental health. It is well known that women are typically in charge of taking care of other people, such as their families and children, as well as household duties (Kawar.2013). Another factor could be that Arab women typically put the demands of their families and children before their own health, which frequently results in their being too occupied to take care of themselves. Prioritizing others could affect women's psychological health and quality of life(Al-Shannaq et al., 2021; Taha.2014).High HRQoL is associated with education. health literacy ($P < .001$) and social support ($P < .001$) were significant factors in self-care behaviors in older adults with heart failure (Bosworth et al., 2000)

This study result might be explained by the fact that educational attainment is often associated with various psychosocial factors that can influence mental health and well-being. Higher levels of education are generally linked to better cognitive abilities, problem-solving skills, and access to resources, including health information (Raghupathi & Raghupathi. 2020). Individuals with higher education levels may have greater awareness of physical and mental health issues, better coping strategies, and the ability to seek appropriate support, leading to improved physical and mental HRQoL (Chevalier& Feinstein, 2006). health literacy is the ability to understand, process, and use health-related information effectively.(Berkman et l.,

2010). In the context of mental health, patients with higher health literacy have the ability to recognize and understand symptoms, access appropriate mental health services, and engage in self-management plans. (Tambling et al., 2023). Adequate HL empowers patients to make informed decisions about their mental health, seek timely treatment, and engage in approaches that promote mental well-being, positively impacting their mental domain of health-related quality of life.(Krist et al., 2017). In the context of physical health, patients with higher HL have the ability to access, understand, and comprehend health information that received from the health care workers regarding medication adherence, lifestyle modifications, healthy food, exercises, and daily routine to prevent complications and further deterioration(Aburadwan and Hayajneh, 2024;Wang et al., 2016; Yujeong. 2022). For example, Jordanian people have inadequate levels of HL which affects their medication adherence(Al- Ali and Telfah, 2023).

Implications

Health literacy in Arab countries and Jordan is crucial for understanding population's health information usage, enabling informed interventions and policy-making to improve health outcomes. Understanding the impact of SS and HL on HRQoL can help healthcare workers, particularly nurses, assess and educate patients with acute CAD, promoting HL and enhancing patient quality of life. (Wang et al., 2018). Jordanian hospitals and cardiac centers are underinvesting in HL among patients with CAD, leading to recurrent admissions and potentially fatal complications. Additionally, as shown in this study and other studies (Aljabery et al., 2022; Nemer; Al-Motassem and Abu Ruz.2008; Malak, 2022; Raffee et al., 2020; Tawalbeh et al., 2015).), CAD occurs at a younger age in Jordanians, which makes HL critical to avoidingfuture CAD events and extending life spans. The study provides baseline data that can help health care professionals develop programs to improve HL, and HRQoL.

The results of this study could fill a gap in literature and spark research interest. It also encourages integrating HL into student curricula and implementing health literacy programs as national goals. This study explores the impact of socio demographic characteristics, SS, and HL on the quality of life of patients with CAD in Jordan. Gender-based discrimination can affect (Al-Shannaq et al., 2021) help-seeking behaviors and access to health services. Considering gender as a predictor helps identify potential disparities and design interventions that address the unique mental health needs of different gender groups, thereby influencing the mental domain of health-related quality of life. Future research on Jordanian women is critical as this study and most others mostly have recruited men. The lower levels of SS in women, indicate the need to explore CAD, HRQoL, SS in this population.

Conclusion

The study investigates the impact of socio-demographic, HL, and SS on HRQoL among Jordanian patients with acute coronary artery disease. The findings can inform healthcare workers, policymakers, and education about the predictors that significantly affect health-related quality of life. Health literacy and SS must be assessed upon admission, and patient education programs should focus on all levels of HL. In-service continuing education programs should include specific lectures and workshops on these concepts. The study's findings can guide healthcare administrators in allocating resources effectively, prioritizing interventions that improve patient outcomes and satisfaction. The findings can also serve as a basis for future research to examine the predictors and their impact on HRQoL. Comparative

studies across different regions or countries can help identify similarities and differences in predictors, and longitudinal studies can manifest HRQoL over time. The study findings are consistent with some studies conducted in other countries, but further research and clinical practices are needed to enhance knowledge in this area.

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