Health- Related Quality of Life Among Spouses of Patients After Coronary Artery Bypass Grafting Versus Spouses of Healthy Individuals: A Comparative Descriptive – Analytical Study

Abstract

Aims: Coronary artery bypass grafting(CABG) is a common cardiac procedure, and spouse frequently assume substantial caregiving responsibilities during the postoperative period. This study aimed to compare Health-Related Quality of Life (HRQoL) among spouses of **Patients** after CABG and spousesof healthy individuals.

Participants & Methods: Utilizing a comparative, descriptive-analytical design, we enrolled 200 participants: 100 spouses of patients recovering from CABGand 100 spouses of healthy counterparts. Participants were recruited via convenience sampling. Quality of life was assessed through the SF-36 Health Survey, with statistical analyses performed using SPSS (v. 22).

Findings: The data indicate that spouses of patients after CABG scored significantly lower across all eight SF-36 dimensions, as well as the Physical component summary(PCS) and Mental component summary(MCS), compared to the healthy control group. Independent-sample t-tests validated these disparities as statistically significant ($p < 0.05$ for all comparisons),indicating a significant decline in both physical and mental well-being among the caregiving spouses.

Conclusion: Spouses of patients after CABG represent a high-risk group that remains largely underserved within the healthcare continuum. Further research is needed to determine whether sustained clinical attention, psychological counseling, and longitudinal follow-up benefit these spouses. Nurses, as frontline providers,may be well positioned to help address this gap. Future studies should examine the feasibility and potential value of integrating spouse-centered assessments into routine post-operative care. Future research should evaluate whether holistic models-incorporaing dyadic education, family therapy, and structured referral systems can support caregiver well-being and family recovery.

Keywords: Coronary artery bypass grafting (CABG), Spouses; Health-Related Quality of Life; Caregiver Burden; Psychosocial Support.

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Introduction

Coronary Artery Disease (CAD) remains one of the most prevalent chronic conditions globally, accounting for an estimated 17.9 million deaths annually [1-3]. The epidemiological landscape in Iran is particularly concerning, with 97% of patients exhibiting at least one cardiovascular risk factor. While pharmacological treatments and percutaneous interventions are frontline strategies, Coronary Artery Bypass Grafting (CABG) becomes imperative when conventional medical techniques fail to halt symptomatic progression [1].

However, the recovery trajectory following CABG is often fraught with challenges. Patients frequently report persistent pain, psychological distress, depressive symptoms, and perceived functional decline relative to their preoperative baseline; these factors are associated with poorer overall Quality of Life (QoL) [4]. As functional limitations increase,care often shifts to the home environment,where family members frequently assume substantial caregiving responsibilities [5]. The long-term consequences of chronic cardiac illness are not limited to the patients but also their partners [2, 3]. As the primary caregiver and the individual with the deepest emotional and cognitive ties to the patient, the spouse often experiences significant changes in lifestyle and daily routines .Previous studies have reported that living with a spouse with a chronic illness is associated with poorer physical and mental health in the partner[6, 7]. Previous studies have reported heigher levels of stress, anxiety and depression among these spouses Compared with non-caregiving peers [7].

The onset of chronic conditions, particularly cardiovascular diseases,is frequently accompanied by substantial changes in the lifestyle and Quality of Life (QoL) of both patients and their spouses [1, 2]. In most instances, the spouse assumes the role of the primary caregiver, taking on the responsibility of monitoring the disease progression, ensuring medication adherence, recognizing red flags of exacerbation, and coordinating medical consultations [8].

Furthermore, the quality of interpersonal dynamics within a marriage significantly influences health outcomes, both directly and indirectly, by bolstering resilience against illness [9, 10]. Indeed, enhancing the caregiver's own Quality of Life can foster greater life satisfaction for both parties and effectively alleviate the caregiver burden [11].

Over the past three decades, Quality of Life (QoL) has emerged as a cornerstone of clinical research and a pivotal metric in the management of cardiovascular patients. It serves as a sophisticated tool for

differentiating patient profiles, predicting clinical outcomes, and evaluating the efficacy of therapeutic interventions [12]. Insights into QoL facilitate a deeper understanding of disease sequelae and medical decision-making across diverse age groups and cultural landscapes [13]. Furthermore, QoL assessments function as an essential barometer for measuring the psychosocial burden inherent in chronic illness [14].
Notably, European scholars integrated the dimension of mental health into the QoL framework a domain previously restricted to psychiatry—thereby lending scientific rigor to this multifaceted construct [15]. According to the World Health Organization (WHO), QoL is defined as an individual's perception of their position in life within the context of their culture and value systems, influenced by physical health, psychological state, level of independence, and social relationships [13]. This multidimensional concept encapsulates an individual's perceived well-being across physical, emotional, and social domains, which may be modulated by health status or broader life circumstances [16]. Ultimately, QoL reflects the perceived gap between an individual's current reality and their aspirations [11].
Over the past three decades, Quality of Life (QoL) has emerged as a pivotal metric in managing cardiovascular patients, serving as a sophisticated tool for predicting clinical outcomes and evaluating the efficacy of therapeutic interventions [12,13].
Within this framework, the physical domain pertains to somatic health and functional capacity. The psychological domain involves emotional well-being, cognitive clarity, and mood indicators. Finally, the social domain encompasses the repercussions of illness on personal roles and the perceived adequacy of social support systems [17]., Attention to the effects of chronic illness on family members is important, as previous studies have reported associations between caregiver well-being and patient outcomes, comfort and rehabilitation [18]. Previous studies have reported associations between spousal support and disease management and health behaviors [19].
Evidence from qualitative research on primary caregivers of hemodialysis patients underscores these caregiver distress associated with caregiving demands and chronic daily stressors [20]. Similarly, Tavakoli-Koohjahri et al. (2017) demonstrated that the onset of physical disability in a family member precipitates a cascade of physical and psychological morbidities for the spouse, ultimately resulting in a suboptimal Quality of Life [7]. These findings are further corroborated by Sajadian et al. (2019), who observed significant physical health limitations among the spouses of women diagnosed with breast cancer [21].
The literature suggests a positive correlation between the intensity of caregiving and the severity of health deterioration, particularly when the caregiver is elderly [7]. Conversely, some studies indicate that caregiving may exert a disproportionately adverse impact on younger female spouses. Furthermore, when caregiving responsibilities are associated with social isolation or persist over an extended period, caregivers may report poorer QoL and greater relationship strain [22].
Given that cardiovascular disease remains the leading cause of mortality in Iran, and considering that psychosocial stress is a critical risk factor for both its onset and recurrence, the supportive role of caregivers particularly spouses is important for long-term recovery. However, this support system may be sustained only when the caregiver's own Quality of Life (QoL) is maintained.
Regrettably, there is a scarcity of research specifically addressing the Quality of Life (QoL) of spouses of patients undergoing Coronary Artery Bypass Grafting (CABG), both globally and within the Iranian context. Spouses are often an overlooked population in healthcare; in certain psychological domains, they may face significant risks comparable to those of the patients themselves, yet they remain largely unaddressed by the healthcare system.
Therefore, the present study was designed to address this gap. The primary research question is: Is there a significant difference in the Health-Related Quality of Life (HRQoL) between spouses of patients after CABG and spouses of healthy individuals? Based on existing literature on caregiver burden, we hypothesized that spouses of patients after CABG would report significantly lower scores across both physical and mental dimensions of HRQoL compared to spouses of healthy individuals.

Participants and Methods

The present research employed a descriptive-analytical, comparative design and was conducted between April 2025 and September 2025. The study setting included the cardiac surgery clinic of Imam Ali Hospital affiliated with Zahedan University of Medical Sciences for the patient group,and primary health centers in Zahedan,Iran ,for the control group.The study population comprised two distinct groups: spouses of patients with a history of CABG and spouses of healthy individuals. To minimize confounding variables,frequency matching (group matching) was employed to ensure similar disributions of age, gender, duration of marriage, educational attainment, and number of children across the two groups. In addition to demographic matching, the two groups were compared for several potential confounding variables, including socioeconomic status (household income level) and participants' comorbidity burden (Charlson Comorbidity Index). In the patient-spouse group, caregiving intensity (hours per day) and caregiving duration (months) were also assessed. Patients' clinical status including NYHA class, LVEF, time since

surgery, and postoperative complications was extracted from medical records.Specifically, the control group was selected such that its overall demographic distribution closely mirrored that of patient- spouse group ,rather than using a one -to-one paried matching approach.

CriteriaParticipants were recruited based on specific inclusion and exclusion criteria. For the clinical group, inclusion criteria included:At least six months having elapsed since the spouse's CABG.Currently living with the spouse.Residency in Zahedan.Voluntary informed consent to participate.Absence of substance abuse or diagnosed psychiatric/psychological disorders.Absence of acute physical illnesses.The control group shared all eligibility criteria, with the exception of the surgical history. For the purpose of this study, "healthy individuals" were operatioally defined as those with no known history of major chronic physical or mental illnesses (e.g., cardiovascular diseases, malignancies, autoimmune disorders, or psychiatric conditions) and who were not currently taking chronic medications for such conditions. To verify their health status, participants completed a structured self-report checklist assessing their medical history and current medication use. This approach ensured that individuals with know chronic conditions were excluded from the control group. Exclusion criteria for both cohorts were defined to ensure the integrity of the Quality of Life (QoL) assessment. These included: Severe familial conflicts or life crises. Divorce, legal separation, or threats of divorce. Polygyny (polygamy), which exhibits a higher prevalence in the studied region. Comorbidities significantly impacting QoL, such as clinical depression, malignancies, autoimmune diseases, or the onset of new physical disabilities during the study. These exclusion criteria were specifically applied to control for potential confounding variables. Pre-existing clinical depression or psychiatric disorders independently and profoundly affect Health-Related Quality of Life (HRQoL). Excluding these individuals ensures that the observed differences in QoL can be primarily attributed to the caregiving burden following CABG rather than pre-existing mental health conditions.

The sample size for this study was calculated based on the mean and standard deviation of Quality-of-Life scores from the study by Mårtensson et al. (2003). To ensure robust results, we utilized a 95% confidence interval (alpha = 0.05) and a statistical power of 95% (beta = 0.05). In this study, the mental component score of the quality of life assessment was used for both patients and their spouses. Based on the relevant formula, the estimated sample size was 37.59 per group, totaling 80 participants. To enhance the study's validity and allow for a degree of generalizability, the sample size was set at 100 patients per group, with a total of 200 spouses included. The calculation was performed using the following formula:

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 (S_1^2 + S_2^2)}{(\bar{X}_1 - \bar{X}_2)^2} = 37.59$$

$Z_{1-\frac{\alpha}{2}} = 1.96$ $S_1 = 7.1$ $\overline{X_1} = 47.3$ $Z_{1-\beta} = 1.64$ $S_2 = 6.6$ $\overline{X_2} = 45.5$

Due to the nature of the study settings,different sampling strategies were applied for each group.For the patient group,spouses of patients after CABG were recruited using convenience sampling from the cardiac surgery clinic. After a comprehensive review of medical records and the identification of eligible patients meeting the inclusion criteria, informed consent was obtained from both the patients and their spouses. Clinical characteristics of the patients, including time elapsed since surgery ,left ventricular ejection fraction (LVEF),New York Heart Association (NYHA) functional class and the occurrence of major postoperative complications(e.g.,wound infection,arrhythmia),were extracted from their medical records.The questionnaires were completed by the spouses in quiet room at the clinic to ensure privacy and minimize distraction. To form the control group, spouses of healthy individuals were recruited using a multi-stage cluster sampling technique to ensure a representative community sample and to facilitate frequency matching with the patient group.This process involved dividing the city into five geographical zones, selecting one primary health center per zone, and then randomly identifying specific health blocks for final participant selection.All control participants were assessed to ensure they met the eligibility criteria and matched the demographic distribution of the patient group.

"Data collection was performed using the Short Form-36 (SF-36) Health Survey, a widely recognized instrument designed to evaluate health status through both physical and mental perspectives, ultimately measuring overall quality of life (QoL). The SF-36 comprises 36 items categorized into eight subscales: Physical Functioning (PF), Role Limitations due to Physical Health (RP), Role Limitations due to Emotional Problems (RE), Vitality (VT), Mental Health(MH), Social Functioning (SF), Bodily Pain (BP), and General Health (GH).

It should be noted that in the SF-36 scoring system, higher scores on all subscales including Bodily Pain (BP) including better health statuse.Specifically, a higher BP score reflected less bodily pain,whereas a lower score indicates more sever pain. These subscales are further aggregated into two primary component summaries: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). Scores range from 0 to 100, where lower scores indicate poorer quality of life and higher scores represent superior health status.The psychometric properties of the SF-36 have been extensively validated globally and within

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the Iranian context. Previous research reported internal consistency with Cronbach's alpha coefficients ranging from 0.72 to 0.94 [24]. Specifically, Montazeri et al. (2005) confirmed the reliability of the Persian version with an alpha of(0.87) [25]. In the present study, the instrument's reliability was reaffirmed, yielding a Cronbach's alpha of (0.77). The overall Cronbach's alpha coefficient was reported as an indicator of the internal consistency of the entire instrument,which is adequate for group-level comparisons.The reliability of individual subscales of the Persian SE=36 has been previously established in the Iranian population,with alpha coefficients ranging from 0.77to 0.90 for most subscales.

The scoring procedure followed the standard SF-36 algorithm. First, all 36 items were recoded according to the standard scoring key so that higher values consistently indicated better health status. Second, the recoded items belonging to each of the eight subscales were summed and linearly transformed to a 0–100 scale using the formula: Scale score = [(Raw score – Lowest possible raw score) / Possible raw score range] × 100 . The eight subscale scores were then standardized into Z-scores based on the means and standard deviations of the general U.S. population. Finally, PCS and MCS scores were computed by multiplying each subscale Z-score by its respective physical or mental factor score coefficient, summing the products, and converting the aggregate score into a T-score (Mean = 50, SD = 10) . A higher PCS or MCS score indicates better physical or mental health status, respectively.

It should be noted that the standard SF-36 scoring algorithm does not yield a single "Total Quality of Life" score. However, to provide a global descriptive summary of the participants' overall HRQoL in this study, a composite Total QoL score was calculated as the mean of the eight SF-36 subscale scores. This composite score is presented solely for descriptive comparison purposes and should not be interpreted as a validated standard SF-36 metric.

Data analysis was conducted using SPSS version 22. Descriptive statistics were used to summarize the data. Prior to conducting independent t-tests, the assumptions of normality and homogeneity of variances were assessed. Normality was evaluated using the Shapiro-Wilk test, and homogeneity of variances was assessed using Levene's test. Chi-square tests were used for comparing categorical demographic variables. Statistical significance was set at ($p \leq 0.05$).

Ethical Considerations:

This study was conducted in accordance with the principles of the Declaration of Helsinki. The study protocol was reviewed and approved by the Ethics Committee of Zahedan University of Medical Sciences (Ethical Code: IR.ZAUMS.REC.1405.118). Prior to data collection, all participants (both patients and their spouses) were provided with a comprehensive explanation of the study objectives and procedures. Written informed consent was obtained from all participants. Participation was entirely voluntary, and participants were assured of their right to withdraw from the study at any time without any negative consequences. To ensure confidentiality and anonymity, all questionnaires were completed without requiring participants' names or personal identifiers. The collected data were stored securely in a password-protected database, and access was restricted exclusively to the research team.

Findings

The demographic and confounding characteristics of the two groups are summarized in Table 1. The mean age of the participants was 64.9 ± 7.3 years in the patient-spouse group and 64.9 ± 7.3 years in the control group. The majority of participants in both groups were female (85% vs. 86%, respectively). Statistical analyses confirmed that there were no significant differences between the two groups regarding age, duration of marriage, number of children, gender, educational attainment, occupational status, socioeconomic status ($p = 0.92$), or comorbidity burden ($p = 0.63$). Therefore, the groups were comparable at baseline.

Among spouses of patients, the mean caregiving intensity was 6.9±2.3hours per day, and the mean caregiving duration was 20.3±6.3months. The patients' clinical characteristics were as follows: NYHA class I (40%), class II (50%), and class III (10%); mean LVEF was 48.2 ± 7.5%; mean time since surgery was 18.5 ± 6.3 months. No major postoperative complications were documented.

Table 1: Demographic Characteristics of the Study Participants

Demographic Variables	Spouses of Patient (n=100)	Spouses of Healthy (n=100)	p-value
Age (Years) (mean ±SD)	65.70 ±6.02	64.9 ±7.30	0.52
Marriage Duration(mean ±SD)	38.41± 3.38	39.50± 3.38	0.07
Number of Children (mean ±SD)	7.46±3.53	7.72±2.35	0.66

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Participants Comorbidity(Charlson Comorbidity Index) (mean ±SD)		1.26±1.03	1.16±0.99	0.63
LVEF(%)mean ±SD		48.2±7.5	----------	----------
Time Since Surgery(Months) mean ±SD		18.5±6.33	----------	----------
Caregiving Duration **(Months) mean ±SD**		20.3±6.3	----------	----------
Caregiving Intensity **(Hours/Day) mean ±SD**		6.9±2.3	----------	----------
Gender,n(%)	**Male**	15(15%)	14(14%)	0.84
	Female	85(85%)	86(86%)	
Educational Attainment n(%)	**Below High Schol&Diploma**	54(54%)	52(52%)	0.67
	Diploma & Higher	46(46%)	48(48%)	
Occupational Status n(%)	**Housewife**	80(80%)	76(76%)	0.75
	Employed	9(9%)	11(11%)	
	Retired	11(11%)	13(13%)	
Socioeconomoic Status n(%)	**Low**	40(40%)	38(38%)	0.92
	Middle	45(45%)	47(47%)	
	High	15(15%)	15(15%)	
NYHA Class n(%)	Class 1	40(40%)	----------	---------
	Class2	50(50%)	----------	
	Class3	10(10%)	----------	
Postoperative Complications n(%)	**None reported**	-------	----------	----------

Prior to the independent t-test analysis, the assumptions were verified. The Shapiro-Wilk test indicated that the HRQoL scores were normally distributed in both groups ($p > 0.05$). Additionally, Levene's test confirmed the homogeneity of variances across the groups ($p > 0.05$). Therefore, the assumptions for the independent t-test were met.

Independent samples t-tests revealed statistically significant differences across all SF-36 domains, with the patient-spouse group scoring consistently lower than the healthy control group. As shown in Table 2, the Total Quality of Life score was significantly lower in the patient group (60.43 ± 5.36 vs. 71.22 ± 6.15; mean difference = -10.79, 95% CI: -12.40 to -9.18, $t(198) = -13.23$, $p < 0.001$, Cohen's $d = -1.87$). Similarly, significant differences were observed for both the Physical Component Summary (PCS: 67.9 ± 11.02 vs. 73.6 ± 9.06; mean difference = -5.70, 95% CI: -8.51 to -2.89, $t(198) = -4.00$, $p < 0.001$, $d = -0.56$) and the Mental Component Summary (MCS: 62.4 ± 19.67 vs. 71.8 ± 18.2; mean difference = -9.40, 95% CI: -14.68 to -4.12, $t(198) = -3.51$, $p < 0.001$, $d = -0.50$). Across all eight subscales, the patient-spouse group exhibited significantly lower scores ($p < 0.001$ for all), with the largest effect sizes observed in Bodily Pain ($d = -1.68$) and Mental Health ($d = -1.12$). Detailed statistical values for all subscales are presented in Table 2.

Quality of Life Outcomes the (mean ±SD) score for the overall quality of life among spouses of patients post-CABG was (60.43± 5.36), whereas the control group (spouses of healthy individuals) reported a significantly higher score of (71.22 ±6.15). Detailed analysis of the SF-36 subscales indicated a substantial statistical divergence between the two cohorts. As illustrated in Table 2, the mean scores across all quality-of-life dimensions were consistently lower in the patient-spouse group compared to the healthy control group. Independent t-test results further confirmed that these differences were statistically significant across all evaluated domains ($p < 0.05$).

Table 2: Comparative Analysis of Quality of Life Domains Between Spouses of Patients and Spouses of Healthy Individuals(Independent samples t-tests;df=198)

Quality of Life Domains(SF=36)	**Spouses of Patients (n=100)**	**Spouses of Healthy (n=100)**	**Mean Difference (CI=95%)**	**t(df=198)**	**p-value (t-test)**	**Effect Size(Cohens d)**

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	(Mean ± SD)	(Mean ± SD)				
Physical Functioning (PF)	62.3±12.2	68.9±11.4	-6.60(-9.89,-3.31)	-3.95	0.01	-0.56
Role Physical (RP)	72.1±8.03	78.3±7.13	-6.20(-8.32,-4.08)	-5.77	0.04	-0.82
Role Emotional (RE)	62.4±12.8	77.3±14.5	-14.90(-18.72,-11.08)	-7.69	0.02	-1.09
Vitality (VT)	58.8±9.59	68.6±8.04	-9.80(-12.27,-7.33)	-7.83	0.01	-1.11
Mental Health (MH)	62.3±13.3	76.9±12.8	-14.60(-18.24,-10.96)	-7.91	0.03	-1.12
Social Functioning (SF)	60.6±16.06	68.9±17.02	-8.30(-12.92,-3.68)	-3.55	p≤0.01	-0.50
Bodily Pain (BP)	68.6±5.27	78.1±6.01	-9.50(-11.08,-7.92)	-11.89	0.04	-1.68
General Health(GH)	55.4±10.5	67.2±11.2	-11.80(-14.83,-8.77)	-7.69	p≤0.01	-1.09
Physical Component Summary (PCS)	67.9±11.02	73.6±9.06	-5.70(-8.51,-2.89)	-4.00	p≤0.01	-0.56
Mental Component Summary (MCS)	62.4±19. 6	71.8±18.2	-9.40(-14.68,-4.12)	-3.51	p≤0.01	-0.50
Total Quality of Life	60.4±5.36	71.2±6.15	-10.79(-12.40,-9.18)	-13.23	p≤0.01	-1.87

Discussion :

The emergence of a chronic condition or disability within a family unit functions as a systemic stressor that can negatively impact various dimensions of familial life. Such conditions often precipitate physical and psychological turbulence, ultimately compromising the overall Quality of Life (QoL) [7]. Cardiovascular Diseases (CVDs), categorized among the most formidable global health challenges, exemplify this impact. The multifaceted restrictions imposed by CVD sranging from limitations on physical exertion and heavy labor to constraints on exercise and sexual activity act as significant detractors from the life quality of both patients and their spouses [26].

Furthermore, a direct correlation exists between the patient's level of dependency and the perceived caregiver burden. As the need for intensive care intensifies, familial tranquility is disrupted, and social liberties are markedly curtailed [7]. These limitations do not merely function in isolation; rather, they exert a combined negative effect on the professional, personal, and academic spheres of family members [26]. Specifically, spouses often endure diminished emotional well-being due to prolonged caregiving hours, resulting in chronic fatigue and necessitated career adjustments [27, 28]. The weight of navigating novel responsibilities and role transitions frequently predisposes these caregivers to adverse psychosocial outcomes, including social isolation, loneliness, and clinical depression [7].

Impairments across various dimensions of Quality of Life (QoL) represent a fundamental determinant of health disparities; a decline in these indices can exert detrimental effects on overall well-being. This phenomenon is particularly salient within the families of cardiovascular patients, where the multifaceted nature of the illness profoundly impacts the physical and psychological health of the patients, their primary caregivers, and even their extended kin [26].

The findings of the present study demonstrate that CABG significantly diminishes the QoL of patients' spouses. Notably, the QoL scores in this cohort were considerably lower compared to those of spouses of healthy individuals in the general population. It is noteworthy that the relatively high mean number of children observed in our study (approximately 7.5 per family) reflects the specific cultural and demographic context of the Sistan and Baluchestan province in Iran, where larger family sizes are traditionally common, particularly among the older generation (mean age ~65 years). This finding is consistent with regional demographic norms and does not indicate a sampling error.

These results align with existing literature indicating that caregivers of patients with chronic conditions often experience compromised QoL [18, 26]. Such individuals typically exhibit deficiencies in physical, psychological, social, and general health domains (18). Furthermore, our results are consistent with the

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findings of Li et al. (2016), who reported that caregiving spouses frequently experience higher levels of anxiety and depression compared to the patients themselves [29].

In alignment with the present findings, Celik et al. (2012) reported that caregiving for individuals with chronic illnesses exerts substantial adverse effects on the caregivers' Quality of Life (QoL) [30]. Furthermore, research by Baghcheghi et al. (2020) revealed that spouses of these patients not only report poorer psychological well-being but also also show higher levels of depression compared to the patients themselves. Previous studies have raised concern that psychological distress among caregivers may adversely affect their own health and deteriorate the quality of care provided to the patient [18]. Consequently, scholars emphasize the necessity of prioritizing the QoL of primary caregivers, particularly in scenarios involving long-term caregiving trajectories [7]. This systemic impact is further supported by Christian Litzelman et al., who, in a study of 919 spouses of breast cancer patients, identified significant longitudinal declines in physical health, emotional stability, and overall QoL for both patients and their partners [31].

In the present study, lower (QoL) among spouses was observed; however, the cross-sectional design dose not permit causal or is mediational inferences.Caregiving knowledge, and functional impairments were not measured in this study. These observations are consistent with the findings reported by Ghavidel et al. (2015) [32]. A synthesis of existing literature underscores that psychological attrition is a common corollary of life-threatening illnesses, subsequently diminishing the QoL and social functioning of spouses following the onset of chronic disease [33-35].

These findings emphasize that monitoring the QoL of spouses is an indispensable metric for reflecting their overall health status. Conversely, neglect within the healthcare system may exacerbate existing morbidities. The caregivers are highly vulnerable; some researchers argue the familial response to chronic illness is as critical if not more so than the patient's own clinical reaction. Consequently, the development of comprehensive care protocols designed to enhance the QoL for both patients and their spouses is imperative. Addressing the unique challenges faced by this demographic is essential; a profound understanding of the psychological attributes and attitudes of both patients and caregivers is foundational to designing effective therapeutic interventions aimed at optimizing bilateral health outcomes [18].

Given that the responsibility for caregiving in chronic and physically debilitating conditions primarily rests upon family members, addressing the secondary complications experienced by primary caregivers is paramount. The previous studies suggested that caregiver well-being is associated with patient health outcomes , overall well-being and rehabilitation. Proactive support for caregivers not only facilitates a more efficient recovery trajectory but also mitigates the risk of hospital readmissions and long-term institutionalization [7].

Limitations and Future Directions

This study has several limitations that should be considered when interpreting the findings. First, the study employed a cross-sectional comparative design, which allows the identification of differences and associations between groups but does not permit causal inferences or assessment of changes over time. Longitudinal designs are needed to examine whether and how HRQoL changes among spouses after CABG. Second, non-probability sampling was used. The patient-spouse group was recruited through convenience sampling from a single cardiac surgery clinic, and the control group was recruited through multi-stage cluster sampling from primary health centers. Although frequency matching was applied selection bias cannot be excluded, and the samples may not be fully representative of the broader population of spouses of CABG patients or of healthy individuals in the community.

Third, data were collected using self-report questionnaires, which may be subject to self-report bias, including social desirability bias, recall bias, and the influence of participants' current emotional state on their responses. No objective clinical or psychological assessments were used to corroborate the self-reported HRQoL scores. Fourth, although the two groups were comparable regarding key demographic variables, socioeconomic status, and comorbidity burden, and although available clinical characteristics of the patients were described, residual confounding cannot be excluded. Important variables such as detailed caregiving burden (e.g., Zarit Burden Interview scores), caregiving knowledge, clinical anxiety and depression, inflammatory or nutritional biomarkers, readmission, hospitalization, and long-term postoperative outcomes were not measured.Therefore, no conclusions can be drawn regarding these outcomes, and all statements about them in the manuscript are either attributed to previous literature or framed as recommendations for future research.

Fifth, the generalizability of the findings is limited. The study was conducted in a single region of Iran (Zahedan, Sistan and Baluchestan province), with a specific cultural and demographic profile, including relatively large family sizes. Therefore, the results may not be directly generalizable to other populations, healthcare systems, or cultural contexts. Future multicenter studies with probability sampling, objective measures, and longitudinal designs are needed to confirm and extend these findings.

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Finally, while we excluded participants with pre-existing psychiatric disorders (e.g., clinical depression) to prevent confounding, we acknowledge that this may have excluded some caregivers whose psychological distress was directly caused by the caregiving burden. This could potentially lead to an underestimation of the true negative impact of CABG caregiving on QoL. Future studies should consider including these populations or using longitudinal designs to differentiate between pre-existing and caregiving-induced psychological distress. Future longitudinal studies should incorporate these measures to further clarify the independent contribution of caregiving to spouses' HRQoL.

Conclusion

In summary, this study indicates that spouses of patients after CABG report significantly lower Quality of Life (QoL) compared to spouses of healthy individuals. These caregivers represent a high-risk, often underserved group within the healthcare continuum. Therefore, healthcare systems should consider integrating the spousal role into routine post-operative care. Future longitudinal research is needed to evaluate whether supportive strategies—such as dyadic education, family therapy, peer support groups, and structured referral services—can alleviate caregiver burden and improve the overall well-being of the family unit. By addressing the needs of these overlooked caregivers, healthcare systems may support both patient recovery and caregiver health

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Ethical Permissions: This study was derived from a research project approved by Zahedan University of Medical Sciences. The study protocol was reviewed and officially approved by the Ethics Committee of Zahedan University of Medical Sciences under the ethical code: IR.ZAUMS.REC.1405.118

Conflicts of Interests: The authors declare no conflicts of interest.

Authors' Contribution:

Sarhadi M (First Author): Introduction writer, methodologist, main researcher, discussion writer, and statistical analyst (85%); Doshanbezaei F (Second Author): Assistant researcher (15%).

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