Prediction of Family Functioning in Patients Candidate for Open-Heart Surgery Based on Interpersonal Dependency and Demographic Factors

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ABSTRACT

This study aimed to predict family functioning in patients who are candidates for open-heart surgery based on interpersonal dependency and demographic variables. This descriptive-analytical study was conducted on 250 patients scheduled for open-heart surgery in cardiac centers. Participants were selected through simple random sampling based on predetermined inclusion criteria. Data were collected using the McMaster Family Assessment Device (FAD) and the Hirschfeld Interpersonal Dependency Questionnaire, along with a demographic checklist. Questionnaires were administered manually and online. Data cleaning and screening procedures were performed prior to statistical analysis. Descriptive and inferential analyses were conducted using SPSS, including correlations, multicollinearity tests, and multiple regression analysis (enter method). Family functioning served as the criterion variable, while interpersonal dependency and demographic characteristics were entered as predictors. Interpersonal dependency ($\beta = 0.44$, $p = .001$), education ($\beta = 0.23$, $p = .040$), age ($\beta = 0.21$, $p = .014$), and marital status ($\beta = -0.17$, $p = .012$) were significant predictors of family functioning. The regression model was significant ($F_{(14, 235)} = 6.79$, $p = .001$), explaining 21% of the variance in family functioning ($R^2 = 0.207$). Multicollinearity diagnostics indicated acceptable tolerance and VIF values for all predictors. Other demographic variables—including spouse's education, illness duration, number of children, income, occupation, and type of illness—were not significant predictors. Correlation analysis also showed a significant association between interpersonal dependency ($r = 0.31$) and family functioning ($p < .05$). Interpersonal dependency, education level, age, and marital status are significant predictors of family functioning among patients awaiting open-heart surgery, highlighting the importance of psychosocial and relational factors in treatment planning and preoperative care.

Keywords: family functioning, interpersonal dependency, demographic factors

Introduction

amily functioning plays a foundational role in shaping health outcomes, psychological adjustment, and interpersonal resilience across the lifespan. A growing body of research emphasizes that family processes—such as communication, emotional responsiveness, problem-solving, role allocation, and behavioral regulation—operate as primary determinants of individual well-being, particularly in contexts involving chronic illness, medical crises, or high psychosocial burden (1). In cardiac populations, especially among

individuals preparing for major procedures such as open-heart surgery, the integrity of family functioning assumes even greater significance. These patients often face substantial physiological and emotional stressors that can disrupt daily functioning, weaken coping resources, and heighten dependency on family members, most notably spouses (2). Therefore, understanding the interplay between interpersonal dependency and family functioning in cardiac candidates for surgery is an essential yet underdeveloped area of inquiry.

Several studies have confirmed that the quality of family relationships is strongly associated with social, psychological, and health-related outcomes in patients with cardiovascular disease. For example, depressive symptoms, anxiety, and emotional exhaustion in family caregivers—commonly observed in heart failure populations—are closely linked to diminished family cohesion, poor communication patterns, and elevated interpersonal tension (3). Furthermore, the systemic demands of heart failure or coronary disease create ongoing stressors that require families to reorganize responsibilities, redefine roles, and maintain adaptive patterns of interaction. This dynamic underscores why family functioning is frequently conceptualized as a protective buffer that enhances health- promoting behaviors, treatment adherence, and quality of life (4).

Research also highlights that family functioning influences caregiver burden, role strain, and psychological outcomes in family members who provide support to cardiac patients. Family caregivers often experience reduced mental health, impaired social functioning, and heightened vulnerability to depression, particularly when communication and problem-solving skills are inadequate or inconsistent (1). When families demonstrate strong cohesion, shared responsibility, and effective emotional management, the negative effect of cardiac illness on patient and caregiver well-being appears significantly reduced. Conversely, rigid, conflict-prone, or emotionally disengaged family systems amplify distress, weaken patient autonomy, and hinder recovery.

Cardiac illness is not experienced exclusively by the patient; rather, it is embedded within reciprocal family dynamics. Qualitative studies suggest that spouses often play the central role in supporting cardiac patients through symptom management, monitoring daily functioning, and coordinating medical care (2). Family members' perceptions of illness severity, their coping resources, and the distribution of family responsibilities all shape how the patient adapts to disease progression. In rural or socioeconomically constrained settings, where external support structures are limited, the influence of family functioning becomes even more pronounced (2).

Interpersonal dependency is another factor that may significantly shape family dynamics among patients requiring open-heart surgery. Psychological models describe interpersonal dependency as a relational pattern characterized by emotional reliance on significant others, difficulty making autonomous decisions, and heightened sensitivity to relationship disruptions. Such dependency becomes particularly prominent in severe medical conditions where individuals anticipate disability, pain, or risk of mortality. Cardiac patients may rely heavily on spouses or other family members for emotional reassurance, daily functioning, and treatment adherence. If interpersonal dependency becomes excessive—or mismatched with the spouse's emotional resources—it may strain family interactions, increase emotional burden, and undermine family functioning (5).

Studies conducted in cardiac and chronic disease contexts reveal that interpersonal dependency correlates with reduced psychological resilience, poorer quality of life, and increased emotional distress (6).

Conversely, adaptive dependency—characterized by secure attachment, confidence in the availability of support, and cooperative communication—may promote healthier family relationships. However, few empirical investigations have examined how interpersonal dependency interacts with broader family functioning in cardiac surgical candidates. This gap is significant given that preparation for open-heart surgery often necessitates increased caregiving demands and heightened emotional reliance on spouses. As a result, dependency behaviors may either strengthen family cohesion or exacerbate relational strain depending on the quality of family interactions.

Family functioning also affects cardiovascular outcomes indirectly through behavioral pathways. Stress-related family conflict, instability, and poor communication contribute to maladaptive health behaviors, including low medication adherence, poor diet, and reduced physical activity (7). Studies on middle-aged adults show that strengthening coherence and reducing family stress improves heart-related behaviors and overall functioning (7). Meanwhile, systemic interventions that improve emotional communication and marital interaction patterns help enhance the emotional and physical recovery of cardiac patients (5).

Beyond cardiac contexts, extensive evidence indicates that family functioning is one of the strongest predictors of psychological well-being, emotional regulation, behavioral adjustment, and resilience across diverse populations. For instance, high-quality family functioning reduces externalizing behaviors in adolescents (8), strengthens coping with peer pressure (9), and mitigates the adverse consequences of bullying, victimization, and stress (10). Conversely, dysfunctional family environments increase vulnerability to mental health disorders, including depression, anxiety, and behavioral difficulties (11). These findings support the systemic theory that family functioning is a multidimensional construct affecting both mental and physical health.

Even in situations of acute crisis, such as the COVID-19 pandemic, family functioning emerged as a decisive factor influencing mental health outcomes among children, adults, and the elderly (12, 13). Studies on COVID-19 survivors demonstrate that strong family functioning and robust social support predict higher psychological well-being, lower levels of distress, and improved recovery (14). Among older adults, family functioning is associated with improved life satisfaction, lower depressive symptoms, and better emotional regulation (15, 16). These findings reinforce the universality of family functioning as a determinant of health outcomes across cultures and clinical conditions.

Research from Iran and other middle-income countries similarly emphasizes the importance of family systems in managing chronic illness. Supportive interventions that increase resilience, enhance communication skills, and foster emotional bonding have demonstrated significant improvements in the well-being of family caregivers of heart failure patients (17, 18). Heart failure patients themselves benefit from family-centered empowerment models that improve illness perception and strengthen coping processes (19). Moreover, family functioning is deeply intertwined with marital satisfaction, conflict management, and spousal support—domains shown to predict psychological adaptation in couples experiencing significant life stressors, including chronic disease (20).

In developmental and adolescent contexts, scholars have examined how parenting patterns, emotional climate, and family function shape emotional development, stress regulation, and risk-taking behaviors (21, 22). The mediating roles of resilience, character strengths, coping strategies, and social support further highlight the systemic nature of family functioning (22, 23). The extensive interdisciplinary evidence

underscores that family functioning is not merely a relational variable but a major determinant of individual and collective well-being.

A number of researchers have also documented the link between family dysfunction and behavioral or psychological disorders, including substance use (24), suicidal behaviors (25), and maladaptive coping strategies (26). These patterns suggest that any condition that increases psychological vulnerability—such as undergoing open-heart surgery—may amplify the significance of family relationships in shaping health outcomes.

Despite the strong theoretical and empirical foundations connecting family functioning to cardiac illness, interpersonal dependency remains an under-studied factor in this domain. This gap is substantial given that interpersonal dependency increases sharply during periods of medical uncertainty and physical vulnerability, potentially influencing both emotional adaptation and family dynamics. No existing study has simultaneously examined interpersonal dependency, demographic determinants, and family functioning among patients preparing for open-heart surgery, despite the unique psychological and relational demands of such procedures.

Given the critical role that families—especially spouses—play in supporting cardiac patients, and the predictive value of interpersonal dependency for stress regulation and emotional well-being, examining this relationship fills an important clinical and empirical gap. Therefore, the present study aims to predict family functioning in patients who are candidates for open-heart surgery based on interpersonal dependency and demographic factors.

1. Methods and Materials

2. *Study Design and Participants*

The present study was designed with the aim of predicting family functioning in patients who are candidates for open-heart surgery and examining the role of spouses in this process, based on interpersonal dependency and demographic factors. This research employed a descriptive-analytical design, and complex statistical methods were used to examine the relationships among the variables.

The statistical population of this study consisted of patients who were candidates for open-heart surgery and referred to various medical centers and hospitals in the city of Isfahan. These individuals were selected through random sampling, and ultimately, 250 patients were chosen to participate in the study. Sampling was conducted using a simple random method and based on specific criteria such as the patients' physical condition and their preparedness for undergoing open-heart surgery. Overall, the sampling process was carried out in compliance with ethical standards and aligned with the needs of the research.

Data were collected by distributing questionnaires to the patients. The questionnaires were provided both manually and online, and after completion, the information was entered into SPSS statistical software. To ensure accuracy and precision, data-cleaning procedures and response-quality checks were conducted. This process was particularly important for the Interpersonal Dependency and Family Functioning questionnaires to eliminate any possible ambiguities in the responses.

3. Measures

The McMaster Family Assessment Device was developed by Epstein, Baldwin, and Bishop (1983) within the framework of the McMaster Model of Family Functioning to provide a standardized assessment of systemic family functioning. The original instrument consists of 60 items that are grouped into seven subscales: problem solving, communication, roles, affective responsiveness, affective involvement, behavior control, and general functioning. Items are rated on a 4-point Likert scale ranging from "strongly agree" to "strongly disagree," and are scored so that higher scores indicate poorer family functioning. In the present study, the validated version of the FAD was used. Previous research in both clinical and non-clinical samples has reported acceptable to good internal consistency coefficients (Cronbach's alpha typically ranging from 0.72 to 0.92), satisfactory test–retest reliability, and evidence of construct and criterion validity for this instrument (Epstein et al., 1983; subsequent validation studies). Therefore, the FAD is considered a reliable and valid tool for assessing the quality of family interactions and the family's capacity to solve problems in patients with chronic medical conditions, including cardiac patients.

The Interpersonal Dependency Questionnaire used in this study is based on the instrument developed by Hirschfeld and colleagues to measure maladaptive patterns of interpersonal dependency (Hirschfeld et al., 1977). The questionnaire comprises 48 items that assess three major subscales: emotional reliance on others, lack of social self-confidence, and assertion of autonomy. Items are rated on a 4-point Likert scale (from "strongly agree" to "strongly disagree"), and scores can be calculated for each subscale as well as a total dependency score, with higher scores reflecting higher levels of interpersonal dependency. In the present research, the standardized and psychometrically evaluated version of this questionnaire was administered. Previous studies have reported good internal consistency (with Cronbach's alpha coefficients generally around or above 0.80), acceptable test–retest reliability over several weeks, and factorial validity consistent with the three-factor structure originally proposed by Hirschfeld and colleagues. These findings indicate that the questionnaire is a reliable and valid instrument for assessing emotional and social dependency on spouses and other family members in both general and clinical populations.

4. Data analysis

After data collection, the data-analysis process began using SPSS software. Descriptive and inferential statistical methods were used in this study. Descriptive statistics, including mean, standard deviation, minimum, and maximum values, were calculated for demographic variables and family functioning. These indices provided initial and general information about the characteristics of the sample. Correlational analysis was used to examine the relationships between demographic variables and family functioning. Finally, multiple regression analysis using the simultaneous entry method was conducted to determine the effects of interpersonal dependency and demographic variables on family functioning.

5. Findings and Results

Based on the findings, approximately 45% of the participants were female and 55% were male. Moreover, the majority of the participants (92%) were married, 8% were widowed, and less than 1% were single. Regarding educational level, about 6% of the participants were illiterate, 15% had primary education, 19% had lower-secondary education, 33% had a high school diploma, 6% had an associate degree, and 21% had a

bachelor's degree. For spouses' education, approximately 4% were illiterate, 16% had primary education, 17% had lower-secondary education, 38% had a high school diploma, 6% had an associate degree, 16% had a bachelor's degree, 2% had a master's degree, and 2% held a doctorate. Additionally, around 5% of the participants were only children.

In terms of cardiac conditions, about 76% had coronary artery disease and 24% had valvular problems. Regarding duration of illness, approximately 20% had been ill for less than one year, 55% for one to five years, 19% for six to ten years, 2% for ten to fifteen years, and 6% for more than 15 years. Among all participants, 37% were homemakers, 28% self-employed, 10% laborers, 13% employees, and 12% retired. In terms of spouses' occupation, 46% were homemakers, 25% self-employed, 4% laborers, 14% employees, and 11% retired. Income levels were as follows: 12% earned less than 10 million tomans, 76% earned between 10 and 20 million tomans, and 11% earned between 20 and 30 million tomans.

In addition, the mean age of the participants was 57.66 with a standard deviation of 10.44, and the minimum and maximum ages were 33 and 78 years. The mean age at marriage was 23.50 with a standard deviation of 5.20, and the minimum and maximum ages were 11 and 40 years. The mean number of children was 3.19 with a standard deviation of 1.75, and the minimum and maximum values were zero and 10. The mean number of siblings was 4.34 with a standard deviation of 2.37, with a minimum and maximum of zero and 10. These data are presented in Table 1.

Table 1. Descriptive Indices of the Variables

Variable	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis
Age	57.66	10.44	33	78	-0.33	-0.89
Number of children	3.19	1.75	0	10	0.95	1.55
Number of siblings	4.34	2.37	0	10	0.41	-0.32
Interpersonal dependency	113.70	14.90	87	151	0.49	-0.35
Family functioning	135.40	19.84	94	180	0.19	0.46

In Table 1, the mean, standard deviation, minimum and maximum scores, skewness, and kurtosis values for all variables are reported. Because the skewness and kurtosis coefficients for all variables fall between -2 and $+2$, the distribution of all variables is considered normal.

Table 2. Correlation Matrix of the Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1														
2	-0.22	1													
3	0.17	-0.11	1												
4	0.06	-0.19	0.81	1											
5	0.04	0.07	-0.03	-0.02	1										
6	-0.22	0.02	-0.09	-0.07	-0.04	1									
7	-0.05	-0.13	-0.08	-0.16	0.07	0.12	1								
8	0.59	-0.16	0.24	0.06	0.10	-0.18	-0.10	1							
9	-0.57	0.31	-0.03	0.11	0.03	0.09	0.01	-0.27	1						
10	0.11	0.04	0.19	0.11	-0.12	0.01	-0.06	-0.01	-0.18	1					
11	0.08	0.01	-0.45	-0.50	0.09	-0.21	0.12	0.06	-0.04	-0.21	1				
12	-0.17	-0.05	-0.54	-0.49	0.04	-0.06	-0.07	-0.19	-0.07	-0.11	0.58	1			
13	0.04	-0.10	-0.32	-0.34	0.43	-0.01	-0.08	0.01	-0.03	-0.12	0.29	0.31	1		
14	-0.09	0.11	-0.29	-0.25	-0.20	0.01	-0.14	-0.09	0.10	0.04	-0.12	-0.01	-0.16	1	
15	-0.04	-0.17	0.05	0.04	-0.10	-0.07	-0.08	-0.12	-0.02	0.10	0.04	0.09	-0.05	0.31	1

1. Gender; 2. Marital status; 3. Education; 4. Spouse's education; 5. Only-child status; 6. Type of illness; 7. Duration of illness; 8. Occupation; 9. Spouse's occupation; 10. Income; 11. Age; 12. Number of children; 13. Number of siblings; 14. Interpersonal dependency; 15. Family functioning

Among the demographic variables, only marital status (r = −0.17) showed a significant correlation with family functioning. The correlation between interpersonal dependency (r = 0.31) and family functioning was also significant. Other correlation coefficients with family functioning were not statistically significant.

Table 3. Examination of Multicollinearity of Variables

Variable	Tolerance	Variance Inflation Factor (VIF)
Gender	0.429	2.333
Marital status	0.719	1.391
Education	0.253	3.948
Spouse's education	0.226	4.421
Only-child status	0.688	1.453
Type of illness	0.851	1.175
Duration of illness	0.860	1.162
Occupation	0.554	1.804
Spouse's occupation	0.554	1.806
Income	0.870	1.150
Age	0.471	2.121
Number of children	0.441	2.265
Number of siblings	0.622	1.607
Interpersonal dependency	0.678	1.474

The values obtained from the calculation of the Variance Inflation Factor and tolerance coefficient indicate that multicollinearity did not occur among the research variables. Since the aim was to predict family functioning in patients who are candidates for open-heart surgery based on interpersonal dependency and demographic variables, multiple regression analysis using the enter method was employed. In this analysis, interpersonal dependency and demographic characteristics were entered as predictor variables, and family functioning was considered the criterion variable.

Table 4. Summary of Regression Analysis

Criterion Variable	R	R^2	Adjusted R^2	Standard Error of Estimate	Durbin–Watson	F	p
Family functioning	0.455	0.207	0.159	18.022	1.716	4.371	0.001

According to Table 4, the amount of variance explained in family functioning by the predictor variables is 0.21. In other words, 21% of the variance in family functioning can be predicted based on the linear combination of interpersonal dependency and demographic factors. It should also be noted that the assumption of independence of errors, based on the Durbin–Watson statistic, falls within the acceptable range of 1.5 to 2.5, indicating that this assumption is met. The observed F value ($F_{(14, 235)}$ = 6.79) is significant at $p < .001$; therefore, it can be concluded that, overall, the predictor variables significantly predict family functioning.

Table 5. Regression Coefficients

Predictor Variables	b	Standard Error	β	t	Sig.
Constant	37.04	23.62	—	1.57	0.118
Gender	−2.84	3.44	−0.07	−0.83	0.410
Marital status	−10.72	4.25	−0.17	−2.52	0.012
Education	3.11	1.53	0.23	2.03	0.040
Spouse's education	0.97	1.60	0.07	0.61	0.540
Only-child status	5.60	5.98	0.06	0.94	0.350
Type of illness	−1.08	2.91	−0.02	−0.37	0.710
Duration of illness	1.86	1.26	0.09	1.47	0.140
Occupation	−2.03	1.08	−0.14	−1.87	0.063
Spouse's occupation	−0.81	1.06	−0.06	−0.76	0.450
Income	2.65	2.51	0.07	1.05	0.293

Age	0.39	0.16	0.21	2.48	0.014
Number of children	0.34	0.92	0.03	0.37	0.710
Number of siblings	0.02	0.61	0.01	0.03	0.975
Interpersonal dependency	0.59	0.09	0.44	6.46	0.001

As shown in Table 5, among all variables entered into the regression model, the beta coefficients for marital status, education, age, and interpersonal dependency are statistically significant. The beta coefficient for marital status is −0.17, which is significant at the .05 level given the obtained t value (t = −2.52). The beta coefficient for education is 0.23, which is significant at the .01 level (t = 2.03). The beta coefficient for age is 0.21, which is significant at the .05 level (t = 2.48). The beta coefficient for interpersonal dependency is 0.44, which is significant at the .01 level (t = 6.46).

Based on these results, it can be concluded that interpersonal dependency, education, age, and marital status are, respectively, the strongest to weakest predictors of family functioning among the spouses of individuals who are candidates for open-heart surgery.

6. Discussion and Conclusion

The purpose of this study was to investigate the predictive role of interpersonal dependency and demographic variables on family functioning among patients who were candidates for open-heart surgery. The results indicated that interpersonal dependency was the strongest predictor of family functioning, followed by education level, age, and marital status. These findings align closely with a growing literature demonstrating that family functioning in medical populations, especially cardiac groups, is shaped by both psychological and structural determinants (1, 4). The significance of interpersonal dependency in this study also supports theoretical frameworks suggesting that chronic illness elevates relational reliance, emotional needs, and support-seeking behaviors within the family system (5, 6). In patients approaching open-heart surgery, the anticipation of major physical risk naturally heightens emotional vulnerability and dependency, which, if well-managed within the family system, may strengthen cohesion but, if misaligned, may strain relational functioning.

The strong predictive role of interpersonal dependency in this study parallels findings from multiple domains in which dependency and emotional reliance amplify relational stress or, alternatively, promote closeness depending on the systemic context. Studies across different populations have shown that interpersonal dependency is associated with increased emotional distress and decreased resilience when family functioning is weak or inconsistent (11, 14). Conversely, when families demonstrate high emotional support and effective communication, dependency may serve adaptive functions, enhancing the patient's sense of security and improving coping processes during illness. This duality is consistent with evidence from chronic cardiac populations showing that family cohesion can mitigate the adverse psychological impacts of heart failure, coronary disease, and cardiac surgery preparation (3, 17). The present findings support this view by showing that interpersonal dependency—when understood as part of the relational fabric of the family—plays a central role in predicting how well families function during periods of medical crisis.

The significance of marital status in predicting family functioning in this study further underscores the key role that spouses play in supporting cardiac patients. In the present sample, married individuals

demonstrated better family functioning, which mirrors earlier findings showing that spousal support is the cornerstone of caregiving and emotional stability in heart disease populations (2). Spouses often take on primary responsibilities for medical management, emotional reassurance, and household adaptation during the course of heart disease. Indeed, research consistently indicates that patients with stronger spousal relationships show improved adherence to treatment, higher quality of life, and better psychosocial adjustment (1, 4). Furthermore, psychosocial studies involving marital functioning reveal that relationship quality mediates the connection between family interaction patterns and both mental and physical outcomes (20). Thus, it is not surprising that marital status was predictive of better family functioning among cardiac surgical candidates in the current study.

Education level also emerged as a significant predictor of family functioning, indicating that individuals with higher educational attainment demonstrated stronger family functioning. This may be due to enhanced health literacy, more efficient problem-solving skills, and greater ability to access and interpret medical information. Previous work has shown similar patterns in heart patients, in which education predicts better illness perception, more adaptive coping, and stronger engagement in health-promoting behaviors (7, 19). Moreover, the broader literature underscores that education is linked to improved communication, emotional regulation, and conflict management within families (21, 26). Higher educational levels may also enhance the ability to navigate complex healthcare systems, thereby reducing family stress and supporting better relational dynamics.

Age was another significant predictor of family functioning. Older adults often face increased physical limitations and emotional vulnerabilities, which can place additional demands on the family system. Research on chronic illness in older adults shows that family functioning plays a crucial role in regulating depressive symptoms, emotional well-being, and adjustment to comorbidities (15, 16). The positive relationship between age and family functioning in this study may reflect higher levels of familial cohesion, longer relationship tenure, or more established intergenerational support networks. These findings are also consistent with cultural patterns in which older adults are embedded in structured family systems that emphasize caregiving responsibilities and relational interdependence.

Interestingly, several demographic variables—including spouse's education, illness duration, number of children, occupation, spouse's occupation, income, type of illness, and number of siblings—did not significantly predict family functioning. These non-significant findings may reflect the dominant role of relational and psychological variables relative to structural or demographic ones in determining family functioning. The literature supports this interpretation; many studies emphasize that emotional, behavioral, and communicative dynamics within the family often exert a stronger influence on well-being than demographic or socioeconomic characteristics (8, 12). Even in contexts of socioeconomic hardship, strong relational functioning can serve as a protective factor that mitigates adversity (22, 23). Therefore, the present findings align with theoretical models suggesting that interpersonal and relational processes are more central to family functioning than demographic characteristics.

The significant predictive effect of interpersonal dependency is also supported by research from adolescent, adult, and clinical populations. Studies indicate that high dependency correlates with greater stress sensitivity, higher emotional involvement, and increased reliance on family members for decision-making (10, 22). These same mechanisms may operate in cardiac surgical candidates, leading to intensified

emotional reliance on spouses or children. This heightened dependency may either support adaptive functioning through collaborative coping or contribute to relational strain when the family lacks adequate resources. Research on psychological distress in families affected by chronic illness emphasizes that emotional dependency and relational stress are reciprocal and mutually reinforcing (1, 11). Thus, the current results reinforce existing models that view interpersonal dependency as central to family functioning in high-stress medical contexts.

Prior studies also show that family functioning influences multiple psychological outcomes in both pediatric and adult populations. For example, family functioning predicts externalizing behaviors in adolescents (8), mitigates the effects of peer pressure (9), and reduces the mental health burden associated with adversity (11). Such findings underscore the universality and robustness of family functioning as a determinant of psychological and behavioral well-being. When applied to cardiac patients, this framework suggests that strong family functioning likely promotes emotional stability, optimizes interpersonal support, and enhances treatment adherence during the preparation for surgery.

Importantly, studies also demonstrate that interventions targeting family functioning—particularly those aimed at improving communication, role clarity, mutual support, and emotional responsiveness—can lead to measurable improvements in both psychological and medical outcomes. For instance, family-centered empowerment interventions have shown significant benefits for heart failure patients and their caregivers (19). Similarly, therapeutic approaches aimed at strengthening meaning-making, marital satisfaction, and family cohesion have demonstrated efficacy among couples experiencing chronic illness and emotional strain (20). The present findings provide further justification for integrating such family-based interventions into cardiac care, especially for patients exhibiting high interpersonal dependency.

Finally, the strong predictive role of interpersonal dependency and marital status aligns with cross-cultural research demonstrating that relational dynamics are especially salient in non-Western or family-oriented societies. Studies conducted during the COVID-19 pandemic confirm that family functioning, social support, and emotional cohesion were essential predictors of well-being across different cultural contexts (13, 14). The current findings reinforce the importance of these relational structures in shaping outcomes in cardiac populations.

Collectively, the results of this study contribute to a deeper understanding of the relational, emotional, and demographic determinants of family functioning in patients preparing for open-heart surgery. The findings underscore the need for integrated psychosocial interventions that address interpersonal dependency, strengthen spousal dynamics, and enhance family communication and emotional cohesion.

This study relied on self-report questionnaires, which may be influenced by social desirability or response bias. The cross-sectional design prevents conclusions about causal relationships among variables. The sample was limited to patients from specific cardiac centers, which may reduce generalizability to other regions or healthcare settings. Cultural factors were not examined in depth, though they may strongly influence family dynamics. Finally, the study did not include qualitative data that could provide richer contextual insight into family functioning.

Future studies should employ longitudinal designs to track changes in family functioning before and after cardiac surgery. Researchers may also examine cultural, economic, and relational factors that interact with interpersonal dependency. Incorporating qualitative interviews would provide deeper insight into the lived

experiences of patients and spouses. Comparative studies across regions, illness types, and medical conditions may clarify the specificity of these findings. Future research should also explore targeted family-based interventions and test their effectiveness in improving postoperative outcomes.

Clinicians should assess interpersonal dependency patterns in cardiac patients to identify families at risk of relational strain. Pre-surgical counseling programs should incorporate family-focused education, stress management techniques, and communication skills training. Healthcare providers should engage spouses and family caregivers as active partners in treatment planning. Developing structured family-support interventions may enhance emotional resilience, improve treatment adherence, and increase overall recovery outcomes for patients preparing for open-heart surgery.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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