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# The effect of caregivers' care burden and psychological resilience on the psychosocial adjustment of patients with open heart surgery in Turkey

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## ABSTRACT

This cross-sectional study investigated the effect of caregivers' care ( $n = 100$ ) burden and psychological resilience on the psychosocial adjustment of patients ( $n = 100$ ) with open heart surgery. Patients had poor psychosocial adjustment. Caregivers who felt incompetent in providing care had a higher care burden and a lower psychological resilience than those who did not. In addition, patients whose caregivers had higher resilience and lower burden of care had better psychosocial adjustment. The results of this study compellingly demonstrate the importance and necessity of supportive and preventive clinical social work interventions to enhance patients' adaptation to a new lifestyle and compliance with treatment during the cardiac rehabilitation process, and reduce the burden on caregivers.

## ARTICLE HISTORY

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## KEYWORDS

Care burden; open heart surgery; psychosocial adjustment; resilience

## Introduction

The elderly population is increasing rapidly due to decreasing fertility and rising life expectancy worldwide. Consequently, a growing number of people are experiencing cardiovascular diseases (Gaziano et al., 2010). According to the World Health Organization (World Health Organization, 2023), cardiovascular diseases remain the leading cause of death globally. In 2019, an estimated 17.9 million people succumbed to cardiovascular diseases, constituting 32% of all global deaths. What is more, it is predicted that more than 23 million people will die from cardiovascular diseases by 2030 (World Health Organization, 2021). According to the Türkiye İstatistik Kurumu (TÜİK) (2019), circulatory system diseases (36.8%), tumors (18.4%), and respiratory system diseases (12.9%) are the top three leading causes of death. The majority of deaths due to circulatory system diseases are caused by ischemic heart (39.1%), cerebrovascular (22.2%), and other heart diseases (25.7%) (TSI, 2019).

Coronary artery bypass graft (CABG) is a common type of cardiopulmonary surgery. During CABG, blood flow and oxygen supply to the heart are improved by redirecting blood around narrowed or blocked arteries (Head

et al., 2017). Following the procedure, patients may encounter various complications, including chest pain, fatigue, shortness of breath, and weakness during daily activities (Çiftçi, 2010). Additionally, patients may face challenges related to neuropsychological failure, stroke, postoperative delirium (Norkiene et al., 2007), and short- or long-term cognitive decline (İşkesen et al., 2007). In the literature, it has been identified that patients may experience significant levels of anxiety, depression (Açikel, 2019; Nguyen et al., 2018; Tully & Baker, 2012), panic disorder, and fear of death due to becoming dependent for a certain period and lifestyle changes after CABG (Condon & McCarthy, 2006). In addition to these psychological challenges, difficulties in adapting to the postoperative situation have been observed, including changes in patients' social relationships, sexual activities (Forouzannia et al., 2012), and work life. This is coupled with alterations in physical appearance and weight, resulting in the impact on self-esteem, loss of self-confidence, decreased life satisfaction, and a deterioration in the quality of life (Alpert et al., 2017; Pourafkari et al., 2016; Thornton et al., 2005). In a study examining the changes in the interpersonal relationships of patients before and after open-heart surgery, it was reported that there were significant reductions in empathy, approval dependency, trust in others, and emotional awareness levels compared to the preoperative period (Kendirkıran & Batmaz, 2020).

Cardiovascular diseases have a more significant impact on the quality of life than many other chronic diseases and types of cancer. Therefore, the support of family caregivers plays a crucial role in the treatment of this disease (Molloy et al., 2005). In Turkey, it is culturally recognized as a fundamental responsibility and valuable practice to have family members as caregivers in the care of adult patients. Family caregivers in Turkey view caring for their patients as a way of showing respect, love, and compassion, which they internalize as a part of their culture (Gök Metin et al., 2019). In Turkey, there is a cultural expectation for family members to take care of their elders, with the hope that this responsibility will be passed down from generation to generation. Wives, daughters, and sons all feel a sense of duty and responsibility toward caring for their elderly family members. They are unwilling to leave their loved ones in the care of paid or institutional caregivers, even if it means that they must provide long-term care. However, this cultural structure, coupled with the lack of official rehabilitation services, can lead to other issues (Yurtsever et al., 2013). Care burden is a multidimensional concept that transforms into an intense and long-term obligation, affecting the mental and physical health of the caregiver. It consumes their time and energy, leading to the sacrifice of work or other recreational and social activities. Care burden results in difficulties in achieving harmony among family relationships, social life roles, and caregiving roles (Doğan & Aslaner, 2023; Macneil et al., 2010). In the literature, it is reported that caregivers of individuals requiring long-term care exhibit depressive symptoms in varying proportions, ranging from 40% to

70%. Additionally, approximately 50% of these caregivers receive a diagnosis of depression (Bédard et al., 2004; Doğan & Aslaner, 2023; Nabors et al., 2002).

Some studies have demonstrated the significant impact of the support and care provided by family members on the biopsychosocial adaptation and overall well-being of a sick individual. Research indicates that post-CABG surgery, the depressive symptoms exhibited by the patient increase the caregiver's burden (Doğan & Aslaner, 2023; Solorzano Singh et al., 2021), which, in turn, hinders the patient's recovery (Moser & Dracup, 2004; Önal et al., 2019) and psychosocial adaptation, leading to repeated hospitalizations (Schwarz & Elman, 2003). In support of this research, it has been found that individuals with caregivers who provide strong and positive social support tend to have better psychosocial adaptation to illness (Türten Kaymaz & Akdemir, 2016). For the care support provided to individuals with cardiovascular disease to be effective, it is crucial to address the needs and care burden of family members who provide care. This includes providing them with information, care, support, empathy, and motivation. By doing so, caregivers are better equipped to provide effective care, which can ultimately improve the health outcomes of those with cardiovascular disease (Kendirkıran & Batmaz, 2020).

The COVID-19 pandemic has had a profound impact on healthcare systems, healthcare professionals, and caregivers globally, including in Turkey. Many caregivers have been compelled to assume greater responsibility for patient care. As of 22 November 2023, the WHO reports 772,166,517 COVID-19 cases and 6,981,263 deaths worldwide, marking it as the most contagious disease in history (World Health Organization, 2023). Research indicates that COVID-19 can induce cardiac symptoms (Yang et al., 2020), and the medications used for its treatment may increase the risk of cardiovascular diseases (B. Li et al., 2020; Xie et al., 2022). The pandemic has not only led to the progression of cardiovascular diseases but has also imposed limitations on surgical interventions, giving rise to complications (Subih et al., 2020). Caregivers experienced increased caregiving burden not only due to the challenges in managing symptoms, adapting to treatment, and maintaining healthy lifestyle behaviors but also because of patients' physical (shortness of breath, fatigue, etc.) and emotional (anxiety, fear, postoperative depression, etc.) symptoms. This situation has been exacerbated by post-operative recovery difficulties and preventive measures implemented in response to the pandemic (Uysal & Argin, 2021). When dealing with care-related issues, caregivers tended to resort to ineffective coping strategies (avoidance/disconnection) against feelings of anger, fear, helplessness, and guilt. This has led to an increase in the maintenance burden (Kazemi et al., 2021).

One of the individual abilities crucial for maintaining caregivers' mental health and effective coping is their level of psychological resilience. Psychological resilience, defined as the ability to cope with stress and challenges and respond flexibly to pressure, encompasses strategies that enhance social

performance, positive reactions to challenging situations, and improvements in mental health (Sisto et al., 2019). High psychological resilience is associated with caregivers employing positive coping strategies (Mulud & McCarthy, 2017), whereas those with high stress levels are likely to exhibit lower psychological resilience (Yağmur & Nehir Türkmen, 2017). Research highlights that individuals participating in training programs focused on psychological resilience show improved interpersonal skills, articulate positive feelings, build self-confidence and self-esteem, and effectively manage negative emotions, stress, and depression (Zoladl et al., 2020). Given the ongoing and dynamic nature of the COVID-19 epidemic, caregivers' situations and challenges evolve. Health systems and social support mechanisms must continually develop strategies to provide effective support to caregivers. Proactive preventive health practices, including stress management techniques, counseling services, support groups, and access to mental health resources, are essential for caregivers. This approach can contribute to better quality care delivery, reduce the burden of care, and promote overall well-being throughout the caregiving journey.

Despite numerous studies on the care burden and adaptations of patients after open-heart surgery in Turkey, the relationships between these variables, the nature of the relationships caregivers establish with the patients, the level of their participation in care, their perceptions of the burden of care, their levels of psychological resilience, and how well they adapt to new conditions remain unanswered questions. The primary goal of the present study is to determine how caregivers perceive the burden of caring for adults with open heart surgery in Turkish society. The secondary goal is to examine the correlation between the psychosocial adjustment of patients with open heart surgery and the caregivers' care burden and psychological resilience.

The following is the research question:

Is there a relationship between the caregiver's perception of burden, the level of psychological resilience, and the patient's psychosocial adjustment to open-heart surgery?

## **Methods**

### ***Aim***

The study aimed to examine if there is a relationship between patients' psychosocial adaptation levels and caregivers' care burden and resilience levels.

### ***Design***

In this clinical study, cross-sectional methods were used. The sample included 100 patients and 100 caregivers. All patients had undergone open-heart surgery in the cardiovascular surgery unit of a public hospital, which is a tertiary care center located in a metropolitan city in Turkey. Participation

in the study was voluntary. The inclusion criteria for patients were: (1) being over 18 years of age, (2) providing informed consent, (3) being able to read and write Turkish fluently, and (4) having no issues with vision or hearing. The inclusion criteria for caregivers were: (1) having stayed with the patient for more than three nights after they were transferred to the ward. (2) Members of the patient's first-degree family (spouse, child, mother, father, sibling, mother-in-law, father-in-law).

### ***Procedure***

The study was conducted between June and December 2020, during the early stages of the COVID-19 pandemic when strict preventive measures were introduced regarding surgery and caregiver procedures in the hospital. Data was collected through face-to-face interviews. The power analysis was performed after the study to determine if the sample was large enough to detect significant differences. The effect size was calculated based on the PAIS-SR mean and standard deviation scores of those with and without communication difficulties, revealing a power of 96%. As per hospital procedures, a patient undergoing open heart surgery is first transferred to the intensive care unit and then to the ward 72 hours after their condition stabilizes. In this particular study, the data was collected three days after patients were transferred to the ward. Patients filled out the data collection tools in their rooms while caregivers were interviewed face-to-face in a separate room.

### ***Measures***

#### ***Data collection tools***

The data were collected using a personal information form, the Zarit Burden Interview (ZBI), the Connor-Davidson Resilience Scale (CD-RISC), and the Psychosocial Adjustment to Illness Scale – Self-Report (PAIS-SR).

#### ***Personal information form***

The personal information form was based on a literature review conducted by the researcher. The form consisted of two parts. The first part consisted of nine items on patients' demographic characteristics (age, gender, education, marital status, employment, monthly income, chronic physical and/or psychiatric illnesses, medication status, and communication problems). The second part consisted of 12 items on caregivers' demographic characteristics (age, gender, marital status, education, occupation, monthly income, chronic physical and/or psychiatric illnesses, degree of kinship, living with the patient, caregiving experiences, feelings during caregiving, level of competence in meeting the patient's

needs and receiving assistance in care) (Gök Metin et al., 2019; Kendirkıran & Batmaz, 2020; Molloy et al., 2005; Moser & Dracup, 2004; Önal et al., 2019; Türten Kaymaz & Akdemir, 2016; Yağmur & Nehir Türkmen, 2017).

### ***Zarit Burden Interview (ZBI)***

The Zarit Burden Interview (ZBI) was developed by Zarit & Zarit (1990) and adapted to fit the culture in Turkey by İnci and Erdem (2006). The instrument consists of 22 items rated on a five-point Likert-type scale ranging from 0 (Never) to 4 (Nearly Always). The total score ranges from 0 to 88, with higher scores indicating increased levels of care burden. The Turkish version has a Cronbach's alpha of 0.75 (17), which was 0.89 in the present study.

### ***Connor-Davidson Resilience Scale (CD-RISC)***

The Connor-Davidson Resilience Scale (CD-RISC) was developed by Connor-Davidson (2003) and adapted to fit the culture in Turkey by Kararmak (2007). The instrument consists of 25 items rated on a five-point Likert-type scale. It has three subscales: (1) tenacity and personal competence, (2) tolerance of negative affect, and (3) tendency toward spirituality. The total score ranges from 0 to 100. The Turkish version has a Cronbach's alpha of 0.89 (18). In the present study, the total scale had a Cronbach's alpha of 0.95, while the subscales "tenacity and personal competence," "tolerance of negative affect," and "tendency toward spirituality" had a Cronbach's alpha of 0.94, 0.84, and 0.55, respectively.

### ***Psychosocial Adjustment to Illness Scale–Self-Report (PAIS-SR)***

The Psychosocial Adjustment to Illness Scale – Self-Report (PAIS-SR) was developed by Derogatis and Lopez (1986) and adapted to fit the culture in Turkey by Adaylar (1995). The instrument consists of 46 items rated on a four-point Likert-type scale. It asks individuals to select from a set of four responses that range from good (0) to poor adjustment (3). A score below 35 indicates good psychosocial adjustment. A score of 35 to 51 indicates moderate psychosocial adjustment. A score above 51 indicates poor psychosocial adjustment. The Turkish version has a Cronbach's alpha of 0.94 (19), which was 0.86 in the present study. The scale has seven domains: (1) health care orientation, (2) vocational environment, (3) domestic environment, (4) sexual relationship, (5) extended family relationships, (6) social environment, and (7) psychological distress. The subscales have a Cronbach's alpha of 0.87, 0.83, 0.78, 0.96, 0.89, 0.92, and 0.79, respectively. In the present study, the subscales had a Cronbach's alpha of 0.94, 0.84, 0.65, 0.79, 0.72, 0.85, and 0.89, respectively.



## **Data analysis**

The data were analyzed using the Statistical Package for Social Sciences (SPSS 22.0) at a significance level of 0.05. Number, percentage, minimum and maximum values, mean, and standard deviation were used for descriptive statistics. The Shapiro – Wilk test was used for normality testing. The results showed that the data were not normally distributed. Therefore, nonparametric tests (Mann-Whitney U and Kruskal Wallis) were used for the analysis. Spearman's correlation coefficient was used to determine the relationship between scale scores. A linear regression analysis was performed to model the relationship.

## **Results**

### ***Sociodemographic characteristics of patients and caregivers***

Patients had a mean age of  $56.95 \pm 11.33$  years. Half the patients were men (51%). More than half the patients were married (79%). More than a quarter of the patients had middle school (38%) or high school degrees (28%). Most patients were unemployed (72%). Almost half the patients had a neutral income (income = expense) (48%). More than half the patients had chronic diseases (57%) and were on medication (60%). The majority of the patients had no difficulty communicating with their caregivers (88%).

Caregivers had a mean age of  $39 \pm 12.14$  years. More than half the caregivers were women (60%) and married (78%). A quarter of the caregivers had high school degrees (24%), while more than a quarter had bachelor's degrees (36%). Caregivers were the spouses (33%), mothers (13%), or fathers (21%) of the patients. More than half the caregivers lived with their patients (58%). More than half the caregivers were employed (67%). A quarter of the caregivers had a negative income (income < expense) (26%), while more than half had a neutral income (65%). Most caregivers had no chronic diseases (80%) and no difficulty communicating with their patients (88%). More than half the caregivers shared the caregiving responsibility with others (61%). Almost half the caregivers felt competent in providing care (47%), while less than half found themselves partially competent in providing care (40%).

### ***Findings regarding patients' psychosocial adaptation and caregiver burden and psychological resilience of patients' relatives***

Patients had a mean PAIS-SR score of  $74.79 \pm 21.68$ . They had a mean PAIS-SR "health care orientation," "vocational environment," "domestic environment," "sexual relationship," "extended family relationships," "social environment," and "psychological distress" subscale score of  $5.82 \pm 5.35$ ,  $13.71 \pm 4.76$ ,  $8.94 \pm 5.06$ ,  $15.15 \pm 4.56$ ,  $6.48 \pm 4.60$ ,  $14.10 \pm 5.48$ , and  $15.36 \pm 7.1$ , respectively (Table 1).



Caregivers had a mean CD-RISC score of  $66.02 \pm 17.34$ . They had a mean CD-RISC “tenacity and personal competence,” “tolerance of negative affect,” and “tendency toward spirituality” subscale score of  $66.02 \pm 17.34$ ,  $13.71 \pm 4.76$ , and  $11.43 \pm 2.67$ , respectively (Table 2).

Female patients had significantly higher mean PAIS-SR total and “sexual relationship” and “psychological distress” subscale scores than their male counterparts. Patients on medications had significantly higher mean PAIS-SR total and “psychological distress” subscale scores than those who were not. Patients who had difficulty communicating with their caregivers had significantly higher mean PAIS-SR total and “health care orientation,” “domestic environment,” and “social environment” subscale scores than those who did not ( $p < .05$ ). (Table 3).

Caregivers who had difficulty communicating with their patients had significantly lower CD-RISC total and “tenacity and personal competence” and “tolerance of negative affect” subscale scores than those who did not. Caregivers with a high income had a significantly higher CD-RISC “tolerance of negative affect” than those with a low income ( $p < .05$ ). (Table 4).

Caregivers who had difficulty communicating with their patients had a significantly higher mean ZBI score than those who did not ( $p < .01$ ). Caregivers who shared the caregiving responsibility with others had a significantly lower mean ZBI score than those who did not ( $p < .01$ ). Caregivers who were aware of their feelings had a significantly lower mean ZBI score than those who were not. Caregivers who felt competent in providing care had a significantly lower mean ZBI score than those who did not ( $p < .01$ ). (Table 5).

**Table 1.** Mean PAIS-SR scores of the patients ( $N = 100$ ).

PAIS-SR Parameters	Mean $\pm$ SD	Minimum	Maximum
Healthcare orientation	$5.82 \pm 5.35$	0	24
Vocational environment	$13.71 \pm 4.76$	2	24
Domestic environment	$8.94 \pm 5.06$	0	24
Sexual relationships	$15.15 \pm 4.56$	0	18
Extended family relationships	$6.48 \pm 4.60$	0	15
Social environment	$14.10 \pm 5.48$	0	18
Psychological distress	$15.36 \pm 7.1$	0	21
Total	$74.79 \pm 21.68$	15	114

Abbreviations: SD: Standard Deviation.

**Table 2.** Mean CD-RISC and ZBI scores of caregivers ( $N = 100$ ).

CD-RISC and Parameters	Mean $\pm$ SD	Minimum	Maximum
Tenacity and personal competence	$40.88 \pm 11.51$	13	60
Tolerance of negative affect	$13.71 \pm 4.76$	2	24
Tendency toward spirituality	$11.43 \pm 2.67$	2	16
CD-RISC total	$66.02 \pm 17.34$	28	99
ZBI total	<b><math>29.13 \pm 13.91</math></b>	<b>3</b>	<b>71</b>

Abbreviations: SD: Standard Deviation.

**Table 3.** PAIS-SR mean scores according to the sociodemographic characteristics of the patients (N = 100).

Variables	N	PAIS-SR PARAMETERS					PAIS-SR Total (n = 100)
		Healthcare orientation	Domestic environment	Sexual relationships	Social environment	Psychological distress	
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Sex							
Female	49	6,06 ± 5,35	9,43 ± 4,78	16,29 ± 3,41	14,51 ± 5,17	17,69 ± 5,05	79,78 ± 20,14
Male	51	5,59 ± 5,40	8,47 ± 5,32	14,06 ± 5,24	13,71 ± 5,79	13,12 ± 8,04	70,00 ± 22,21
Statistics <sup>a</sup>		1178,50/0,617	1113,50/0,340	896,00/0,007**	1151,00/0,450	840,00/0,003**	2,302/0,023*
Patients on medications							
Yes	60	6,20 ± 5,17	9,25 ± 4,63	15,75 ± 3,96	14,75 ± 5,58	16,45 ± 6,66	78,55 ± 21,35
No	40	5,25 ± 5,63	8,48 ± 5,67	14,25 ± 5,25	13,13 ± 5,24	13,73 ± 7,50	69,15 ± 21,19
Statistics <sup>a</sup>		1044,00/0,262	1015,50/0,186	1026,00/0,177	956,00/0,056	925,50/0,042*	2,163/0,033*
Difficulty communicating with their caregivers							
Yes	12	9,50 ± 5,24	12,50 ± 4,01	17,25 ± 1,35	17,50 ± 1,16	18,75 ± 4,45	93,00 ± 14,69
No	88	5,32 ± 5,20	8,45 ± 5,01	14,86 ± 4,76	13,64 ± 5,68	14,90 ± 7,28	72,31 ± 21,34
Statistics <sup>a</sup>		289,50/0,01*	268,50/0,00**	373,50/0,071	337,00/0,024*	361,00/0,062	3,248/0,002**

Abbreviations: <sup>a</sup>Mann-Whitney U/Kruskal Wallis, \*p < .05 \*\*p < .01.

**Table 4.** CD-RISC mean scores according to the sociodemographic characteristics of the caregivers (N = 100).

Variables	N	CD-RISC Parameters			CD-RISC Total (N= 100)
		tenacity and personal competence Mean± SD	tolerance of negative affect Mean± SD	tendency toward spirituality Mean± SD	
Income status					
Income less than expenses	26	38,69 ± 13,07	12,44 ± 4,78	11,13 ± 2,58	62,25 ± 18,96
Income equals expense	65	42,38 ± 9,57	14,52 ± 4,44	11,65 ± 2,83	68,54 ± 15,10
Income more than expenses	9	49,25 ± 7,80	19,25 ± 2,36	12,50 ± 1,73	81,00 ± 9,89
Statistics <sup>a</sup>		3,839/0,147	5,575/ <b>0,005**</b>	1,995/0,369	5,498/0,064
Difficulty communicating with their patients					
Yes	12	27,08 ± 9,86	9,33 ± 5,19	10,25 ± 2,56	46,67 ± 16,45
No	88	42,76 ± 10,43	14,31 ± 4,41	11,59 ± 2,66	68,66 ± 15,79
Statistics <sup>a</sup>		146,00/ <b>0,000**</b>	-587/ <b>0,001**</b>	353,50/0,062	179,00/ <b>0,000**</b>

Abbreviations: <sup>a</sup>Mann-Whitney U/Kruskal Wallis, \*p < .05 \*\*p < .01.

**Table 5.** The mean ZBI scores of the caregivers by Sociodemographic Characteristics (N = 100).

ZBI Total	Sociodemographic characteristics	N	Mean± SD	Mann-Whitney U/Kruskal Wallis/p
Difficulty communicating with their patients	Yes	12	45,33 ± 17,24	216,50/ <b>0,001**</b>
	No	88	26,92 ± 11,89	
Caregivers who shared the caregiving responsibility with others	Yes	61	25,25 ± 10,25	733,00/ <b>0,001**</b>
	No	39	35,21 ± 16,62	
Caregivers who were aware of their feelings	Sufficient	47	25,26 ± 11,64	15,23/ <b>0,002**</b>
	Partly sufficient	40	29,58 ± 14,48	
	Insufficient	6	36,67 ± 13,48	
	Unknown	7	46,14 ± 11,26	

Abbreviations: <sup>a</sup>Mann-Whitney U/Kruskal Wallis, \* $p < .05$  \*\* $p < .01$ .

**Table 6.** Correlation Analysis of Patients' PAIS-SR and caregivers' CD-RISC and ZBI.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>CD-RISC</b>	1							
tenacity and personal competence (1)								
tolerance of negative affect (2)	0,820**	1						
tendency toward spirituality (3)	0,581*	0,485*	1					
CD-RISC Total point (4)	0,979**	0,895**	0,673*	1				
<b>ZBI Total point(5)</b>	-0,440*	-0,405*	-0,352	-458*	1			
<b>PAIS-SR</b>	-0,338	-0,267	-0,244	-,335	0,555*	1		
domestic environment (6)								
social environment(7)	-0,315	-0,189	-0,239	-,298	0,447*	0,551	1	
PAIS-SR total points(8)	-0,453*	-0,391	-0,278	-451*	0,586*	0,788	0,711	1

\* $p < .05$  \*\* $p < .01$ .

**Table 7.** The effect of Independent variables on PAIS scores.

Variables	PAIS Scale				
	Model 1 ( $\beta$ )	Model 2 ( $\beta$ )	Model 3 ( $\beta$ )	Model 4 ( $\beta$ )	Model 5 ( $\beta$ )
Sex	9.776				
Regularly Medication Use		9.400			
Experiencing Difficulty Communicating with a Caregiver			20.693		
Caregivers' Burden				0.912	
Caregivers' Resilience					0.563
R	0.227	0.213	0.312	0.586	0.451
R <sup>2</sup>	0.051	0.046	0.097	0.343	0.203
F	5.301	4.679	10.548	51.143	25.005
P	0.023*	0.033*	0.002*	0.000**	0.000**
DW	1.655	1.603	1.716	1.818	1.742

Abbreviations: DW, Durbin – Watson; PAIS: The Psychosocial Adjustment Of illness' Scale.

\* $p < .05$ . \*\* $p < .001$ .

There was a negative correlation between CD-RISC “tenacity and personal competence” scores and ZBI ( $r$ :-0.453,  $p < .05$ ) and PAIS-SR ( $r$ :-0.440,  $p < .05$ ) total scores. There was a negative correlation between CD-RISC “tolerance of negative affect” scores and ZBI total score. There was a negative correlation between CD-RISC total score and PAIS-SR ( $r$ :-0.278,  $p < .05$ ) and ZBI ( $r$ :-0.451,  $p < .05$ ) total scores. There was a positive correlation between the ZBI total score and PAIS-SR total ( $r$ :0.586,  $p < .05$ ) and “domestic environment”

( $r:0.555$ ,  $p < .05$ ) and “social environment” ( $r:0.447$ ,  $p < .05$ ) subscale scores. (Table 6).

Table 7 shows the effect of some variables on patients’ PAIS-SR scores. The increase in their PAIS-SR scores was explained by gender [5.1% ( $R^2: 0.051$ )], medication use [4.6% ( $R^2:0.046$ )], communication problems with caregivers [9.7% ( $R^2: 0.997$ )], caregivers’ burden of care [34.3% ( $R^2: 0.343$ )], and caregivers’ psychological resilience [20.3% ( $R^2: 0.203$ )].

## Discussion

Patients who receive effective health care after open heart surgery are likely to adapt to their current state faster and stay in the hospital shorter (Herdy et al., 2008). Family members also provide home care to their patients from the pre-operative period. Taken together, as multidisciplinary healthcare professionals, we need to understand the burden of care on family members and determine the relationship between care burden and psychological resilience. Healthcare team members can be effective in relieving caregivers’ burden of care and helping them see the importance of self-care, informing them about measures to increase resilience, providing quality care to their relatives, and preventing burnout (Pope et al., 2017).

Health professionals may underestimate the significance of the health education they provide as an intervention for patients and caregivers. However, it is crucial to remember that education given to patients and their families is an indispensable practice among the fundamental elements of healthcare. This training serves as a practice that encourages them to effectively communicate reliable information, make informed decisions, strengthen their autonomy, and take control of their psychosocial adjustment.

Examining the study results, it was revealed that the majority of patients who underwent open heart surgery had poor psychosocial adjustment (85%). Only five patients had good psychosocial adjustment (5%), while ten had moderate psychosocial adjustment (10%). Patients had the highest scores on the psychological distress, sexual relationship, social environment, and vocational environment subscales, indicating that patients with open heart surgery have difficulty adjusting to vocational, social, and sexual relationships and experience high levels of psychological distress. Togluk and Çuhadar (2021) also found that patients with COPD (Chronic Obstructive Pulmonary Disease) had poor psychosocial adjustment in the early postoperative period. In our research, male patients had significantly lower mean PAIS-SR “sexual relationship” and “psychological distress” subscale scores than their female counterparts, indicating that male patients have less difficulty adjusting to sexual relationships and experience less psychological distress than female patients. Freitas et al. (2013) also determined that male

patients with congenital heart disease had better psychosocial adjustment than their female counterparts. On the other hand, Lin et al. (2015) reported that male patients tended to be under more pressure than females regarding social-role adjustment.

Marital status, employment, chronic diseases, education, and monthly income did not affect patients' PAIS-SR total and "health care orientation," "vocational environment," "domestic environment," "extended family relationships," and "social environment" subscale scores ( $p > .05$ ). Wang et al. (2014) also reported that income, chronic diseases, education, and employment did not affect the psychosocial adjustment of patients undergoing peritoneal dialysis.

In this study, patients who were on medications had significantly higher mean PAIS-SR total and "psychological distress" subscale scores than those who were not ( $p < .05$ ). This outcome might be linked to the existence of patients who, because of prolonged medication use, did not receive sufficient medical support to adhere to treatment during the pandemic. Furthermore, this finding may indicate that patients could be dealing with more severe illnesses. This situation could potentially explain the heightened burden on caregivers as well.

Patients who had difficulty communicating with their caregivers had significantly higher mean PAIS-SR total and "health care orientation," "domestic environment," and "social environment" subscale scores than those who did not ( $p < .05$ ). Although no research supports this finding, it is not surprising because communication is an integral part of relationships and feeling supported. Therefore, patients with good communication and a strong bond with their caregivers are more likely to have good psychosocial adjustment (Başol, 2018).

Caregivers had a moderate level of psychological resilience. Yağmur and Nehir Türkmen (2017) also reported that family members caring for patients with mental illness had a moderate level of psychological resilience. High-income caregivers had a significantly higher CD-RISC "tolerance of negative affect" than their low-income counterparts ( $p < .05$ ). Research shows a positive correlation between income and psychological resilience (Kalomo et al., 2018). Our results are probably because income affects one's coping strategies and opportunities. Low-income caregivers are more likely to have difficulty meeting their patients' and their own needs at the same time, resulting in an increased physical, emotional, social, and financial burden. As a result, they have difficulty in providing care and adaptation to their patients. On the other hand, having a better income could allow caregivers to take breaks from their duties or access opportunities for rest, both for themselves and for the patients. In this respect, health professionals should advocate expanding healthcare funds for caregivers to include self-care to strengthen service delivery (Pope et al., 2017).

Caregivers had a moderate level of care burden, which is consistent with the literature (Subih et al., 2020). This is probably because our patients and their caregivers stayed in the hospital shorter than others to avoid infections due to the pandemic. Furthermore, in this study, the burden of care was assessed only after caregivers spent 3 days in the hospital, and the duration of caring for patients at home could not be further evaluated. If measured until the completion of the care cycle, the burden of care might have indeed increased.

Caregivers who had difficulty communicating with their patients had a significantly higher mean ZBI score than those who did not ( $p < .01$ ). Subih et al. (2020) reported higher levels of care burden among caregivers who were not close relatives. Effective communication and family support are critical to sustainable care. Caregivers who shared the caregiving responsibility with others had a significantly lower mean ZBI score than those who did not ( $p < .01$ ). Caregivers who share the caregiving responsibility are likely to experience less care burden. For example, Naganuma et al. (2021) found that primary family caregivers who received social and emotional support experienced less care burden than those who did not. Caring for surgical patients presents many challenges. Therefore, caregivers need support and respite from family and friends.

Caregivers who were aware of their feelings had a significantly lower mean ZBI score than those who were not. Caregivers who felt competent in providing care had a significantly lower mean ZBI score than those who did not ( $p < .01$ ). Lidell (2002) points to a negative correlation between emotional support and care burden and argues that caregivers with emotional distress are more likely to feel incompetent in coping with challenges.

The correlation results showed that the higher the psychological resilience, the lower the care burden on caregivers. The results also showed that the higher the psychological resilience in caregivers, the higher the psychosocial adjustment in patients. Research shows that caregivers with higher psychological resilience are likely to suffer less from care burden (Atak & Özekes, 2019; Y. Li et al., 2018; Mulud & McCarthy, 2017; Önal et al., 2019; Qiu et al., 2021). A heightened burden of care affects both the patient and the caregiver. It causes delayed recovery and paves the way for different complications.

The regression analysis showed that gender, communication problems, and medication use predicted patients' PAIS-SR scores ( $p < .05$ ). Research shows that social support reduces the burden of care and depression, whereas low social support and insufficient self-care adversely affect symptom management (Dekker et al., 2009; Graven & Grant, 2014; Yavaş, 2020). Health professionals responsible for the care of patients undergoing open heart surgery also have a counseling role as they provide psychosocial support to patients and their families by providing education and information on rehabilitation options that will increase the freedom and well-being of the individual. Caregivers who receive social support and training are likely to have



better psychological well-being and resilience, which indirectly affects patients' recovery and adaptation processes positively.

One of the psychosocial support practices implemented to enable heart patients and caregivers to cope more effectively with this process is cardiac rehabilitation. Cardiac rehabilitation aims to improve the quality of life for individuals with heart disease while also reducing the physical, mental, and social care burden on caregivers during this process. Social workers, as part of the cardiac rehabilitation team, play crucial roles in patient and family-centered care practices using methods such as individual counseling, group work, and education (Marmo et al., 2024; Moradian, 2018). The literature emphasizes that social work interventions encompass problem-focused counseling, addressing the physical, social, and emotional needs of patients and families dealing with heart failure and other chronic illnesses. These interventions involve providing psychoeducational support to cope with loss, anxiety, anger, and stress. Additionally, they include offering guidance on communication skills, directing individuals to social service resources tailored to their needs, ensuring effective communication and coordination among the health team and other support services, facilitating family communication, and providing post-discharge home care (Kumar et al., 2021; Marmo et al., 2024). Beneficial outcomes and improved well-being have also been documented in a wide range of areas, including rehabilitation, strengthening social integration and links with social services, identifying end-of-life preferences, informing patients of their rights, guiding them through legal processes when necessary, and assessing financial situations (Marmo et al., 2024; O'Donnell et al., 2018; Pozet et al., 2016).

## Conclusion

For caregivers, the major risk factors for an increased care burden are gender (female), low-income status, chronic diseases, communication problems, and a lack of shared responsibility for care. Moreover, communication problems and low-income status are major risk factors for low psychological resilience. For patients, the major risk factors for poor psychosocial adjustment are gender (female), communication problems, medication use as well as high care burden and low psychological resilience on the part of caregivers.

Considering these results, we think that authorities responsible for the provision and planning of health care services should develop innovative care services for patients undergoing heart surgery and their caregivers in times of crisis such as the COVID-19 epidemic. They should also provide holistic care approaches. These approaches should encompass educational programs and telehealth services designed to offer support, counseling, information, and skills addressing patients' and their families' physical, mental, social, environmental, and spiritual needs (Nair et al., 2018; Subih et al., 2020).

From this point of view, we must consider all internal and external factors that may affect patients with cardiovascular diseases and their family members and develop strategies to help at-risk groups show great resilience in other times of crisis.

### **Limitation**

It is crucial to note that the study's measurements regarding caregivers' emotions and communication with patients were self-reported, and objective measurement tools such as observation or psychometric measurement could not be used, which is a significant limitation. Additionally, the study had a considerable number of subjects (200), which made the effective implementation of such measurements challenging. Moreover, the results were based on a single-centered cross-sectional analysis instead of longitudinal assessments of resilience and caregiver burden. The study solely focused on Turkish caregivers providing informal care at the hospital, and the perceived caregiver burden was assessed using only ZBI. Therefore, this study has limitations as it does not encompass all dimensions of caregiver burden.

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### **Authorship criteria**

(DÖK, SD) designed the study. (DÖK) collected the data. (SD) analyzed the data. (DÖK, SD) prepared the manuscript. All authors approved the final version for submission.

### **Informed consent statement**

All patients were informed about the research purpose and procedure. Informed consent was obtained from those who agreed to participate in the study.

## Institutional review board statement

The study was approved by the ethics committee of a university (180/5 March 2020). Written permission was obtained from the Republic of Turkey Ministry of Health Ankara Provincial Health Directorate Ankara Dışkapı Yıldırım Beyazıt Training and Research Hospital and Ankara Provincial Health Directorate.

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