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Relationship Between the Perception of Self-Efficacy and Early Post-Operative Symptoms in Patients Undergoing Coronary Artery Bypass Graft Surgery with Median Sternotomy

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Abstract

This study aimed to determine the relationship between the perception of self-efficacy and early post-operative symptoms in patients who had undergone coronary artery bypass graft (CABG) surgery with median sternotomy. All patients aged over 18 who had undergone CABG surgery for the first time with median sternotomy and who agreed to participate in the research. An "Individual Introduction Form", the "Barnason Efficacy Expectation Scale: Cardiac Surgical Version", and the "Heart Surgery Symptom Inventory" were used for data collection. Student t-test, One-Way ANOVA, Kruskal Wallis test, Man-Withney U test, correlation, and multiple linear regression analysis were used for data analysis. The means age of the patients who had undergone CABG surgery was 56.58±11.83. The severity of symptoms perceived by the patients was evaluated with HSSI and the mean scale score of the patients was 45.71±26.51. In the study, the self-efficacy score of the patients was 42.33±7.74. The level of self-efficacy of the patients increased as the mean age increased. Although the patients' levels of self-efficacy were high after coronary artery bypass graft surgery, the severity of their symptoms was moderate. Marital status, cohabitants, and family history of cardiac disease were found to affect the severity of patients' symptoms.

Keywords: Coronary artery bypass grafts, self-efficacy, severity of symptoms

INTRODUCTION

According to data from the World Health Organization (WHO), approximately 17.9 million people die each year due to cardiovascular diseases (CVD). In national and international, deaths due to cardiovascular diseases rank first among all causes (Nur'aeni et al., 2018; Sultana et al., 2015; Türkiye Saglık Bakanlıgı, 2022; Yavuz Emik et al., 2019). The most common disease among CVD diseases is coronary artery disease (CAD) (Onat & Can, 2010). Coronary artery bypass graft (CABG) surgery is the standard treatment method that is preferred frequently in the treatment of CAD (Dursun & Sanlı, 2013). However, patients experience physical, emotional, and social changes post-operatively (Oztekin et al., 1999). Patients require a lot of knowledge and skills in order to return to their pre-operative lives without complications, adapt to the new lifestyle, accept the change in body appearance, and pursue their lives as independently as possible (Folkman et al., 1986; Gultekin & Ozbayır, 2006; Ozcan, 2008; Oztekin et al., 1999). The level of self-efficacy is important for patients undergoing CABG surgery in order them to adapt to behavioral changes in areas such as post-operative exercises, coping with stress, appropriate diet, sexual life, smoking cessation, and limited alcohol consumption (Ozcan, 2008). Self-efficacy is defined as "*perceiving, gaining awareness, and being aware of or understanding feelings*" (Zulkosky, 2009). According to Bandura, self-efficacy is "*one's own judgment about his/her capacity to organize and successfully perform the activities necessary to reveal a certain performance*" (Bandura, 1977). One's perception of self-efficacy plays an essential role in adopting and initiating behavior and maintaining behavior changes (Schwarzer & Fuchs, 2010; Sol et al., 2006).

A good level of self-efficacy after coronary artery bypass graft surgery contributes to the reduction and management of disease risk factors (Ewart, 1989). Patients with a high level of self-efficacy use analgesics less after surgery, can better perform physical activities, achieve faster recovery, and return to work earlier after discharge. Therefore, a high level of self-efficacy is a tool for high motivation. High self-efficacy helps to increase self-confidence and the potential to cope with stress, thus increasing self-care power (Bandura et al., 1988; Glanz et al., 2002; Lev & Owen, 2000). A high level of perception of self-efficacy increases awareness of the disease and compliance with treatment, minimizes risk factors, prevents complications, and helps the individual gain healthy lifestyle behaviors. Accordingly, this study aimed to determine the relationship between the perception of self-efficacy and early post-operative symptoms in patients who had undergone coronary artery bypass graft surgery with median sternotomy.

MATERIAL and METHODS
Design

This research has a descriptive and cross-sectional design.

Research population and sample

The population of the research consisted of all patients (n=169) who underwent CABG surgery with median sternotomy in the Cardiovascular Surgery clinic of a university hospital between October 2021 and July 2022. The research sample consisted of all patients (n=159) aged over 18 who had undergone CABG surgery for the first time with median sternotomy and who agreed to participate in the research. Patients (n=10) who had simultaneously undergone CABG surgery and one of the cardiac surgeries (valve replacement, mechanical support device, pacemaker), who had a history of psychiatric disease, or who had communication problems (n=10) were excluded from the research.

Data collection

An "Individual Introduction Form", the "Barnason Efficacy Expectation Scale (BEES): Cardiac Surgical Version", and the "Heart Surgery Symptom Inventory (HSSI)" were used for data collection. Research data were collected in face-to-face interviews. The principles of the Declaration of Helsinki were followed for data collection.

Individual introduction form: The form was prepared based on the relevant literature (Avcı et al., 2013; Onat & Can, 2010) and consists of a total of 23 questions regarding sociodemographic characteristics (age, gender, marital status, education level, economic status, lifestyle, social security and occupation, date of operation, post-operative day, and post-operative satisfaction).

Barnason efficacy expectation scale (BEES) cardiac surgical version: The BEES cardiac surgical version was developed by Barnason et al. in 2002 (Barnason et al., 2002). The scale aims to determine the self-efficacy of patients in adapting to risk factors and lifestyle in terms of post-CABG recovery. The Cronbach alpha value of the scale was calculated as 0.93. BEES consists of a total of 15 items and 5 subscales: physical function, psychosocial function, diet modification, exercise-activity modification, and self-care management. The score of the entire scale ranges between 15-60. The Turkish validity and reliability of the scale was established by Avcı and Karahan in 2013(Avcı et al., 2013). In this study, the Cronbach alpha value of the scale was 0.813.

Heart surgery symptom inventory (HSSI): The inventory was developed by LaPier and Jung (2002). The original version consists of 76 items. The score obtainable from the inventory ranges between 0-140. The severity of symptoms increases as the scale score increases. There are no reverse items in the inventory. The Turkish validity and reliability study of the scale was carried out by Altınok and Saglam (Altınok & Saglam, 2018). The Cronbach alpha value of the inventory is 0.961. In this study, the Cronbach alpha value of the inventory was 0.951.

Statistical analysis

The data of the research were analyzed in the SPSS 25.0 statistical program. Among descriptive statistics, number, percentage, mean and standard deviation were used in the analysis of descriptive information of individuals. The normality analysis of the data was based on the normal distribution with the skewness and kurtosis values within the range of ± 2. Student t-test, One-Way ANOVA, Kruskal Wallis test, Man-Withney U test, correlation analysis, and multiple linear regression analysis were used for data analysis.

RESULTS

The mean age of the patients who had undergone CABG surgery was 56.58±11.83. Of the patients participating in the study, 56.0% were male; 45.9% lived with their spouses; 43.4% were smokers; 42.1% were overweight according to BMI. According to the findings of the patients regarding the disease process, 70.4% had a family history of cardiac disease and 48.4% had undergone surgical intervention. CABG surgery patients participating in the study had been diagnosed with the disease an average of 79.96±136.08 months ago; an average of 44.23±305.80 days passed after CABG surgery; the patients had been hospitalized in the intensive care unit for an average of 3.44±5.16 days after surgery (Table 1).

Table 1. Distribution of patients by sociodemographic and clinical characteristics

		X±SS (min-max)	
Age		56.58±11.83 (27-81)	
Disease diagnosis time (mounth)		79.96 ±136.08 (1-720)	
Duration after surgery (day)		44.23±305.80 (4-292)	
Duration of ıntensive care unit (day)		3.44±5.16 (0-6)	
		n	**%**
Gender	Famela	119	44.0
	Male	89	56.0
Marital status	Married	119	74.8
	Single	40	25.2
Level of education	Primary school	73	45.9
	Middle school	36	22.6
	High school	30	18.9
	University	20	12.6
Proffession	Officer	18	11.3
	Employee	34	21.4
	Housewife	46	28.9
	Retired	54	34.0
	Other	7	4.4
Economic conditions	Bad	50	31.4
	Middle	90	56.6
	Good	19	11.9
Living person	single	26	16.4
	Peer	73	45.9
	Peer and child	44	27.7
	Friends	16	10.1
Smoking	Yes	69	43.4
	No	90	56.6
Alcohol	Yes	26	16.4
	No	133	83.6
BMI	Underweight	2	1.3
	Normal	25	15.7
	Overweight	67	42.1
	Obesity class I	46	28.9
	Obesity class II	19	11.9
Family history of heart disease	Yes	112	70.4
	No	47	29.6
Comorbidity	Yes	78	49.1
	No	81	50.9
Surgery history	Yes	77	48.4
	No	82	51.6

The severity of symptoms perceived by the patients was evaluated with HSSI and the mean scale score of the patients was 45.71±26.51. The mean scores on the physical function, self-care, diet, psychological function, and exercise subscales of the self-efficacy scale were 7.86±1.93, 11.85±3.49, 5.67±1.49, 8.29±1.69, and 8.65±1.73, respectively. Also, the self-efficacy score of the patients was 42.33±7.74 (Table 2).

Table 2. Distribution of patients' HSSI and BEES scale score

	X ±SS	Min-Max	Skewness	Kurtosis
HSSI total	45.71 ± 26.51	0-120	0.418±0.192	-0.203±0.383
Physical function	7.86±1.93	3-12	0.188±0.192	0.084±0.383
Self-care	11.85±3.49	4-42	3.780±0.192	3.468±0.383
Diet modification	5.67±1.49	2-8	-0.248±0.192	-0.328±0.383
Psychosocial function	8.29±1.69	4-12	0.239±0.192	-0.380±0.383
Exercise-activity modification	8.65±1.73	3-12	-0.142±0.192	0.401±0.383
BEES total	42.33±7.74	18-75	0.653±0.192	2.058±0.383

According to these findings, the severity of symptoms was higher in patients who were single, who had been living alone, and who had a family history of cardiac disease (Table 3). Table 3 presents other data regarding the relationship between the subscales of the scale and the affecting factors. The level of self-efficacy of the patients increased as the mean age increased. Furthermore, the level of self-efficacy of the patients who were university graduates and had lived with their spouses and children was higher compared to other patients. According to these findings, the level of self-efficacy of the patients participating in the study was high. There was a statistically significant difference between the level of self-efficacy of the patients who had undergone CABG surgery and age (p=0.001), education level (p=0.006), and cohabitants (p=0.008). Moreover, there was a statistically significant difference between the mean symptom severity score of the patients and their marital status (p=0.001), cohabitants (p=0.032), and family history of cardiac disease (p=0.011) (Table 3).

Table 3. Distribution of patients by factors affecting surgical HSSI and BEES scale scores

		HSSI total		Physical function		Self-care		Diet modification	
		X±SS	Test/p	X± SS	Test/p	X± SS	Test/p	X± SS	Test/p
Gender	Famela	49.31±25.78	t=1.524 p=0.130	7.95±1.86	t =0.552 p=0.582	74.16±51	Z=-1.458 p=0.145	5.88±1.32	t 1.604 p=0.111
	Male	42.88±26.87		7.78±1.98		84.60±75		5.50±1.59	
Marital status	Married	41.74±24.66	t =-3.361 p=0.001	7.98±1.96	t =1.373 p=0.172	83.70±99	Z=-1.794 p=0.073	5.79±1.47	t 1.373 p=0.172
	Single	57.52±28.56		7.50±1.86		69.00±27		5.30±1.50	
Level of education	Primary school	45.47±28.29	F=0.692 p=0.558	7.54±1.79	F=4.487 p=0.005	11.42±2.35	KW=10.073 p=0.018	5.67±1.45	F=1.403 p=0.244
	Middle school	49.16±27.00		7.58±1.53		11.97±5.90		5.30±1.41	
	High school	40.30±19.44		8.06±2.09		12.33±2.73		5.83±1.70	
	Universty	48.50±28.49		9.20±2.28		12.80±2.5		6.10±1.37	
Living person	Single	56.88±29.86	F=3.011 p=0.032	7.73±1.86	F=2.806 p=0.042	11.46±2.92	KW=0.913 p=0.663	5.80±1.14	F=4.342 p=0.006
	Peer	41.32±25.06		7.72±1.91		11.65±2.69		5.63±1.55	
	Peer and child	43.25±24.9		8.47±1.94		12.70±4.99		6.06±1.31	
	Friends	54.37±36.63		7.00±1.71		11.06±2.08		4.56±1.26	
Smoking	Yes	48.05 ±25.41	t =0.975 p=0.331	8.05±2.07	t =1.124 p=0.263	82.83±52.15	KW=2910.00 p=0.486	5.81±1.39	t 1.027 p=0.306
	No	43.92±27.32		7.71±1.81		77.83±=50.10		5.56±1.55	
Alcohol	Yes	53.34±24.14	t = 1.613 p= 0.109	8.11±1.88	t= 0.732 p=0.465	84.83±22.50	Z=1603.5 p=0.548	5.84±1.31	t =0.647 p=0.519
	No	44.22±26.77		7.81±1.94		79.06±10.50		5.63±1.52	
BMI	Underweight	44.50±14.84	F= 0.203 p= 0.937	7.00±1.41	F=0.710 p=0.586	13.00±1.41	KW=1.743 p= 0.783	5.00±1.41	F=0.474 p=0.775
	Normal	44.28±26.38		7.40±2.00		11.88±2.36		5.52±1.29	
	Over weight	46.38±27.16		8.02±1.71		11.58±2.65		5.59±1.55	
	Obesity class I	47.39±36.40		7.78±1.71		12.10±5.17		5.76±1.46	
	Obesity class II	41.31±27.33		8.1±2.36		12.05±2.46		8.15±2.36	
Family history of heart disease	Yes	49.15±27.61	t =2.566 p=0.011	8.06±1.86	t =2.045 p=0.042	76.76±85.00	Z=2269.0 p=0.159	5.58±1.55	t =1.093 p=0.276
	No	37.53±21.83		7.38±2.01		87.72±41.00		5.87±1.31	

Table 3. Distribution of patients by factors affecting surgical HSSI and BEES scale scores (continue)

		Psychosocial function		Exercise-activity modification		BEES total	
		X± SS	Test/p	X± SS	Test/p	X± SS	Test/p
Gender	Famela	8.30±1.64	t =0.029 P=0.977	8.67±1.63	t =0.111 p=0.912	42.22±6.72	t =-0.160 p=0.873
	Male	8.29±1.73		8.64±1.82		42.42±8.49	
Marital status	Married	8.37±1.70	t =1.843 p=0.067	8.73±1.76	t =1.061 p=0.290	43.00±7.98	t =1.869 p=0.063
	Single	8.05±1.66		8.42±1.66		40.37±6.68	
Level of education	Primary school	7.90±1.50	F= 5.741 p= 0.001	8.34±1.41	F=3.530 p=0.016	40.80±5.90	KW=12.564 p=0.006
	Middle school	8.00±1.33		8.38±1.41		41.25±8.06	
	High school	9.13±1.83		9.26±2.06		44.63±9.01	
	Universty	9.00±2.12		9.35±2.39		46.45±9.23	
Living person	Single	8.26±1.68	F=2.301 p=0.079	8.80±1.69	F=3.418 p=0.019	42.07±7.59	F=4.073 p=0.008
	Peer	8.10±1.62		8.60±1.81		41.7±7.42	
	Peer and child	7.75±1.61		9.0±1.61		45.13±8.61	
	Friends	8.29±1.69		7.50±1.31		37.87±3.44	
Smoking	Yes	8.27±1.96	t =-0.132 p= 0.896	8.82±1.87	t =1.092 p=0.276	43.30±9.11	t =1.379 p= 0.170
	No	8.31±1.45		8.52±1.62		41.60±6.45	
Alcohol	Yes	8.34±1.99	t = 0.157 p= 0.868	8.76±2.06	t =0.157 p=0.713	44.11±10.17	t=1.281 p=0.202
	No	8.28±1.63		8.63±1.67		41.99±7.17	
BMI	Underweight	8.50±2.12	F= 0.336 p= 0.854	6.50±0.70	F=3.918 p=0.271	40.00±5.65	KW=1.330 p= 0.856
	Normal	8.20±1.63		8.68±1.43		41.68±7.19	
	Over weight	8.19±1.88		8.49±1.94		41.89±7.90	
	Obesity class I	8.32±1.35		8.78±1.57		42.76±7.75	
	Obesity class II	8.68±1.88		9.10±1.69		44.00±8.42	
Family history of heart disease	Yes	8.39±1.69	t =1.119 p=0.265	8.62±1.87	t =0.325 p=0.746	42.45±8.32	t=0.290 p=0.772
	No	8.06±1.68		8.72±1.97		42.06±6.21	

There was also a weak negative statistically significant correlation (r=-0.267, p=0.001) between the severity of symptoms and the level of self-efficacy in patients undergoing CABG surgery.

According to the correlation result, the severity of the disease symptoms increased as the level of self-efficacy of the patients decreased (Table 4).

Table 4. Correlation of patients' HSSI and BEES scale score

	HSSI total	Physical function	Self-care	Diet modification	Psychosocial function	Exercise-activity modification	BEES total
Age	r=0.115 p=0.148	r =-0.219 p= 0.006	r =-0.212 p= 0.007	r = -0.117 p=0.026	r = -0.279 p= 0.001	r = -0.163 p= 0.40	r = -0.282 p= 0.001
HSSI total	-	r =-0.031 p= 0.696	r =-0.319 p= 0.001	r =-0.227 p= 0.004	r =-0.125 p= 0.159	r = -0.197 p= 0.013	r =-0.267 p=0.001

These independent variables explained 20% of the severity of disease symptoms (R=0.449, R^2=0.201, F=4.174, p=0.001, DW=1.82) and 16% of the level of

self-efficacy of patients undergoing CABG surgery (R=0.402, R^2=0.162, F=7.439, p=0.001, DW=2.09) (Tablo 5).

Table 5. Regression of patients' HSSI and BEES scale score

	HSSI		BEES	
	B	**P**	**B**	**P**
Age	0.044	0.02	-0.113	0.001
Level of education	-	-	1.313	0.044
Material status	12.982	0.804	-	
Living person	0.940	0.006	-0.053	0.030
Family history of heart disease	-9.366	0.546	-	-
Self care	-3.846	0..016	-	-
Diet modification	-3.710	0.119	-	-
Psychosocial function	-3.093	0.284	-	-
Exercise-activity modification	-1.414	0.284	-	-
R		0.449		0.402
R²		0.201		0.162
F		4.174		7.439
P		0.001		0.001
DW		1.82		2.099

DISCUSSION and CONCLUSION

Coronary artery bypass graft surgery is a major surgery and patients experience physical, emotional, and social changes in the post-operative period (Dursun & Sanlı, 2013; Eghbali et al., 2021; Oztekin et al., 1999). Especially in the early post-operative period, symptoms related to cardiac surgery such as incisional pain, sleep disturbance, decreased appetite, nausea, vomiting, extremity injury, and stress are at the forefront (Oztekin et al., 1999; Sillero & Zabalegui, 2018). In this study, the early post-operative symptoms experienced by the patients who had undergone CABG surgery were evaluated with HSSI. According to this inventory, it was determined that the patients included in the study experienced chest pain, nausea, vomiting, sleep disturbance, and symptoms related to the surgical wound in the early period. The severity of these symptoms was moderate. In the national study conducted by Bozkurt and Saglam(Bozkurt & Saglam, 2021) it was stated that patients who had undergone CABG surgery experienced similar symptoms. However, in the study of Bozkurt and Saglam, contrary to our study, the severity of symptoms experienced by the patients was high. Although the studies were carried out in the same country, this

difference is thought to be due to the cultural diversity in Turkey. Moreover, the severity of symptoms perceived by patients after surgery can also be affected by different variables. According to this research, patients who were single, who had lived alone, and who had a family history of cardiac disease experienced more severe cardiac symptoms compared to other patients. According to these findings, it can be suggested that family and social support have an important role in coping with symptoms in the management of symptoms after CABG surgery. The severity of symptoms perceived by the patients after surgery is associated with psychological support and the level of self-efficacy(Ewart, 1989; Ozcan, 2008). It was observed that the patients participating in this study had high a high level of self-efficacy. In the study conducted by Köhler et al. (Kärner Köhler et al., 2018), it was stated that the level of self-efficacy of patients who were diagnosed with coronary artery disease 6 to 12 months ago was high. In other relevant studies, it was reported that the level of self-efficacy of patients with CAD and undergoing CABG surgery was high (Eghbali et al., 2021; Greco et al., 2014). In national studies on the subject, it was reported that patients' level of self-efficacy

was high (Cąğlar et al., 2021; Kara et al., n.d.). In this context, the research findings are consistent with the national and international literature. In addition, it was seen that the self-efficacy subscale scores of the patients were high in this study. According to these findings, it can be said that the patients participating in the research had high levels of self-efficacy in three areas: physical, emotional, and social. Patients with a high perception of self-efficacy cope with stress more easily, return to work early after discharge, and adapt to life changes more easily (Bandura et al., 1988; Glanz et al., 2002; Lev & Owen, 2000). High self-efficacy increases patients' self-confidence in the management of the post-operative process, provides awareness of the disease, ensures compliance with treatment, and facilitates coping with symptoms (Lu et al., 2020). In the study conducted by Eghbali et al. (Eghbali et al., 2021), it was reported that a high level of cardiac self-efficacy facilitates coping with disease symptoms. Patricia et al.(Thomson et al., 2019) also found a negative correlation between symptom burden and the level of self-efficacy in patients undergoing CABG surgery. In this study, it was found that the severity of symptoms perceived by the patients decreased as the level of self-efficacy increased. When the six subscales of self-efficacy were examined, it was seen that the severity of symptoms perceived by the patients with high levels of physical function, self-care, compliance with diet, and exercise decreased. In this context, the results of the research are consistent with those reported in the literature. Self-efficacy is affected by age, gender, occupation, BMI, comorbidities, and the type of diagnosis (Kang & Yang, 2013). In addition, in the study by Greco et al. (Greco et al., 2014), it was stated that perceived social support increases self-efficacy, as well. Similar to the literature, in this study, the level of self-efficacy increased as the mean age of the patients increased. Moreover, the level of self-efficacy of patients who were university graduates and who had lived with their spouses and children was higher compared to other patients. These findings support the effect of social support on self-efficacy. According to the research results, it can be suggested to evaluate the levels of self-efficacy of patients and the affecting factors during nursing care for patients to cope with the symptoms in the early post-operative period, accelerate the adaptation process to life changes, and reduce re-hospitalizations. When compared to the literature, it is thought that the research contributes to the literature. The limitation of the research is that it was carried out in an institution. It may be recommended to repeat the findings in different sample groups. Furthermore, patients who had undergone CABG surgery were included in the study. It may be recommended to investigate the level of self-efficacy in patients in the preoperative period. Although the patients' levels of self-efficacy were high after coronary artery bypass graft surgery, the severity of their symptoms was moderate. Marital status, cohabitants, and family history of cardiac disease were found to affect the severity of patients' symptoms. In line with these results, it can be recommended to provide family and social support to patients, increase patient-nurse communication, and effectively provide psychological support to patients in the perioperative period.

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