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Anxiety of Relatives of Patients Undergoing Coronary Angiography, Stent, or Balloon Procedures*

Koroner Anjografi, Stent veya Balon Uygulanan Hastaların Yakınlarının Anksiyetesi

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Özgün Araştırma

Abstract

Objective: To examine anxiety of family members of patients before and after coronary angiography, stent, and balloon procedures.
Method: One hundred forty-one family members of patients were enrolled in the descriptive study. Data were collected using the Spielberger's State-Trait Anxiety Inventory and a questionnaire form.
Results: Marital status, the degree of relationship to the patient, the type of hospitalization (outpatient or inpatient) of the patient, the type of the coronary intervention (coronary stent, balloon, angiography), a previous history of cardiac operation and coronary angiography of the patient affected participants' "state anxiety". The "trait anxiety" scores were higher in the family members of female patients and the patients who had chronic disease, multiple previous coronary angiography procedures and previous heart operation.
Conclusions: The period prior to coronary angiography, stent, and balloon procedures is a difficult time necessitating monitoring the anxiety of patient relatives and helping them. To know the factors increasing anxiety of patient relatives during coronary diagnostic procedures is important to plan and maintain holistic care.

Keywords: Coronary angiography, stent, balloon, patient relative, anxiety.

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Özet

Amaç: Koroner anjiyografi, stent ve balon işlemi öncesinde ve sonrasında hasta yakınlarının anksiyete düzeylerini belirlemektir.
Metod: Tanımlayıcı nitelikteki bu çalışmada 141 hasta yakını yer aldı. Veriler, Spielberger'in Durumluk-Sürekli Anksiyete Ölçeği ve anket formu ile toplandı.
Bulgular: Katılımcıların durumluluk anksiyetesi üzerinde, evli olmaları, hasta ile akrabalık derecesi, hastanın hastaneye yatış şekli (yatarak veya ayaktan), hastaya yapılan koroner girişim türü (stent, balon, anjiografi), hastanın önceki kalp ameliyatı ve koroner anjiografi deneyimi etkiliydi. Kadın, kronik hastalığı olan, birden fazla angiografi deneyimi olan ve daha önce kalp ameliyatı olan hastaların yakınlarının sürekli anksiyete puanı daha yüksekti.
Sonuç: Koroner anjiografi, stent, balon uygulamasının işlem öncesi dönemi hasta yakınlarının endişelerinin izlenmesi ve yardım edilmesi gereken zor bir dönemdir. Koroner tanı işlemleri esnasında hasta yakınlarının anksiyetesini artıran nedenleri bilmek bütüncül bakımın planlanması ve sürdürülmesinde önemlidir.

Anahtar Sözcükler: Koroner anjiyografi, stent, balon, hasta yakını, anksiyete.

Introduction

Diagnose and treatment for coronary artery disease is usually used to coronary angiography, coronary stent and balloon procedures. These diagnose and treatment procedures are one of the major causes of anxiety and frightening for both patients and their relatives. To be at hospital for these invasive procedures are a difficult time for their families as well as patients, regardless of the reason and duration of the hospitalization.[1-3] Even if, most patient relatives find the hospital experience for heart disease a "roller coaster ride through hell." The patient relatives lives are going along fine when they are told to come to the hospital. The worst thoughts go through their heads and they are very afraid. This is the place where bad things happen-people get very sick, or die. Therefore, to help and know the factors for increased anxiety of patient relatives, it is important for maintain of holistic care.[3-6]

Often the heart failure person gets discharge from hospital is a very big event for patient relatives. It's a great occasion. But unfortunately, it's just the beginning of the recovery process.[4,5] In countries like Turkey (developing country), where home care services require improvement, both patients and healthcare institutions expect family support. [7,8] Currently, although invasive procedures for the diagnosis and treatment of coronary heart disease include: coronary angiography, as well as coronary stent and balloon procedures, there has not been much research on the anxiety of family members of such patients.[1-5] This might be attributed to the limited time spent with patient relatives during interventions. However, research has shown that support of patient relatives and help at home are needed during the post-discharge period after these interventions are performed.[3,9] One of the major functions of nursing is to relieve both patient and their family members' discomfort. Because anxiety is one of the major determinants patient and their relatives comfort, nurses should include the anxiety-lowering measures in planning the holistic care. Therefore, improved knowledge with regard to the anxiety of patient relatives and these invasive procedures might help improve patient management in the hospital and at home. Nurses should be able to recognize the challenges that family members face as well as their patients, particularly if health services require early discharge.[4,5,10-12]

The aim of this study was to determine the pre- and post-procedure anxiety of relatives of patients undergoing coronary angiography, coronary stent and coronary balloon procedures. This study sought answers to the following questions:

1. Does coronary angiography, stent and balloon procedures cause anxiety among the patient' relatives?
2. Does the anxiety levels of patient relatives differ before and after the procedure?
3. Are there any internal or external factors that affect the anxiety of patient relatives?

Methods

Design

The study was designed as a descriptive study. In the study; one of the improbable sampling methods -random sampling technique- was used.

Setting and subjects

This study was conducted at the Coronary Angiography Unit (CAU) of Cumhuriyet University Research and Training Hospital in Sivas/Turkey between August-November 2010, and January 2011. This unit performs diagnostic and/or treatment procedures for cardiac outpatients and inpatients such as: coronary angiography, coronary stent and coronary balloon procedures as well as pacemaker placement. The weekly number of cases for coronary angiography, stent and balloon procedures was 10-15.

Three nurses worked in the CAU every day. One of the nurses was responsible for preparation of patients for the diagnostic procedures and their post-procedure care until discharge. The other two nurses assisted the doctors in the diagnostic and treatment interventions. The procedure in the CAU consisted of four segments. During the first, there was a secretary who arranged admission and discharge. The secretary monitored appointments for diagnostic and treatment procedures and informed the patients about their appointments. The secretary also informed patient relatives when the diagnostic and/or treatment procedures in the CAU were finished. Second, the patient relatives were directed to a waiting room with seats and a television. The waiting room was separate from the CAU but next to it. Third, the patients were prepared for the procedures and they were monitored after the procedure until discharge. The patient rooms were for one or two people. The fourth segment included a sterile area where the necessary diagnostic and treatment procedures were performed.

When patients were admitted to the CAU for diagnostic or treatment procedures, their relatives were taken to the waiting room, where they remained until the patient was discharged. This period of time varied from 1.5 to 5.5 hours. When patients were ready for discharge from the CAU, their relatives were allowed to enter their rooms and help with the discharge procedure.

The doctors usually informed patient relatives about the procedures. The doctors briefly informed each patient and family member about the type and location of the procedure and the pre-procedure preparations (e.g. no eating for 8-10 hours before the procedure, what they needed to bring with them).

All of the patients and patient relatives in this study were informed about pre-procedure preparation and that coronary angiography, stent and/or balloon procedures would be performed through a vein in an arm or leg. In addition, the patient relatives of all outpatients knew that their relatives would be discharged from the hospital within a few hours unless there were complications.

When a patient was discharged, the patient relatives were given a one-page leaflet that explained the post-procedure period and what to do (e.g. vehicle seating position during transportation to home, medication, activities at home, monitoring the procedure wound) and contact information for a doctor and nurse. The nurse briefly explained the information in these leaflets to patients and their relatives. For 13 patients that did not have a car they had to either take a cab (9 patients) or take public transportation (4 patients) to go home.

The participants in this study were relatives of patients scheduled for coronary angiography, stent and/or balloon procedures. The patient relatives were over 18 years of age, had no communication problems preventing them from participating in the study and volunteered to participate. The participants of the current study were those who accompanied the patients at the hospital. Based on these criteria, relatives of 184 patients were contacted. However, 43 patient relatives were excluded because they could not be reached before or after the procedure and another 19 were excluded because they had issues with patient management and did not agree to participate. In addition, 24 patient relatives were lost to follow up.

The sample size of this study was determined based on two criteria. The first criterion was calculation of sample size based on the number of items used in the Spielberger's State-Trait Anxiety Inventory (STAI). In scales, the recommended subject to variable ratio to be considered for sample size is 10:1-30:1 based on the number of items. However, in some cases (for example, when the number of sample size and the duration of the study are limited), if the number of variables is not complex and high, this ratio can be decreased to 2:1.[13,14] Therefore, the scales of both the state anxiety (SA) and trait anxiety (TA) of the study had 20 items and needed a minimum of 40 people. The second criterion was calculation of sample size based on confidence level of research and acceptable error. It was necessary to conduct this study with a 111-subject sample for a confidence level of 90 percent. A 141-subject sample was accepted as sufficient and then the study was ended.

Ethical considerations

Cumhuriyet University did not have an ethics committee at the time of this research. The university had an official unit called Cumhuriyet University Scientific Research Project Evaluation Board (CUSRPEB) that evaluated all scientific studies at the university.

This study was approved by the CUSRPEB at the Cumhuriyet University Research and Training Hospital, Department of Surgical Sciences, where the study was conducted in 2010. The participants were informed about the aim of the study and explained that they would not be at risk for any physical or emotional harm as a result of their participation and then their written permission was obtained.

Data collection

Instruments

Data were collected using a questionnaire that identified patient and their relatives descriptive characteristics and the STAI. The STAI is a well-established scale used extensively in clinical practice; its validity in Turkey was tested and confirmed by Oner and Le Comple.[15] For the STAI, individuals responded to each item using a four-point Likert scale (1; not at all / almost never, 4; very much so / almost always) including two parts based on the SA (20 statements) and TA (20 statements). The

possible scores ranged from 20 to 80, with higher scores indicating greater anxiety (low anxiety= 20-39, moderate anxiety= 40-59, high anxiety=60-80).[15]

The questionnaire was developed based on relevant literature.[2-5,11,16-18] This form included 11 closed-ended questions about patients and nine questions about patient relatives. Questionnaire form included questions about participants' and their patients' ages, gender/sex, marital status, economical status, habits, health history (coronary angiography, heart surgery, etc) and degree of relationship. The form, also, included questions about doctors' diagnoses and treatment plan after coronary angiography. Some of the patient data were obtained from the medical records and some by talking to patients and their relatives.

Procedure

After the patients were taken to the CAU for procedures, their relatives were directed to the waiting room. Next, the SA of patient relatives was assessed by researcher. After the diagnostic and treatment procedures, the patients were taken to their rooms in the CAU for post-procedure care. The researcher informed patient relatives about the patients' overall health (e.g. the procedure and its results). The SA of patient relatives was assessed for the second time before patient discharge after their procedures. The TA was assessed only during the post-procedure period. Among the participants, 24.8% (that were illiterate) filled out the information forms with the help of the researcher; the others filled out the forms themselves. The forms were completed, on average, in 15 minutes.

Data analysis

SPSS (version 15.0) was used to analyze the data. Statistical significance was considered at a $p<0.05$. Descriptive data obtained from the study were categorized and compared among group variables of the study. For the comparison of the variables; non parametric tests were employed in the study. According to Kolmogorov-Smirnov test, the data in this study did not follow normal distribution and group variances were not equal. For the assessment of the data; frequency, median, mean and standard deviation, Mann-Whitney *U*, Kruskal-Wallis, Wilcoxon W tests were used.

Results

In this part; findings pertaining to anxiety status of the patients' relatives and the affecting factors were presented.

Table 1 and 2 demonstrated some characteristics about patients' relatives and their patients. Among the patients' relatives in the study, 51.8% were female and the mean age was 44.65 ± 13.22. The youngest age was 15 (n= 2) and the oldest age was 70 (n= 4); 85.8% percent were married, 24.8% did not go to school, 36.2% graduated from primary school, 36.2% graduated from high-school, 97.9% had no a previous coronary angiogram, 14.9% had a chronic illness, 70.2% described their economic status as "low or mid-level", 84.4% were first-degree relatives of the patients (spouse, child, sister or brother), and 15.6 % were second-degree relatives (such as a son-in-law or daughter-in-law, cousin).

Among the patients in the study, 65.2% were male, the mean age was 59.29±12.93, 92.2% were married and living with their spouses, 7.8% were widowers and lived with their children, 66.0% were smokers, 53.9% had a chronic disease to add other than heart disease, 36.2% had prior heart surgery,

48.9% had coronary angiography for the first time, 35.5% had coronary angiography at the twice, and 15.6% had angiography for the tree times or more. In addition, 55.3% of the patients were scheduled for diagnostic coronary angiography and 44.7% of the patients were scheduled for coronary stent and/or balloon procedures. After the diagnostic coronary angiography (n=78), 42.3% of the patients were recommended to have coronary stent and/or balloon procedures, and, coronary by-pass surgery was recommended for 20.5%. The patients were 39.0% inpatients and 61.0% outpatients.

Table 1: Characteristics of Participants (N=141)

Characteristics	Number	%
Gender		
Female	73	51.8
Male	68	48.2
Marital status		
Married	121	85.8
Single	20	14.2
Age[a]		
15-30 years old	22	15.6
31-40 years old	28	19.9
41-50 years old	45	31.9
51-60 years old	28	19.9
61 years old or over	18	12.8
Education		
Unschooled	35	24.8
Primary school	51	36.2
High-school	31	22.0
University	24	17.0
Economic status		
Low or middle	99	70.2
High or very high	42	29.8
Medical history		
Other chronic disease	21	14.9
No other chronic diseases	120	85.1
Previous experience of a coronary angiography		
Yes	3	2.1
No	138	97.9
Previous experience of a heart surgery		
Yes	0.0	0.0
No	141	100.0
Smoking status of the patient		
Smoker	65	46.1
Non-smoker	76	53.9
Relation to the patient		
Spouse of the patient	40	28.4
Son or daughter of the patient	46	32.6
Brother or sister of the patient	33	23.4
Other (e.g. son/daughter-in-law, cousin)	22	15.6

[a] *Average age 44.65 ± 13.22*

Table 2: Characteristics of Patients of Participants

Characteristics	Number	%
Gender		
Male	92	65.2
Female	49	34.8
Marital status		
Married	130	92.2
Divorced[a]	11	7.8
Age[b]		
31-40 years old	12	8.5
41-50 years old	23	16.3
51-60 years old	45	31.9
61-70 years old	34	24.1
71 years old or over	27	19.1
Medical history		
Chronic disease other than heart disease	76	53.9
No other chronic diseases	65	46.1
Previous experience of a heart surgery		
Yes	51	36.2
No	90	63.8
Previous experience of coronary angiography		
Once	69	48.9
Twice	50	35.5
Three times or more	22	15.6
Smoking status of the patient		
Smoker	93	66.0
Non-smoker	48	34.0
Type of hospitalization		
Outpatient	86	61.0
Inpatient	55	39.0
The procedure performed		
Diagnostic coronary angiography	78	55.3
Stent or balloon	63	44.7
Recommendation for the patient after coronary angiography[c]		
Advice such as diet, exercise, medication, quitting smoking	29	37.2
Referred for coronary stent or balloon procedures	33	42.3
Referred for coronary by-pass	16	20.5

[a] These individuals were living with their children. [b] Average age 59.29 ± 12.93, [c] n= 78

Table 3 shows family member SA and TA scores according to their characteristics:

In this study, TA (40.17±7.65) and the pre-procedure SA (55.08±15.77) of the female participants were higher than the male participants' pre-procedure SA (51.45±15.46) and TA (38.06±6.51) scores. However, the post-procedure SA was higher in male (37.21±18.38) participants then in the female (37.14±18.81) participants. The difference between TA, pre-procedure SA, post-procedure SA according to gender was not significant ($p>0.05$).

The participants' TA, pre-procedure SA, and post-procedure SA varied according to age, education level and economic status but these differences were not significant ($p>0.05$). With regard to the effect of marital status on the anxiety score, the married patient relatives' pre-procedure SA (54.70±15.11), post-procedure SA (38.05±18.75) and TA (39.49±7.28) were higher than for the single participants. However, the statistical difference was significant only for the pre-procedure SA

(p=0.010). The presence of a chronic health problem among patient relatives had no significant effect on the SA (p> 0.05). However, the patient relatives with chronic health problems had higher TA (42.28 ± 8.77) scores than those without chronic health problems (38.52 ± 6.71); this difference was significant (p=0.024).

Table 3. The Family Members' SA and TA Scores According to Some of Their Characteristics (*N* =141)

Some characteristics	Pre-procedure SA		Post-procedure SA		Pre-post procedure SA	TA	
	Means ±SD	Median (min-max)	Means ±SD	Median (min- max)	Test[a]	Means ±SD	Median (min-max)
Gender[b]							
Female	55.08± 15.77	52.0 (25.0-77.0)	37.14 ±18.81	25.0 (25.0-72.0)	*-5.219; 0.001*	40.17 ±7.65	36.0 (25.0-53.0)
Male	51.45± 15.46	60.0 (25.0-77.0)	37.21 ±18.38	25.0 (25.0-72.0)	*-4.239; 0.001*	38.06 ±6.51	36.0 (25.0-53.0)
z and p value	*-1.414; 0.157*		*-0.202; 0.840*			*-1.773; 0.076*	
Age[c]							
15-30 years old	46.59±18.54	46.5 (25.0-77.0)	32.36±16.17	25.0 (25.0-72.0)	*-2.634; 0.008*	40.68±6.72	36.0 (36.0-53.0)
31-40 years old	52.64±13.95	55.0 (25.0-77.0)	37.60±20.09	25.0 (25.0-72.0)	*-2.644; 0.008*	38.03±5.88	36.0 (25.0-51.0)
41-50 years old	54.11±14.17	55.0 (25.0-77.0)	38.00±17.94	25.0 (25.0-72.0)	*-4.092; 0.001*	38.64±7.71	36.0 (25.0-53.0)
51-60 years old	55.75±15.92	66.0 (25.0-77.0)	36.53±18.76	25.0 (25.0-70.0)	*-3.802; 0.001*	37.67±5.79	36.0 (25.0-50.0)
61 years old or over	56.94±16.79	59.0 (28.0-77.0)	41.38±20.46	26.5 (25.0-72.0)	*-2.026; 0.043*	42.05±9.19	43.0 (25.0-53.0)
χ^2 *and p value*	*5.398; 0.249*		*4.026; 0.402*			*5.676; 0.225*	
Education[c]							
Unschooled	53.37 ±16.65	60.0 (25.0-77.0)	38.34 ±19.01	25.0 (25.0-72.0)	*-3.077; 0.002*	38.71 ±7.21	36.0 (25.0-53.0)
Primary school	55.76 ±14.33	55.0 (25.0-77.0)	37.78 ±19.14	25.0 (25.0-72.0)	*-4.323; 0.001*	39.66 ±8.23	36.0 (25.0-53.0)
High-school	52.77 ±16.78	55.0 (25.0-77.0)	30.93 ±13.26	25.0 (25.0-72.0)	*-4.239; 0.001*	38.06 ±5.48	36.0 (25.0-51.0)
University	48.83 ±15.41	50.0 (25.0-77.0)	42.29 ±21.11	25.0 (25.0-72.0)	*-1.315; 0.118*	39.70 ±6.69	36.0 (25.0-53.0)
χ^2 *and p value*	*3.885; 0.274*		*4.235; 0.237*			*1.534; 0.674*	
Marital status[b]							
Married	54.70±15.11	55.0 (25.0-77.0)	38.05 ±18.75	25.0 (25.0-72.0)	*-6.434; 0.001*	39.49 ±7.28	36.0 (25.0-53.0)
Single	45.05±16.84	49.5 (25.0-77.0)	31.95 ±16.58	25.0 (25.0-72.0)	*-2.049; 0.040*	36.60 ±5.82	36.0 (25.0-51.0)
z and p value	*-2.569; 0.010*		*-1,157; 0.247*			*-0.476; 0.634*	
Economic status[b]							
Low or middle	54,40±15,59	56.0 (25.0-77.0)	35,16±17,55	25.0 (25.0-72.0)	*-6.578; 0.001*	38,91±6,71	36.0 (25.0-53.0)
High or very high	50,80±15,77	51.0 (25.0-77.0)	41,95±20,05	25.0 (25.0-72.0)	*-2.295; 0.022*	39,47±8,15	36.0 (25.0-53.0)
z and p value	*-1.301; 0.193*		*-1.558; 0.119*			*-0.629; 0.529*	
Medical history[b]							
Other chronic disease	52.33± 18.32	52.0 (25.0-77.0)	34.90± 17.47	25.0 (25.0-72.0)	*-2.522; 0.012*	42.28± 8.77	43.0 (25.0-53.0)
No other chronic diseases	53.50± 15.25	55.0 (25.0-77.0)	37.58± 18.74	25.0 (25.0-72.0)	*-6.314; 0.001*	38.52± 6.71	36.0 (25.0-53.0)
z and p value	*-0.200; 0.841*		*-0.187; 0.852*			*-2.260; 0.024*	
Relation to the patient[c]							
Spouse of the patient	60.67 ±14.08	67.0 (25.0-77.0)	37.67 ±19.62	25.0 (25.0-72.0)	*-4.395; 0.001*	38.90 ±6.12	36.0 (25.0-53.0)
Son or daughter of the patient	55.19 ±15.66	56.0 (25.0-77.0)	38.67 ±19.20	25.0 (25.0-72.0)	*-3.845; 0.001*	41.34 ±8.38[a]	36.0 (25.0-53.0)
Brother or sister of the patient	51.00 ±11.85	52.0 (25.0-71.0)	36.84 ±18.18	25.0 (25.0-70.0)	*-3.311; 0.001*	36.09 ±6.13[a]	36.0 (25.0-49.0)
Other (e.g. son/daughter-in-law, cousin)	39.59 ±14.62	32.0 (25.0-66.0)	33.68 ±16.14	25.0 (25.0-72.0)	*-1.476; 0.140*	39.18 ±6.13	36.0 (25.0-53.0)
χ^2 *and p value*	*28.306; 0.001*		*0.939; 0.816*			*10.444; 0.015*	
Total anxiety[a]	53.33 ±15.67	55.0 (25.0-77.0)	37.18 ±18.52	25.0 (25.0-72.0)		39.08 ±7.14	36 (25.0-53.0)
z and p value[d]	*-6.720; 0.001*					-	-

SA: State Anxiety, TA: Trait Anxiety, SD: Standard Deviation, χ^2: Chi-Square. Used tests: [a] Wilcoxon W, [b] Mann-Whitney U, [c] Kruskal–Wallis H, [d] Test for pre-procedure and post-procedure SA

The patients' spouses' pre-procedure SA (60.67±14.08) was significantly higher than the patients' children (55.19±15.66), siblings (51.00±11.85) and other patient relatives (e.g. son-in-law and daughter-in-law) (39.59 ± 14.62) ($p<0.001$). The participants' post-procedure SA, however, showed no significant difference with regard to the degree of relationship to the patient ($p=0.816$). Regarding the TA among the patient relatives, the patients' children (41.34±8.38) had a higher level of TA than did their spouses (38.90±6.12), siblings (36.09 ± 6.13) and other patient relatives (39.18 ± 6.13). The difference was statistically significant ($p=0.015$).

The participants' overall pre-procedure SA (53.33±15.67) was significantly higher than both the post-procedure SA (37.18±18.52) ($p<0.001$). According to total TA score (39.08±7.14) was low TA of patients' relatives.

Table 4 shows the anxiety scores of participants according to patient characteristics:

The male patients' relatives had higher pre-procedure SA and post-procedure SA scores (53.81±15.85 and 37.67±18.59) than did female patients' relatives (52.42± 15.46 and 36.26±18.56), but the difference was not significant ($p>0.05$). However, the TA was higher among relatives of female patients (40.77±7.84) than for the family members of male patients (38.18±6.61). This difference almost reached significance ($p=0.049$). In addition, marital status and age of the patients was insignificant on the anxiety score of patient relatives ($p>0.05$).

The relatives of patients with a chronic disease other than heart disease had higher TA (40.19±7.80 / 37.78±6.10, $p>0.05$), pre-procedure SA (54.14±16.55 / 52.38±14.65, $p>0.05$) and post-procedure SA (39.35±19.55/ 34.64±17.05, $p>0.05$) scores than the relatives of patients without a chronic disease other than heart disease.

The inpatients' relatives had higher scores than did the relatives of outpatients on the pre-procedure SA (56.85 ±14.14/ 51.08 ±16.26, $p=0.024$), post-procedure SA (37.45±18.94/ 37.01±18.36, $p=0.994$ and the TA (39.69±7.68/ 38.69±6.79, $p=0.372$).

The relatives of patients referred for coronary stent, balloon, by-pass procedures (n=78) after coronary angiography than other intervention (e.g diet, exercise, medication) had significantly higher scores for TA ($p=0.008$), and post-procedure SA ($p<0.001$).

Coronary stent and balloon, as well as coronary by-pass procedures, based on the results of the diagnostic coronary angiography, were associated with an increased TA ($p<0.001$), pre-procedure SA ($p=0.003$) and post-procedure SA ($p=0.009$) of the patient's relatives (see Table 3).

Relatives of the patients with a previous history of heart surgery had higher scores than the relatives of the patients without a previous history of heart surgery with regard to the pre-procedure SA (64.15±11.99/ 47.20±14.16), post-procedure SA (43.58±20.26/ 33.55±16.50) and the TA (43.29±7.35/ 36.70±5.84); these differences were significant ($p<0.01$).

The number of times patients had coronary angiography did affect anxiety levels on anxiety their relatives ($p<0.01$). Whether the patients smoked did not have an effect on their family members' anxiety ($p>0.05$).

The difference observed for SA was statistically significant in terms of intra-group comparisons made for all the characteristics of the participants (for example; SA of the women before and after the implementation) ($p< 0.05$).

Table 4. Anxiety Status of The Family Members According to Patients Characteristics (N=141)

The patient's characteristics	Pre-procedure SA		Post-procedure SA		Pre-post procedure SA	TA	
	Means±SD	Median (min-max)	Means ±SD	Median (min-max)	Test[a]	Means±SD	Median (min-max)
Gender[b]							
Male	53.81±15.85	55.5 (25.0-77.0)	37.67±18.59	25.0 (25.0-72.0)	*-5.409; 0.001*	38.18±6.61	36.0 (25.0-53.0)
Female	52.42±15.46	52.0 (25.0-77.0)	36.26±18.56	25.0 (25.0-72.0)	*-3.916; 0.001*	40.77±7.84	36.0 (25.0-53.0)
z and p value	*-0.492;0.623*		*-0.049; 0.961*			*-1.967; 0.049*	
Age[c]							
31-40 years old	58.08± 14.68	61.0 (32.0-77.0)	2850± 12.12	25.0 (25.0-67.0)	*-2.906; 0.004*	38.41± 4.66	36.0 (36.0-50.0)
41-50 years old	51.69± 15.02	55.0 (25.0-77.0)	31.91± 15.22	25.0 (25.0-67.0)	*-3.167; 0.002*	38.43± 5.29	36.0 (36.0-53.0)
51-60 years old	55.95± 15.11	60.0 (25.0-77.0)	42.28± 20.66	25.0 (25.0-72.0)	*-3.456; 0.001*	38.33± 6.71	36.0 (25.0-53.0)
61-70 years old	50.47± 15.64	51.0 (25.0-77.0)	37.02± 18.78	25.0 (25.0-72.0)	*-.609;0.009*	38.00± 8.37	36.0 (25.0-53.0)
71 years old or over	51.85± 17.49	52.0 (28.0-77.0)	37.22± 17.74	25.0 (25.0-72.0)	*-2.825; 0.005*	42.55± 7.84	43.0 (25.0-53.0)
χ^2 and p value	*4.331; 0.363*		*7.247; 0.123*			*4.615; 0.202*	
Marital status[b]							
Married	53.65±15.67	55.0 (25.0-77.0)	37.81±18.94	25.0 (25.0-72.0)	*-6.296; 0.001*	38.97±7.24	36.0 (25.0-53.0)
Divorced	49.54±15.94	52.0 (31.0-77.0)	29.72±10.51	25.0 (25.0-51.0)	*-2.491; 0.013*	40.36±6.087	36.0 (36.0-49.0)
z and p value	*-0.932; 0.351*		*-1.417; 0.156*			*-0.476; 0.634*	
Medical history[b]							
Chronic disease other than heart disease	54.14± 16.55	56.0 (25.0-77.0)	39.35 ±19.55	25.0 (25.0-72.0)	*-4.281; 0.001*	40.19 ±7.80	36.0 (25.0-53.0)
No other chronic diseases	52.38 ±14.65	52.0 (25.0-77.0)	34.64 ±17.05	25.0 (25.0-72.0)	*-5.328; 0.001*	37.78 ±6.10	36.0 (25.0-53.0)
z and p value	*-0.868; 0.385*		*-1.718; 0.086*			*-1.932; 0.053*	
Type of hospitalization[b]							
Outpatient	51.08 ±16.26	51.5 (25.0-77.0)	37.01±18.36	25.0 (25.0-72.0)	*-4.942; 0.001*	38.69 ±6.79	36.0 (25.0-53.0)
Inpatient	56.85 ±14.14	60.0 (25.0-77.0)	37.45±18.94	25.0 (25.0-72.0)	*-4.527; 0.001*	39.69 ±7.68	36.0 (25.0-53.0)
z and p value	*-2.261; 0.024*		*-0.008; 0.994*			*-0.892; 0.372*	
Recommendation for the patient after coronary angiography (n= 78)[c]							
Advice such as diet, exercise, medication, quitting smoking	48.68± 13.56	51.0 (25.0-67.0)	25.20± 1.11	25.0 (25.0-31.0)	*-4.570; 0.001*	35.62±3.57	36.0 (25.0-47.0)
Referred for coronary stent or balloon procedures	55.48± 15.55	56.0 (25.0-77.0)	56.69± 14.43	60.0 (25.0-70.0)	*-0.576; 0.564*	39.27± 8.63	36.0 (25.0-53.0)
Referred for coronary by-pass	52.87± 16.84	57.5 (25.0-77.0)	63.87± 15.71	70.0 (25.0-72.0)	*-1.847; 0.065*	41.31±8.61	43.0 (25.0-53.0)
χ^2 and p value	*3.947;0.139*		*49.420; 0.001*			*9.557; 0.008*	
The procedure performed[b]							
Diagnostic coronary angiography	50.32± 14.23	51.5 (25.0-77.0)	33.30 ±16.30	25.0 (25.0-72.0)	*-5.347; 0.001*	36.48 ±5.52	36.0 (25.0-51.0)
Coronary stent or balloon	57.06 ±16.67	65.0 (25.0-77.0)	41.98 ±20.069	25.0 (25.0-72.0)	*-4.074; 0.001*	42.30 ±7.65	43.0 (25.0-53.0)
z and p value	*-2.952; 0.003*		*-2.618; 0.009*			*-5.331; 0.001*	
Experience of coronary angiography[c]							
Once	49.72 ±13.82	51.0 (25.0-77.0)	32.66 ±15.77	25.0 (25.0-72.0)	*-5.352; 0.001*	35.66 ±4.44	36.0 (25.0-53.0)
Twice	56.82 ±15.13	62.0 (25.0-77.0)	40.06 ±18.94	25.0 (25.0-70.0)	*-4.285;0.001*	41.90 ±7.40	43.0 (25.0-53.0)
Three times or more	56.72 ±20.02	65.5 (25.0-77.0)	44.81 ±22.28	26.5 (25.0-72.0)	*-1.583;0.113*	43.40 ±8.47	45.0 (25.0-53.0)
χ^2 and p value	*9.470; 0.009*		*9.022; 0.011*			*38.285; 0.001*	
revious experience of a heart surgery[b]							
Yes	64.15 ±11.99	67.0 (28.0-77.0)	43.58 ±20.26	25.0 (25.0-72.0)	*-4.464; 0.001*	43. 29 ±7.35	43.0 (25.0-53.0)
No	47.20 ±14.16	50.0 (25.0-77.0)	33.55 ±16.50	25.0 (25.0-72.0)	*-5.081; 0.001*	36.70 ±5.84	36.0 (25.0-53.0)
z and p value	*-6.654; 0.001*		*-3.011; 0.003*			*-5.981; 0.001*	
Smoking status of the patient[b]							
Smoker	52.76± 15.73	54.0 (25.0-77.0)	36.75± 18.22	25.0 (25.0-72.0)	*-5.570; 0.001*	38.78± 6.79	36.0 (25.0-53.0)
Non-smoker	54.43± 15.67	55.5 (25.0-77.0)	38.02± 19.27	25.0 (25.0-72.0)	*-3.795; 0.001*	39.66± 7.82	36.0 (25.0-53.0)
z and p value	*-0.554; 0.580*		*-0.820; 0.412*			*-0.525; 0.600*	

SA: State Anxiety, TA: Trait Anxiety, SD: Standard Deviation, χ^2: Chi-Square. Used tests: [a] Wilcoxon W, [b] Mann-Whitney U, [c] Kruskal – Wallis

Discussion

The heart is an organ that symbolizes life and human survival. Therefore, patient relatives are essential for coping with the physiological and psychological effects of heart disease. The interaction among patient relatives is important during this difficult time.[19-22]

The family caregivers of patients with heart failure (HF) report burden and poor quality of life, but little is known about changes in their perceptions over time.[16]

A Family Systems Theory suggests that interaction of family members with each other is essential. According to this theory, family members are connected to each other and they need to interact with each other. When someone in the family gets sick and is hospitalized, the internal dynamics of the family change and their routine interactions are disrupted.[20-22] An individual and his or her family members suffer from anxiety and mental pain due to fear and concern during this time. If the source of anxiety is known and the individual is able to receive help, this situation can be overcome similar to any acute crisis. Otherwise, the individual's anxiety may turn into a chronic condition and the integrity of the family might be more permanently damaged.[22-24]

Patient'relatives (especially family members) sacrifices attention to their own lives to help care for cardiac patients' comfort and well-being. Therefore, compared to the patients themselves, family members may suffer from higher levels of anxiety, more severe and frequent depression and a diminished quality of life. For this reason, in order to cope with the anxiety caused by heart disease, health care professionals should be aware of the anxiety likely present in family members.[1,12,16-21]

According to the relevant literature, the standard score of the state anxiety scale in daily life is 35.[15] Some studies have reported that treatment, diagnostic tests and procedures scheduled for patients are associated with anxiety and fear among family members, and that family members' anxiety levels increase especially when they are leave form the patient for hospitalization (regardless of how long they are not together). Making this more frightening is that physicians and nurses often speak in another language. Doctors and nurses are very busy and may be impatient with family members who are not sure of what questions to ask. Doctors tend to give quick, short news with lots of medical terms.[2-5,16-18] In this study, the patients and their relatives were not together in the pre-procedure period. The anxiety score during this period showed that the patient relatives had a moderate level of state anxiety. The sudden decrease of this score, after the procedure, might have been due to the health professionals' failure to meet the information needs of the patient relatives. During the pre-procedure period, the findings of this study indicate that the family members were not informed about the diagnostic and treatment procedures, while they were very concerned about the procedures and the patients' safety. In a study reported by Sucu et al.[25] In the present study, the participants reported that they were worried about their patients and they needed information to relieve their anxiety. This information about their patients was more important than their own physical needs. According to Miracle[23], health professionals tend to carry out diagnostic and treatment tasks based on patients' needs while not addressing the needs of patient relatives.

In this study, two groups of factors affected the anxiety of participants. The first group consisted of the characteristics of the participants such as: age, education, gender, marital status, economic status, health status, and degree of relationship with the patient. However, most of these variables, except for marital status, health status and degree of relationship to the patient, were not significant causes of anxiety. Marital status and the degree of relationship to the patient were associated with the

anxiety of patient relatives. This finding underscores the importance of family ties and social values (e.g. respect and love for family elders, responsibility for caring for them) and the roles (e.g. mother, father, spouse roles) of the patient relatives with regard to the patients. The TA score of the patient relatives with chronic health problems could be interpreted as difficulty in coping with their own health problems. The fact that these participants have to live with another member of the family with a chronic disease (especially coronary insufficiency) may increase their TA even more in the future. The results showed that caregivers with a chronic disease should be supported in cases where a loved one has heart disease. Nurses can be essential in identifying such patient relatives and guiding them to the help they need.

The second group of factors significantly affecting the participants' anxiety was the descriptive characteristics of the patients, e.g. gender of the patient, type of hospitalization, the invasive intervention performed, treatment decisions, and the patient's health status. Gender of the patient affected the TA scores of patient relatives; the patient relatives' TA was affected when the patients were female. This finding could be interpreted to mean that female patients with a chronic health problem cannot adequately perform their usual role within the family. The increase of responsibilities for other patient relatives might have caused an increase in their trait anxiety. Another significant variable affecting the patient relatives' state and trait anxiety was the patients' scheduled coronary stent and / or balloon procedures. The variable that most affected the patients relatives' anxiety, with the highest score, was a previous history of heart surgery or a recommendation for coronary by-pass surgery after coronary angiography. These findings suggest that the patient relatives perceived additional procedures, such as coronary stent, balloon and by-pass interventions, as traumatic and increased their feelings of helplessness. These findings suggest that heart failure in a loved one may be a major stressor for the family. According to Chung et al.[17], family members caring for HF patients with depressive symptoms had significantly higher levels of caregiving burden and worse quality of life compared to those caring for patients without depressive symptoms.

According to the relevant literature, the anxiety level increases while the emotional well-being decreases with age. The anxiety of women appears to be higher than men since they can express themselves more comfortably. In addition, the educational level and economic status are variables that sometimes increase and sometimes decrease anxiety. However, over the course of a disease, patient characteristics (health and emotional well-being status in particular) are reported to have a greater effect on the anxiety of family members than socio-demographic characteristics. The patient characteristics can caused hopeless. It's important determinants of caregiver burden. Anxiety and hopeless impact on finances, daily schedule and health of family members.[16-18,26] In a similar study, Martensson et al.[27] showed that a spouse's depression had no significant effect on the patient's depression; however, the patient's depression had a negative impact on the spouse's depression and quality of life. According to Martensson et al. [27], especially with regard to the depression of female spouses, the physiological functionality and emotional well-being status of the patient's husband can be very effective. Luttik et al.[28] found that if the patient's partner was a male, his emotional well-being status was higher than the patient; but, if the patient's partner was a female, there was no significant difference between the emotional well-being status of the patient and the partner. In a study reported by Jaarsma et al.[29], the quality of life of cardiac patients and their family members was lower than that of their peers in the general population and those suffering from other chronic diseases. Dracup et al.[30] showed that the emotional well-being status of family members of patients

with advanced heart failure (especially young spouses) deteriorated more than for the patients. According to Evangelista et al.[31], caregivers (especially spouse) should be supported in cases where heart disease of a loved one is present and that the age, gender and health status of patients are closely related to the emotional well-being of family members.

In conclusion, since heart diseases tend to occur more frequently as patients age, patients need a strong family support system. Despite the negative effects of heart disease on the lives of family members, diagnosis, treatment and care are focused frequently only on the patient.[3-8] The well-being status of family members plays a key role in the lives of patients. Therefore, at every stage of diagnosis, treatment and care, special attention should be paid to anxiety levels; the well-being status of family members can be expected to deteriorate over time.[3,5,23,29,30] According to Davidson et al.[32], awareness by health professionals of family member anxiety can contribute to improvement of patient management and help achieve better outcomes.

Limitations of the study

There was some limitations of this study. This is the scarcity of research on anxiety of patient relatives of coronary angiography, stent and balloon procedures reported in the medical literature. This made it difficult to find confirmation of the study findings.

In the current study; primary disease burden, disease threat level, complication risk level were not evaluated. Besides; whether or not relatives of the patients had a life experience that may have led to anxiety in the last three months was not examined, either. Therefore; in the future studies, the use of a clinical scale that would investigate these variables and their correlation with anxiety level may help obtain more reliable data.

Conclusion

According to the results of this study, coronary angiography and coronary stent/balloon procedures cause significant anxiety among patient relatives, which health care professionals should be aware of this family dynamic. Finally, health care professionals must assess the level of anxiety of family members of patients during these procedures and provide information and counseling them. To know the factors for increased anxiety, it is important for nurse to maintain of holistic care.

The data from this study will help inform nurses and other caregivers about the affect of coronary angiography, coronary stent and coronary balloon interventions as diagnostic and/or treatment procedures as significant causes of anxiety for patient relatives. The findings show that the period before the procedures related to cardiac diagnosis and treatment is a period of acute crisis for the relatives of patients. In addition, the findings show that the descriptive characteristics of patients are associated with the anxiety levels of family members. Finally, these findings can help improve the quality of care of patients with coronary failure by recognizing the importance of anxiety management among patient relatives.

The findings of this study apply only to the individuals that participated in this study. Future studies are needed to confirm these findings and expand them to a wider population.

Contributions

Study design: YS, HT, HTA, MY;

Data collection and analysis: YS, HT, MY, HTA

Manuscript preperation: YS, HTA, MY, HT

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Conflict of interest

The authors declare they have no conflict of interest.

References

1. Chung ML, Moser DK, Lennie TA, Rayens MK. The effects of depressive symptoms and anxiety on quality of life in patients with heart failure and their spouses: testing dyadic dynamics using Actor-Partner Interdependence Model. *Journal of Psychosom Res* 2009; 67(1): 29-35.
2. Stewart DA, Stein A, Forest GC, Clark DM. Psychosocial adjustment in siblings of children with cronic life-threatining illness: A research note. *J Child Psychol Psychiatry* 1992; 33(4): 779-84.
3. Trecartin K, Carroll DL. Nursing interventions for family members waiting during cardiac procedures. *Clin Nurs Res* 2011; 20(3): 263-75.
4. Eastwood JA, Doering LV, Dracup K, Evangelista LS, Hays RD. Health-related quality of life: The impact of diagnostic angiography. *Heart Lung* 2011; 40(2): 147-55.
5. Ferre-Grau C, Casado MS, Cid-Buera D, LLeixa-Fortuno M, Monteso- Cutro P, Berenguer-Poblet M. Caring for family caregivers: An analysis of a family-centered intervention. *Rev Esc Enferm USP* 2014; 48: 87-94
6. Eggenberger SK, Nelms TP. Being family: the family experience when an adult member is hospitalized with a critical illness. *J Clin Nurs* 2007; 16(9): 1618-28.
7. Leff B, Burton L, Mader SL, Naughton B, Burl J, Koehn D, Greenough WB, Guido S, Steinwachs D, Burton JR. Comparison of stress experienced by family members of patients treated in hospital at home with that of those receiving traditional acute hospital care. *J Am Geriatr Soc* 2009; 56(1): 117-23.
8. Gozum S, Kilic D. Health problems related to early discharge of Turkish Women. *Midwifery* 2005; 21(4): 371-8.
9. Odacioglu Y, Sahin U, Unluoglu I. Hastane hizmetleri ile evde bakım hizmetlerinin organizasyon ve koordinasyonu nasıl olmalıdır? Evde Bakım Kurs Kitabı. İstanbul, Marmara University Technical Education Press, 2001; 7-11.
10. Van Horn ER, Kautz D. Promotion of family integrity in the acute care setting. *Dimens Crit Care Nurs* 2007; 26(3): 101-7.
11. Bakas T, Pressler SJ, Johnson EA, Nauser JA, Shaneyfelt T. Family caregiving in heart failure. *Nursing Research* 2006; 55(3): 180-8.
12. Sorrell JM. Caring for the caregivers. *J Psychosoc Nurs Ment Health Serv* 2007; 45(11): 17-20.
13. Osborne JW, Costello AB. Sample size and subject to item ratio in principle components analysis. *Practic Assess Research and Evaluation* 2004; 9: http://pareonline.net/getvn.asp?v=9&n=11. Accessed: April 15, 2012.
14. Tavsancil E. *Measurements of attitudes and data analysis with SPSS*, 4th edn. Ankara, Nobel Publishing, 2010.
15. Oner N, Le Comple A. State-trait anxiety inventory handbook. Istanbul, Bogazici University Publications, 1985; 208-17.
16. Pressler SJ, Gradus-Pizlo I, Chubinski SD, Smith G, Wheeler S, Sloan R, Jung M. Family caregivers of patients with heart failure: a longitudinal study. *J Cardiovasc Nurs* 2013; 28(5):417-28.
17. Chung ML, Lennie TA, Mudd-Martin G, Dunbar SB, Pressler SJ, Moser DK. Depressive symptoms in patients with heart failure negatively affect family caregiver outcomes and quality of life. *Eur J Cardiovasc Nurs* 2014; doi: 10.1177/1474515114535329.
18. Bozkurt Zincir S, Sunbul M, Zincir S, Aydin Sunbul E, Oguz M, Feriha Cengiz F, Durmus E, Kivrak T, Sari I. Burden and depressive symptoms associated with adult-child caregiving for individuals with heart failure. *ScientificWorld Journal* 2014; doi: 10.1155/2014/641817.
19. Luttik ML, Jaarsma T, Veeger NJ, Veldhuisen DJ. For better and for worse: Quality of life impaired in HF patients as well as in their partners. *Eur J Cardiovasc Nurs.* 2005; 4(1): 11-4.
20. Agren S, Evangelista L, Strömberg A. Do partners of patients with chronic heart failure experience caregiver burden? *Eur J Cardiovasc Nurs* 2010; 9(4): 254-62.
21. Chung ML, Pressler SJ, Dunbar SB, Lennie TA, Moser DK. Predictors of depressive symptoms in caregivers of patients with heart failure. *J Cardiovasc Nurs* 2010; 25(5): 411-9.
22. Mehta A, Cohen SR, Chan LS. Palliative care: a need for a family systems approach. *Palliat Support Care* 2009; 7(2): 235-43
23. Miracle VA. Are we doing enough to meet the needs of the families of our patients? *Dimens Crit Care Nurs* 2005; 24(2): 107-10.
24. Plaszewska-Zywko L, Gazda D. Emotional reactions and needs of family members of ICU patients. *Anaesthesiol Intensive Ther* 2012; 44(3): 145-9.
25. Sucu G, Cebeci F, Karazeybek E. The needs of the critical patients' relatives in the emergency department and how they are met. *Ulus Travma Acil Cerrahi Derg* 2009; 15(5): 473-81.
26. Utne I, Miaskowski C, Paul SM, Rustøen T. Association between hope and burden reported by family caregivers of patients with advanced cancer. *Support Care Cancer* 2013; 21(9): 2527-35.
27. Martensson J, Dracup K, Canary C, Fridlund B. Living with heart failure: depression and quality of life in patients and spouses. *J Heart Lung Transplant* 2003; 22(4): 460-7.

28. Luttik ML, Lesman-Leegte I, Jaarsma T. Quality of life and depressive symptoms in heart failure patients and their partners: the impact of role and gender. *J Card Fail* 2009; 15(7): 580-5.
29. Jaarsma T, Johansson P, Agren S, Strömberg A. Quality of life and symptoms of depression in advanced heart failure patients and their partners. *Curr Opin Support Palliat Care* 2010; 4(4): 233-7.
30. Dracup K, Evangelista LS, Doering L, Tullman D, Moser DK, Hamilton M. Emotional well-being in spouses of patients with advanced heart failure. *Heart Lung* 2004; 33(6): 354-61.
31. Evangelista LS, Dracup K, Doering L, Westlake C, Fonarow GC, Hamilton M. Emotional well-being of heart failure patients and their caregivers. *J Card Fail* 2002; 8(5): 300-5.
32. Davidson JE, Jones C, Bienvenu OJ. Family response to critical illness: postintensive care syndrome-family. *Crit Care Med* 2012; 40(2): 618-24.