Research Article

The effect on anxiety level of coronary angiographic result and the perception of pain

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ABSTRACT

Background: The problems and complications experienced by the patients who underwent a CAG due to their pain and anxiety can be minimized through a care plan prepared to meet their needs and a coordinated teamwork. In this prospective and descriptive study we aimed at determining the effect of coronary angiography results and perceived pain on anxiety level in patients who undergoing coronary angiography.

Methods: The study was carried out with patients who were implemented coronary angiography for the first time at the cardiology clinic of Osmaniye private new life hospital between May 2014 and August 2014. The study data were collected using the State-Trait Anxiety Inventory (STAI), a verbal pain rating scale and a questionnaire that was prepared by the investigators. The descriptive data are given in the form of arithmetic mean Standard Deviation (SD), numbers and percentage distribution. The correlations between the variables were assessed using crosstabs, one-way ANOVA and the Pearson's correlation analysis. The data were evaluated in 95% confidence interval and at a significance level of P <0.05.

Results: 35.9% of the patients stated that they felt severe pain. The mean anxiety score was 36.746.81 and those who felt very severe and unbearable pain had higher mean anxiety scores (P <0.01). Those who had three coronary diseases had higher anxiety levels (41.149.30) than those who had an atherosclerotic stenosis and #8805;50% (normal) (35.945.49) (P <0.01). Gender had an influence on pain levels (P <0.01).

Conclusion: Coronary angiography results and pain perception were determined to be statistically significant effects on anxiety level. A statistically significant correlation was found between pain and anxiety. In general, pain and anxiety affect each other positively; an increase in one results in an increase in the other.

Keywords: Pain, Anxiety, Coronary angiography

INTRODUCTION

The most common diseases in adults is Coronary Artery Disease (CAD).[1] According to the report on Cardiac Diseases in Turkish Adults and Risk Factors (RCDTARF) in 2009, CAD is in the first place as a cause of death both in males and females and CAD-related deaths are higher than in all of the European countries.[2] Coronary angiography (CAG) is a common invasive diagnostic method used for diagnosing and assessing CAD and heart valve diseases.[3,4] The CAG implementation causes to experience intensive stress, pain and anxiety as well as fear of death in many patients.[5] Many factors including previous experience, pain, anxiety, foreign environment and fear contribute to

the increasing levels of stress in patients. Everyone reacts different types of physiological and biochemical reactions in terms of duration, intensity and general effects of stress. When exposed to a stressor, pain, anxiety or both may occur, or their severity may increase. The response to a psycho-physiological stress increases the work load on the cardiovascular system. During an angiographic implementation, pain may be associated with cannula insertion, immobilization, injection of a contrast material and ballooning.[5] Psychological factors adversely affect CAD development and prognosis.[6] Anxiety disorders are seen more in population with CAD than in normal population. Todaro et al. (1998)[7] reported the prevalence of anxiety disorders was 36% and the prevalence of having at least one anxiety disorder during their lives was 45.3% in these people. Local anesthesia can be used to alleviate the pain in these patients and anxiolytic agents to moderate their anxiety symptoms. Despite these pharmacologic measures and the supportive care provided by nurses, the symptoms of anxiety occur frequently in these patients.[5]

From the moment the patient is relaxed following the CAG, the nurse identifies her aims after a careful anamnesis, physical examination and symptom assessment. By identifying nursing diagnoses, the care is planned and care process continues. In this context, acute pain and anxiety are important issues among the diagnoses that can be dealt with for the patients. The problems and complications experienced by the patients who underwent a CAG due to their pain and anxiety can be minimized through a care plan prepared to meet their needs and a coordinated teamwork. The most appropriate people who will give this care are nurses as they are continuously in communication with patients in a hospital environment.

In our study to determine in patients undergoing CAG, after operations which is one of the most common symptoms of pain perception how affects the anxiety levels and demonstrate the relationship of these three parameters.

METHODS

Study type

This is a prospective and descriptive study.

The population and sample of the study

The study population consisted of patients who were implemented coronary angiography for the first time at the coronary angiography unit of the private hospital between May 2014 and July 2014. The power analysis, a method that guarantees the validity, reliability and sensitivity of the study result, was used when deciding on the sample. The sample size was found to be n=220 people in the power analysis. The inclusion criteria for the patients were:

1. Being 18 years old and older,

2. Patients who have no communication problems, who are able to respond to all of the questions,

3. Patients who agree to have an interview, who can speak Turkish.

Data collecting tools

The study data were collected using the State-Trait Anxiety Inventory (STAI), a verbal pain rating scale and a questionnaire that was prepared by the investigators.

Spielberger State-Trait Anxiety Inventory (STAI): The adaptation to Turkish, validity and reliability study of the inventory, which was developed by Spielberger, Gorsuch and Lushene in 1970, was performed by Öner and Le Compte in 1983. The State-trait anxiety inventory requires that the individual describes how he/she feels at a certain moment and under certain conditions. The inventory has 20 items, the emotions and behaviors expressed in its items are described by selecting one of the choices '(1) Not at all, (2) Somewhat, (3) Moderately so and (4) Very much so. High scores obtained from the inventory show that the level of anxiety is high.[8,9]

Data analysis

The data were analyzed on the SPSS 21.0 (SPSS Inc., Chicago, IL, USA) statistics software. Percentages, means, One Way ANOVA (one way variance analysis), crosstabs and the Pearson's correlation analysis were used as the methods of analysis. In comparisons, values P <0.05 were considered statistically significant.

Ethical aspect of the study

The scientific principles and the ethical principles of the Helsinki Declaration were adhered to when performing the study. In this respect, the principles of informed consent, autonomy, confidentiality and protection of privacy, fairness, and harmlessness/usefulness were observed during the study. The necessary written permission from the concerned institution to conduct the study and an ethics committee approval were obtained (28.04.2014-73). Before the procedure, the patients to take part in the study were explained about the purpose, plan and benefits of the study.

RESULTS

The participating patients were assessed in Table 1 with respect to gender, education level, occupation, smoking status, BMI, presence of DM diagnosis, last measured Blood Pressure (BP), perceived pain, treatments administered-planned, CAG result, age, triglyceride, HDL and LDL, urea, creatinine, FBS, and anxiety.

Table 1: Breakdown of patients by their characteristics (n: 220).

Characteristics	n	%	Characteristics	n	%
Gender			**Diabetes mellitus**		
Female	60	27.3	Yes	78	35.5
Male	160	72.7	No	142	64.5
Education level			**Hypertension**		
Illiterate	20	9.1	Optimal	58	26.4
Literate	18	8.2	Normal	50	22.7
Primary school	113	51.4	High-normal	62	28.2
High school	54	24.5	Stage 1	36	16.4
University	15	6.8	Stage 2	12	5.5
			Stage 3	2	0.9
Occupation			**Pain level**		
Housewife	58	26.4	Mild	43	19.5
Worker	45	20.5	Annoying	47	21.4
Retired	65	29.5	Severe	79	35.9
Civil servant	20	9.1	Very severe	14	6.4
Freelance	32	14.5	Unbearable	37	16.8
Smoking			**Treatment type**		
Yes	88	40.0	Medical treatment	106	48.2
No	132	60.0	PTCA+stent	61	27.7
			Surgical treatment	53	24.1
BMI (kg/m^2)			**Coronary angiography result**		
<18.5	0	0.0	Normal (≥50% stenosis)	106	48.2
18.5-24.9	64	29.1	Single vascular disease	57	25.9
25-29.9	115	52.3	Two vascular diseases	43	19.5
30-34.9	26	11.8	Three vascular diseases	14	6.4
35-39.9	11	5.0			
>40	4	1.8			

The categorical variables are presented numerically (percentages). BMI: Body mass index, PTCA: Percutanous transluminal coronary angioplasty.

72.7% of the patients monitored in the cardiology clinic were male, 51.4% of them were graduates of primary school, most of them (29.5%) were retired and housewives (26.4%). 40% of the patients smoked, 35.5% were diagnosed with DM, and 52.3% were overweight.

According to the CAG result, 51.8% of the patients were advised to have PTCA+stent or surgical treatment and the majority of the patients stated that they felt severe pain (35.9%) (Table 2).

Table 2: Breakdown of patients by their characteristics (n: 220) (continued).

Characteristics	Min	Max	Mean ± SD
Age (years)	32	85	58.96 ± 11.11
Triglyceride (mg/dl)	105	215	156.92 ± 20.91
HDL (mg/dl)	65	190	143.99 ± 24.01
LDL (mg/dl)	28	76	40.56 ± 9.35
Urea (mg/dl)	9	28	13.93 ± 4.10
Creatinine (mg/dl)	0.2	1.4	0.9 ± 0.19
FBS (mg/dl)	69	307	154.84 ± 53.88
BMI (kg/m2)	20.2	40.4	27.68 ± 4.07
Anxiety	21	55	36.74 ± 6.81

The continuous variables are presented as mean ± standard deviation. LDL: Low-density lipoprotein, HDL: High-density lipoprotein, FBS: Fasting blood sugar, BMI: Body mass index.

The mean age of the patients was 58.96 ± 11.11, their mean FBS was 154.84 ± 53.88 and their mean anxiety score was 36.74 ± 6.81 (Table 2).

The mean anxiety scores of the patients by their perceived pain are shown in Table 2; the mean anxiety scores of those who had very severe and unbearable pain were found higher (P <0.01).

Table 3: The mean anxiety scores of patients by their perceived pain.

Pain	n	Anxiety Mean ± SD	F	P
Mild	43	35.02 ± 5.29		
Annoying	47	34.02 ± 2.24		
Severe	79	35.08 ± 5.55	21.55	0.00
Very severe	14	44.85 ± 2.50		
Unbearable	37	42.67 ± 9.68		

The factors that could affect the level of anxiety in patients are exhibited in Table 4.

Although women had high levels of anxiety, there was no statistically significant difference with respect to gender and treatment administered-planned (P >0.05). The anxiety level was higher in workers (39.00 ± 6.33) and civil servants (41.50 ± 5.45), in those who had three vascular diseases as per the CAG result (41.14 ± 9.30), those with high BP values, those who were diagnosed with DM and those who had low BMIs (P <0.01, P <0.05).

We examined the factors that could affect the pain perceived by patients in Table 5.

The patients' pain levels were seen to be affected by gender difference; the rate of having severe pain was more and the rate of having mild pain was noticeably less in females than males (P <0.01). The rate of having severe pain was markedly higher in housewives, retired

and freelancers (P <0.01). The patients who were advised to have medical treatment according to their CAG results had more severe pain than the other groups, most of those who had stage 2 and 3 BP felt unbearable pain, those whose atherosclerotic stenosis was ≥50% (normal) according to the CAG result felt less very severe and unbearable pain, and those who smoked and had low BMIs had markedly more unbearable pain (P <0.01) (Table 5).

The relationships between pain and anxiety, and gender, age, education, occupation, smoking status, DM, BP values, CAG result, treatment methods administered-advised and BMI were assessed through a correlation analysis in Table 5. There was a statistically significant correlation between anxiety and age in the negative direction (P <0.05). This result means that anxiety decreases as age advances. In the one-way ANOVA analysis made to identify from where the statistically significant correlations originate, it was seen that as age advanced BMI increased, smoking decreased and the prevalence of DM increased (P <0.01). As education level went up, BMI decreased, and there was an upward trend in smoking (P <0.01) (Table 6).

Table 4: Patients' mean anxiety scores by their other characteristics.

Characteristics	n	Anxiety Mean ± SD	F	P
Gender				
Female	60	37.18 ± 5.93	0.33	0.56
Male	160	36.58 ± 7.13		
Occupation				
Housewife	58	36.87 ± 5.79		
Worker	45	39.00 ± 6.33		
Retired	65	36.27 ± 6.77	10.32	0.00
Civil servant	20	41.50 ± 5.45		
Freelance	32	31.31 ± 6.62		
Treatment type				
Medical treatment	106	35.94 ± 5.49		
PTCA+stent	61	37.54 ± 8.74	1.42	0.24
Surgical treatment	53	37.43 ± 6.64		
Hypertension				
Optimal	58	36.24 ± 6.66		
Normal	50	35.08 ± 6.17		
High-normal	62	37.32 ± 6.15	5.25	0.00
Stage 1	36	36.16 ± 7.70		
Stage 2	12	42.00 ± 5.08		
Stage 3	2	54.00 ± 0.00		
Coronary angiography result				
Normal (≥50% stenosis)	106	35.94 ± 5.49		
Single vascular disease	57	38.84 ± 7.80	6.17	0.00
Two vascular diseases	43	34.51 ± 6.32		
Three vascular diseases	14	41.14 ± 9.30		
Diabetes mellitus				
Yes	78	38.15 ± 6.20	5.25	0.02
No	142	35.97 ± 7.03		
BMI (kg/m^2)				
<18.5-24.9	64	40.68 ± 7.78		
25-29.9	115	35.79 ± 5.70		
30-34.9	26	35.23 ± 5.30	12.43	0.00
35-39.9	11	30.90 ± 1.86		
>40	4	27.00 ± 0.00		

Table 5: Patients' mean anxiety scores by their other characteristics.

Characteristics	Pain level					x^2	P
	Mild	Annoying	Severe	Very severe	Unbearable		
Gender							
Female (60)	4 (6.7%)	16 (26.7%)	29 (48.3%)	0 (0%)	11 (18.3%)	16.99	0.00
Male (160)	39 (24.4%)	31 (19.4%)	50 (31.3%)	14 (8.8%)	26 (16.3%)		
Occupation							
Housewife (58)	4 (6.9%)	16 (27.6%)	29 (50%)	0 (0%)	9 (15.5%)		
Worker (45)	15 (33.3%)	9 (20%)	6 (13.3%)	5 (11.1%)	10 (22.2%)		
Retired (65)	17 (26.2%)	14 (21.5%)	25 (38.5%)	3 (4.6%)	6 (9.2%)	60.30	0.00
Civil servant (20)	4 (20%)	4 (20%)	2 (10%)	6 (30%)	4 (20%)		
Freelance (32)	3 (9.4%)	4 (12.5%)	17 (53.1%)	0 (0%)	8 (25%)		
Treatment type							
Medical treatment (106)	18 (17%)	29 (27.4%)	45 (42.5%)	5 (4.7%)	9 (8.5%)		
PTCA+stent (61)	10 (16. 4%)	6 (9.8%)	24 (39.3%)	7 (11.5%)	14 (23%)	26.26	0.00
Surgical treatment (53)	15 (28.3%)	12 (22.6%)	10 (18.9%)	2 (3.8%)	14 (26.4%)		
Hypertension							
Optimal (58)	8 (13.8%)	12 (20.7%)	34 (58.6%)	0 (0%)	4 (6.9%)		
Normal (50)	9 (18%)	14 (28%)	14 (28%)	9 (18%)	4 (8%)		
High-normal (62)	19 (30.6%)	14 (22.6%)	16 (25.8%)	5 (8.1%)	8 (12.9%)	73.90	0.00
Stage 1 (36)	7 (19.4%)	3 (8.3%)	13 (36.1%)	0 (0%)	13 (36.1%)		
Stage 2 (12)	0 (0%)	4 (33.3%)	2 (16.7%)	0 (0%)	6 (50%)		
Stage 3 (2)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (100%)		
CAG result							
Normal (≥50% stenosis) (106)	18 (17%)	29 (27.4%)	45 (42.5%)	5 (4.7%)	9 (8.5%)		
Single vascular disease (57)	10 (17.5%)	4 (7%)	20 (35.1%)	9 (15.8%)	14 (24.6%)	34.05	0.00
Two vascular diseases (43)	11 (25.6%)	10 (23.3%)	12 (27.9%)	0 (0%)	10 (23.3%)		
Three vascular diseases (14)	4 (28.6%)	4 (28.6%)	2 (14.3%)	0 (0%)	4 (28.6%)		
Diabetes mellitus							
Yes (78)	16 (20.5%)	20 (25.6%)	21 (26.9%)	6 (7.7%)	15 (19.2%)	4.56	0.33
No (142)	27 (19%)	27 (19%)	58 (40.8%)	8 (5.6%)	22 (15.5%)		
Smoking							
Yes (88)	16 (18.2%)	13 (14.8%)	27 (30.7%)	6 (6.8%)	26 (29.5%)	18.41	0.00
No (132)	27 (20.5%)	34 (25.8%)	52 (39.4%)	8 (6. 1%)	11 (8.3%)		
BMI (kg/m²)							
<18.5-24.9 (64)	12 (18.8%)	6 (9.4%)	16 (25%)	5 (7.8%)	25 (39.1%)		
25-29.9 (115)	13 (11.3%)	29 (25.2%)	56 (48.7%)	9 (7.8%)	8 (7%)		
30-34.9 (26)	14 (53.8%)	4 (15.4%)	4 (15.4%)	0 (0%)	4 (15.4%)	98.35	0.00
35-39.9 (11)	0 (0%)	8 (72.7%)	3 (27.3%)	0 (0%)	0 (0%)		
>40 (4)	4 (100%)	0(0%)	0 (0%)	0(0%)	0 (0%)		

Table 6: The relationships between gender, age, education, occupation, smoking status, diabetes mellitus, blood pressure, treatment administered-advised after coronary angiography, BMI, pain and anxiety ("r" values of the correlation analysis).

	Age	Gender	Education	Occupation	Smoking	Diabetes	BP	CAG result	Treatment	Pain	Anxiety	BMI
Age		-0.246**	-0.541**	-0.247**	0.395**	-0.336**	0.074	0.180**	0.112	-0.039	-0.143*	0.296**
Gender			0.357**	0.675**	-0.354**	0.229**	-0.224**	0.112	0.026	-0.081	-0.039	-0.117
Education				0.368**	-0.206**	0.217**	-0.076	0.035	-0.033	0.076	0.097	-0.295**
Occupation					-0.164*	0.273**	-0.142*	0.240**	0.001	0.063	-0.184**	-0.221**
Smoking						-0.256**	-0.105	-0.146*	-0.041	-0.221**	-0.106	0.226**
Diabetes							-0.249**	-0.254**	-0.209**	0.000	-0.153*	-0.167*
BP								0.150*	0.231**	0.202**	0.189**	-0.095
CAG result									0.383**	0.055	0.079	-0.085
Treatment										-0.110	-0.011	0.057
Pain											0.426**	-0.357**
Anxiety												-0.408**

*P <0.05, **P <0.01

DISCUSSION

Coronary angiography may be acute stress for the patients. Pain and anxiety are common stressors seen in cardiovascular diseases. Characterized by strain, nervousness and worries, anxiety is an emotional condition that increases the activation of the autonomic nervous system. It may be effective in reducing the impact of stress, but experiencing too much anxiety may adversely affects the cognitive abilities of an individual, causing to a feeling of hopelessness. Accompanying a present or potential tissue damage or defined by this damage, pain is a disliked sensory and emotional experience.[10,11] However, many people report that they experience pain without any tissue damage or physiopathologic change. This definition suggests that pain is always subjective because it is a sensation and a disliked condition.[10] Pain is an experience associated with complex perceptions that require urgent care, that overwhelm the patient, that impair his/her behaviors and thoughts and that at the same time urge the person to carry out the activities for stopping the pain, and that results in behavioral reactions and automatic changes.[12,13] Pain and anxiety are interactive stressors.[5] The reactions given by patients such as confusion, fear, anger, unrest, anxiety, changes in verbal functions and uneasiness are defined as psychological symptoms.[14,15]

The percutaneous implementations to be administered to the coronary artery are often performed through the femoral artery because it is easily accessible and has a high chance of success.[16] Using sandbags for compression after the procedure requires patients to rest in bed without movement for a long time. Back pain, inguinal pain and leg pain may occur. Heavy sandbags and complications in the femoral region after CAG also impair comfort in the patient considerably.[17-19] Vascular complications cause additional discomfort in the patient and prolongation of hospitalization. Post-CAG ecchymosis is an important complication and pain may accompany it.[20,21] In the end, the CAG implementation and the following applications may cause pain and anxiety in patients in different levels.

In the study to determine the effect of informing patients about diagnosis procedures on their anxiety, Ertin et al. (1999)[22] found that 69% of the patients had anxiety out of being unaware of what the result of the procedure would be and 14% of them concerned with the process because it may be painful. Sunbul et al. (2013)[23] assessed in their study the level of anxiety in patients who underwent a CAG and they found that the patients whose CAG result was normal had a mean state anxiety score of 40.4 ± 4.3 and the patients who had ≥50% atherosclerotic stenosis or had a slow coronary flow had a mean score of 45.3 ± 5.5. Vural et al.

(2009)[24] did not find any relationship between the rising in the abnormal coronary angiographic findings and anxiety; they also found that although female patients had less CAD, their anxiety level was significantly higher. Tajfard et al. (2014)[25] found in their study that the mean anxiety scores showed statistically significant differences among the groups and these difference was originated from among the groups that consisted of healthy individuals and patients who did not have any serious coronary disease. Baram (1993)[26] found in his study that the state anxiety level was 28.67 ± 9.58 in the patients after a CAG implementation was administered. Karadede et al. (2001)[27] found in their study patients who had a coronary stenosis larger than 70% that the trait anxiety inventory value was significantly higher in than in patients who had no coronary stenosis.

We found in our study that the mean post-CAG anxiety score of the patients was 36.74 ± 6.81. According to the CAG results, the state anxiety level was significantly higher in those who had three vascular diseases than in those whose CAG result revealed they had who had $\geq 50\%$ atherosclerotic stenosis (normal). Women had higher anxiety levels than men. Looking at the values among the groups, the anxiety level was higher in those who had a serious vascular disease, who had high BP values, who were diagnosed with DM and who had lower BMIs based on their CAG results.

Bally et al. (2003)[5] found in their study that most of the patients (80.4%) reported that they had no pain after the CAG procedure, the mean state anxiety score was 33.6 in the control group and they did not find any statistical relationship between pain and anxiety after the procedure. Chair et al. (2012)[28] found in their study that an early ambulation caused a significant provide significant reduction in back pain and improve the general well-being. However, they found that the pain in the catheter insertion site did not have any significant effect on the patient's satisfaction level. Although men and women show similar reactions to pain, it has been reported that women experience more pain than men in practice.[29] Puntillo and Weiss reported in their study that tolerance to pain was higher in males and this difference between the genders reflected the ethnical attitudes towards pain.[30] Kocaman found in their study that the patients who would be operated for the first time experienced more pain because they had of preoperative stress.[31] In the study of Büyükyılmaz and Aştı, 78.7% of the patients stated that movement increased pain.[32]

We found in our study that there was a significant relationship between pain and anxiety. The patients who had $\geq 50\%$ atherosclerotic stenosis (normal) based on the CAG result had less very severe or unbearable pain. Implementation of CAG to patients for the first time may have produced pain and anxiety increasing effect. We found that the level of pain was affected by gender differences and the rate of feeling severe pain was more in females than males. Inevitable long bed rest and sandbag procedure applied to the patients who were implemented CAG increase occurrence of pain associated with weight and immobility. Socio-cultural differences may influence people's psychology and their perception of pain; it is inevitable that the results of studies made with different patient groups in different nations turn out different.

CONCLUSION

Coronary angiography results and pain perception were determined to be statistically significant effects on anxiety level. We found in our study that there is a significant relationship between pain and anxiety and they affect each other in the positive direction. An increase in one results in an increment in the other. We found that there were common factors that caused increment in both of them. Nurses assume major responsibilities in preventing the negative effects of pain and anxiety that could most possibly develop due to a coronary angiography procedure on the quality of life and health of patients. Being aware of the pain and anxiety to be experienced, nurses should inform the patients about the procedure, answer their questions and support them to use the methods to cope with this special situation. With broader studies to be performed, the relationship between pain and anxiety, the factors influencing them and the differences among societies should be revealed.

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