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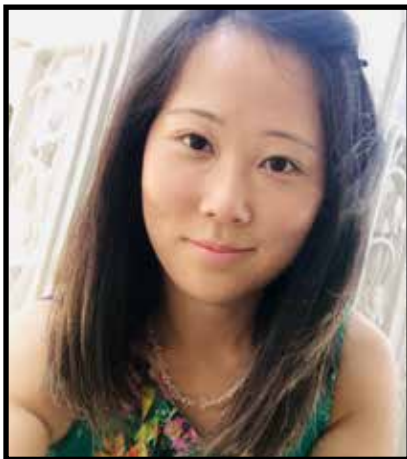
Anxiety and stress in patients awaiting cardiac catheterization: a cross-sectional study

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ABSTRACT

Aim: To evaluate the relationship of anxiety and stress with sociodemographic and clinical characteristics of patients awaiting cardiac catheterization (*cateterismo cardíaco* – CATE). **Method**: This is a cross-sectional study of patients awaiting CATE. Anxiety and stress were assessed by the State Anxiety Inventory and Perceived Stress Scale. Fisher's exact test and t-Student or Mann-Whitney test were used, considering a significance level of 5%. **Results**: Men were the majority; average age 60 ± 9 years. Patients had low or moderate anxiety, mean score of 42 ± 9.17 points, and low stress, and mean score of 19.1 ± 6.4 points. Anxiety was related to age (p=0.033), self-reported stress (p=0.046), and former smokers (p=0.013). Stress was related to age (p=0.019) and smokers (p=0.001). **Conclusion:** The most anxious were younger, former smokers and self-reported as stressed; the most stressed were younger and smokers.

Descriptors: Cardiac Catheterization; Anxiety; Stress, Psychological; Nursing.

INTRODUCTION

Currently, cardiovascular diseases are the leading cause of death in the world, predominantly coronary artery disease (CAD), which includes acute coronary syndrome (ACS) and stable coronary disease, which have disabilities and morbidity and mortality[1]. The diagnosis of these diseases can be made by coronary angiography or cardiac catheterization (*cateterismo cardíaco* – CATE) that allows the presence, extension and severity of atherosclerotic plaques to be evaluated[2]. One study shows that lack of knowledge about this procedure, waiting time and the threat of change in health status were related to anxiety and stress[2], feelings that can be changed when variables such as older age, female gender, white race, being married, low education, presence of cardiovascular risk factors, beta-blocker use, hospitalization, and/or previous experience of percutaneous intervention, and intensive care unit admission are present[3,4].

Anxiety can be divided into state anxiety and trait. Spielberger[5] defined state anxiety as a transient condition of tension in the face of a circumstance perceived as threatening, symbolically, nonspecific and anticipated. Acute stress disorder, according to the Diagnostic and Statistical Manual of Mental Disorders-V, is the development of typical symptoms lasting from three days to one month after exposure to one or more traumatic events[6]. Both feelings when present may increase blood pressure and heart rate and, consequently, increase oxygen consumption and worsen the course of the disease[3,7].

In this context, identifying the factors that may influence the increase of these feelings of a given population is extremely important so that preventive measures can be performed. Thus, the aim of this study was to evaluate the relationship of anxiety and stress with sociodemographic and clinical characteristics (age, sex, race or skin color, marital status, education, cardiovascular risk factors, beta-blocker use, previous medical diagnosis of depression, hospitalization and previous experience of the procedure and place of hospitalization) of patients awaiting CATE.

METHOD

This is a descriptive cross-sectional study. Patients awaiting CATE, admitted to inpatient units or coronary units from April to December 2016, were considered eligible. Subjects with CAD or ACS who agreed to voluntarily participate in the study by signing the Informed Consent Form were included, and literate, as the scales were self-applicable. Subjects not included were those with situations of hemodynamic instability and/or chest pain that could influence patients' anxiety and stress and/or vital signs; patients who underwent emergency CATE; with visual impairment that made reading impossible and/or with any alteration in the level of consciousness; and patients using benzodiazepines, anxiolytics and/or herbal medicines. There were situations in which patients received guidance on CATE prior to the beginning of the research at the current hospitalization and/or when they stated that they did not wish to receive information. Participants could be excluded if they presented situations of hemodynamic instability and/or chest pain during data collection. For a significance level of 5% and a

test power of 0.90, a minimum sample of 122 participants was required.

The State Anxiety Inventory (A-State) instrument, developed by Spielberger and translated and adapted to Brazil by Biaggio, was used to assess anxiety[5]. This self-report instrument comprises two parallel scales, one for measuring trait anxiety (A-Trait) and one for measuring state anxiety (A-State). The translated and validated version in Brazil[8] consists of 20 items, with Likert-type answers, ranging from 1 (absolutely not) to 4 (very much), obtaining values ranging from 20 to 80 points, where the higher the score, the higher the patient's anxiety[8]. The criterion chosen for the categorization of anxiety was[7]: low anxiety (20-34 points), moderate anxiety (35-49 points), high anxiety (50-64 points) and very high anxiety (65-80 points). Stress was assessed using the Perceived Stress Scale (PSS) proposed in 1983[9], based on its reduced version with ten items, elaborated in 2010[10]. PSS-10 contains questions with answer options ranging from zero to four points (0=never; 1=almost never; 2=sometimes; 3=almost always; 4=always). The total scale score can range from zero to 40 points, and the higher the sum, the greater the stress perceived by the patient[10]. For the stress assessment in this study the cutoff point was used[3]: not stressed (less than or equal to 21 points); moderate stress (22 to 27 points); stressed (28 to 31 points); and high stress (greater than or equal to 32 points).

The sociodemographic and clinical variables studied were: age, sex, race or skin color, marital status, education, cardiovascular risk factors (systemic arterial hypertension - SAH, diabetes mellitus - DM, self-reported stress, physical inactivity, obesity, dyslipidemia - DLP, smoking, alcoholism, family history of cardiovascular disease, previous medical diagnosis and/or symptoms of depression), beta-blocker use, hospitalization and/or previous experience of percutaneous intervention and place of hospitalization.

To describe the quantitative variables, measures of centrality and dispersion were presented (mean, median, quartiles and standard deviation); for qualitative variables, percentage and absolute frequencies were presented. To verify the existence of a relationship between sociodemographic and clinical variables with anxiety and stress, Fisher's exact test and T-Student or Mann-Whitney test were applied, according to the normality of the variables, and a significance level of 5% was considered.

This study was approved by the Research Ethics Committee (CAAE:48609115.3.3001.5462, CAAE: 48609115.3.0000.5505).

RESULTS

The sample consisted of 122 participants. There was a predominance of males (n=94; 77%), with a mean age of 60.7±9 years, white (n=87; 71%), married (n=90; 74%) and with average study time of 9.2±4 years. The cardiovascular risk factors found were systemic arterial hypertension (n=97; 79%), diabetes mellitus (n=54; 44%), dyslipidemia (n=76; 62%), self-reported stress (n=62; 51%), obesity (n=42; 34%), physical inactivity (n=88; 72%), family history (n=90; 74%), current smoker (n=24; 20%), non-smoker (n=41 ; 33%) and former smoker (n=57; 47%). Sixty-three patients (52%) have had prior CATE experience. Among

regular medications, 95 (78%) patients were on beta-blockers.

Comparing the antecedent variables with anxiety, it was observed that there was a significant relationship between anxiety and the self-reported stress, smoking and age variables, in which the most anxious group reported being stressed, former smokers and young. With regard to stress, there was a relationship with smoking and age and smokers and younger patients were the most stressed (Tables 1 and 2).

DISCUSSION

The results of the present study indicate that participants with higher levels of anxiety self-reported as stressed were former smokers and younger (mean age 59).

Stress is known to have an important influence on patients' anxiety. The relationship between stress and anxiety can be explained by neurophysiology, where the body, upon receiving a stressor, immediately triggers a series of reactions in the nervous and endocrine system, with the secretion of hormones such as adrenaline and noradrenaline, which activate the reaction and decision of fight or flight; dopamine, which keeps the individual alert/hypervigilant; serotonin, which modulates behavioral reactions; and cortisol, which activates mechanisms for homeostasis. These hormones are also responsible for increased anxiety[11].

As for smoking, an observational study assessing the effect of smoking cessation on psychological symptoms revealed that those who quit reported a significantly higher level of anxiety than those who did not quit (p=0.03)[12]. Analyzing 58,176 never smok-

ers, 37,428 former smokers and 32,028 current smokers, it was observed that smokers and former smokers respectively had 1.71 times (95% CI 1.54 to 1.90, p<0.001) and 1.23 times (95% CI: 1.12 to 1.36, p<0.001) higher chances of anxiety compared to those who never smoked[13].

Nicotine, which is the main additive chemical in tobacco smoke, responsible for continuous and compulsive use, is known to stimulate the release of various neurotransmitters such as dopamine and norepinephrine, which are associated with pleasurable sensations; serotonin, which modulates mood; endorphin, which can reduce anxiety and tension; and the amino acid gamma-aminobutyric acid - GABA, with its dopaminergic inhibitory effect, which promotes addiction; and when it is removed from the body, there may be increased feelings and negative emotions, such as anxiety[14].

The relationship of age with anxiety can be attributed to the fact that these individuals are concerned with civic and social responsibilities, establishing and maintaining an economic standard of living, and accepting and adjusting the physical changes of middle age[15]. People who are still working are more anxious because of the risks of future unemployment, fear of not being able to get another job and also harbor the concern to establish a safe situation with the end of their professional career[15]. The proximity of aging arouses uncertainties and insecurities, which require the elaboration of new life plans and projects, which can cause greater anxiety.

Another fact that deserves attention is that most anxious individuals of this average age were former smokers and, as discussed ear-

Table 1. Relationship of sociodemographic and clinical variables of participants with anxiety and initial stress lower and higher than the median value of the anxiety and stress score. São Paulo, 2016

Variables	Anxiety					Stress				
	<42 (n=59)		≥42 (n=63)		p-value*	<19 (n=56)		≥19 (n=66)		p-value*
	n	%	n	%		n	%	n	%	
Sex					**0,527**					**0,051**
Man	47	79,7	47	74,6		48	85,7	46	69,7	
Color					**0,549**					**1,000**
White	44	74,6	43	68,3		40	71,4	47	71,2	
Marital status					**0,765**					**0,253**
Married	45	76,3	45	71,4		44	78,6	46	69,7	
Arterial hypertension	49	83,1	48	76,2	0,378	48	85,7	49	74,2	0,176
Diabetes mellitus	25	42,4	29	46,0	0,718	26	46,4	28	42,4	0,716
Dyslipidemia	39	66,1	37	58,7	0,457	34	60,7	42	63,6	0,852
Self-reported stress	24	40,7	38	60,3	0,046	25	44,6	37	56,1	0,276
Prior medical diagnosis of depression	6	10,2	13	20,6	0,137	6	10,7	13	19,7	0,215
Obesity	25	42,4	17	27,0	0,088	21	37,5	21	31,8	0,569
Sedentary lifestyle	45	76,3	43	68,3	0,419	41	73,2	47	71,2	0,842
Family Background	44	74,6	46	73,0	1,000	43	76,8	47	71,2	0,540
Smoking					**0,021**					**0,002**
No	27	45,8	14	22,2		26	46,4	15	22,7	
Yes	10	16,9	14	22,2		4	7,1	20	30,3	
Former smoker	22	37,3	35	55,6		26	46,4	31	47,0	
Ethylism					**0,752**					**0,898**
No	32	54,2	33	52,4		28	50,0	37	56,1	
Socially	15	25,4	13	20,6		13	23,2	15	22,7	
Daily	11	18,6	14	22,2		13	23,2	12	18,2	
Former Alcoholist	1	1,7	3	4,8		2	3,6	2	3,0	
Prior hospitalization	45	76,3	46	73,0	0,835	44	78,6	47	71,2	0,408
Previous experience of percutaneous intervention	30	50,8	33	52,4	1,000	31	55,4	32	48,5	0,472
Beta blocker	47	79,7	48	76,2	0,669	42	75,0	53	80,3	0,518
Place of hospitalization					**0,324**					**0,805**
Coronary unit	52	88,1	51	81,0		48	85,7	55	83,3	
Inpatient unit	7	11,9	12	19,0		8	14,3	11	16,7	

* Fisher's exact test

Table 2. Relationship of the variables age and years of study of participants with anxiety and initial stress lower and higher than the median value of the anxiety and stress score. São Paulo, 2016

Variables	Mean (±sd)	Median	Q25	Q75	Mean (±sd)	Median	Q25	Q75	p-value
Anxiety	**<42 (n=59)**				**≥42 (n=63)**				
Age	62,5 (±9,3)	63,0	55,0	69,0	59,0 (±8,5)	61,0	52,0	66,0	0,033*
Study (years)	9,0 (±4,7)	8,0	5,0	13,0	9,3 (±4,5)	9,0	5,0	13,0	0,747†
Stress	**<19 (n=56)**				**≥19 (n=66)**				
Age	62,8 (±8,6)	64,0	56,0	68,0	58,9 (±9,0)	60,0	52,0	67,0	0,019*
Study (years)	9,0 (±4,2)	9,0	5,0	12,0	9,3 (±4,9)	8,0	4,0	14,0	0,984†

Caption: SD - standard deviation, Q25 - first interquartile range, Q75 - third interquartile range; * Student's t-test; † Mann Whitney test

lier, former smokers tend to be more anxious. As for stress, it was observed that smokers are more stressed than non-smokers and that adults are more stressed than the elderly. Other studies also show that stress was higher among smokers when compared to nonsmokers[13]. Research has shown that smokers indicated higher levels of perceived stress (p=0.004) and fewer years of education (p=0.001)[16]. A longitudinal study that tracked the impact of stress on the health of working adults showed that those who reported a high impact of perceived stress on their health were women, single, of lower occupational status, not white, current smokers, consumed less fruits and vegetables daily, did not practice physical activity at recommended levels, reported high level of psychological distress, high negative affect score, poor self-rated health perception, and poor social support at work (all p≤0.01)[17]. In addition to pleasure and stimulation, smoking can promote analgesia, reducing feelings and emotional conflicts quickly, but because it is transitory, it brings back tension and irritability[18]. When nicotine effects cease, smokers experience symptoms of irritability, frustration, anger, difficulty concentrating, agitation, increased appetite, insomnia, and depressed mood. To reduce these stressful symptoms, there is an increased desire to smoke[19].

Regarding the association of age and stress, it was observed that adults were more stressed than the elderly. This association can be credited to the fact that adults are still in social production[15], facing different potentially stressful situations, such as raising children, relationship as a couple, interpersonal relationships, financial aspects, and social aspects relating to the maintenance of family, employment and retirement[15]. Older people, on the other hand, are less exposed to daily stressful situations, have greater emotional regulation, and assume adaptive postures that save psychological, physiological, social, and cognitive resources[20].

This research was limited to the impossibility of monitoring participants during and after CATE and the non-assessment of participants' prior knowledge of the procedure.

In this context, nurses should be aware of patients with these characteristics (adults, for-

mer smokers and smokers and self-reported stress) and should propose interventions to reduce anxiety and stress in these patients.

CONCLUSION

The sociodemographic and clinical variables that were related to anxiety were age, smoking and stress, in which it was found that adults, former smokers and patients who self-reported as stressed were more anxious. Stress was related to age and smoking, as adults and smokers were more stressed.

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