Anger in Cardiovascular Disease: Its Relationship with Depression and Anxiety Levels

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Abstract

Introduction: Psychiatric problems accompanying cardiac problems are noteworthy risk factors as regards cardiovascular morbidity and mortality.

Aim: This study aimed to determine the anger level and anger expression style in patients with cardiovascular disease, and the association of anger level with anxiety and depression levels.

Method: This cross-sectional study was conducted with 254 patients with cardiovascular disease. Study data were collected with the Personal Information Form, State-Trait Anger Expression Inventory, and Hospital Anxiety and Depression Scale. Descriptive statistics, the Kolmogorov-Smirnov test and Spearman correlation were used for the analysis.

Results: The mean scores the patients obtained from the trait anger, anger-in, anger-out and anger-control subscales were 24.28 ± 6.39, 18.37 ± 3.74, 16.78 ± 4.78, 18.65 ± 5.66 respectively. Trait anger level had a strong positive correlation with anxiety and depression levels. Anger-in level had a weak positive correlation with anxiety and depression levels. Anger-out level had a moderate positive correlation with anxiety and depression levels. On the other hand, anger-control level had a moderate negative correlation with anxiety level and a strong negative correlation with depression level.

Conclusion: The participants' anxiety and depression levels increased as their trait anger, anger-in and anger-out levels increased and their anger-control levels decreased. Therefore, in order to reduce anger levels of patients with cardiovascular disease, psychosocial interventions addressing anger control should be planned, and a multidisciplinary approach should be applied.

Keywords: anger, anxiety, cardiovascular disease, depression

Introduction

Cardiovascular disease (CVD) is one of the most important causes of morbidity and mortality worldwide (WHO, 2017). According to the American Heart Association, about one in every four deaths in the United States each year is the result of cardiovascular disease (Benjamin et al., 2017). Cardiovascular disease is also the most common cause of mortality in Turkey, causing 40.4% of all deaths (Turkish Statistical Institute, 2016).

This high rate of mortality from cardiovascular disorders emphasizes the importance of a detailed investigation of the triggering factors of the disease. The various factors thought to play a role include the classic factors such as smoking, nutritional habits, family history and sedentary lifestyle, in addition to personality features, anger and psychosocial risk factors (Chauvet-Gelinier & Bonin, 2017; Chida & Steptoe, 2009; Nakamura et al., 2013). Anger is known to cause sympathetic activation with chronic overstimulation of the sympathetic nervous system (Vella & Friedman, 2007) and high levels of anger have been associated with cardiovascular disease (Chida & Steptoe,

2009; Denollet & Pedersen, 2009; Nakamura et al., 2013). Davidson and Mostofsky (2010) have reported that unmanaged anger increases the risk of cardiac disease by 30% in both genders.

Unmanaged anger plays a major role in the development of mental disorders such as depression and anxiety in addition to physical disorders. In the literature, it is reported that anger levels of patients with cardiovascular disease are high, and the anger control skills are inadequate. Mental problems such as anger-related depression and anxiety are also common in these patients (Denollet & Pedersen, 2009; Hamedi & Ameri, 2013; Nakamura et al., 2013; Smeijers et al., 2017). Belialov (2017) has reported that mental problems such as anxiety and depression both increase the incidence of cardiovascular disease and negatively affect the prognosis.

Psychiatric problems accompanying cardiac problems are noteworthy risk factors as regards cardiovascular morbidity and mortality (Belialov, 2017; Cohen, Edmondson, & Kronish, 2015; Nakamura et al., 2013; Smeijers et al., 2017). However, the number of studies on the anger level and anger expression style and the accompanying psychiatric disorders in cardiovascular disorders is limited. It is therefore quite important to evaluate the effect of psychological factors among the modifiable risk factors of cardiovascular disease within the scope of consultation liaison psychiatry in order to prevent and treat cardiovascular problems.

Aim

This study aimed to determine the anger level and anger expression style in patients with cardiovascular disease, and the association of anger level with anxiety and depression levels.

Method

Study Design
This cross-sectional study was conducted between June 2017 and December 2017 at Bandirma State Hospital.

Sample
The study population comprised 311 patients diagnosed with cardiovascular disease according to the International Classification of Diseases System (ICD-10), and admitted to and treated at the cardiology clinic of a state hospital. The sample consisted of 254 patients who met the inclusion criteria and agreed to participate in the study. The inclusion criteria were as follows: agreeing to participate in the study, being older than 18 years, having been diagnosed with cardiovascular disease (at least 6 months ago). The exclusion criteria were as follows: having perception disorders, having mental disorders.

Data Collection Tools
Data were collected with the Personal Information Form, Suicide Probability Scale and the Hospital Anxiety and Depression Scale.

Personal Information Form: The form developed by the researchers through a literature review consists of 12 items that question some socio-demographic and clinical characteristics of the patient.

State-Trait Anger Expression Inventory (STAXI): The validity and reliability study of the Turkish version of the scale developed by Spielberger (1988) was carried out by Ozer (1994). The 34-item

inventory consists of a 10-item Trait Anger subscale and a 24-item Anger Expression subscale. The Anger Expression subscale has three subscales: anger-in, anger-out and anger-control. The Inventory is a 4-point Likert-type scale. Each item on the scale is scored from 1 to 4. While high scores obtained from the Trait Anger Subscale indicate a high level of anger, high scores obtained from the anger-control subscale indicate that the anger is controlled, high scores obtained from the anger-out subscale indicate that anger is easily expressed and high scores obtained from the anger-in subscale indicate that anger is suppressed (Ozer, 1994).

Hospital Anxiety and Depression Scale (HADS): The scale developed by Zigmond and Snaith (1983) is a self-rating scale used to determine the risk of depression and anxiety in people with a physical illness. The validity and reliability study of the Turkish version of the scale was performed by Aydemir et al (1997). The scale has two subscales: Anxiety (HADS-A) and Depression (HADS-D). The Cronbach alpha of the Turkish version was 0.85 for anxiety and 0.77 for depression. Responses are rated on a 4-point Likert scale ranging from 0 to 3. The scale has 14 items. While 7 of them (odd numbers) assess anxiety, the remaining 7 (even numbers) assess depression. The lowest and highest possible scores to be obtained from each subscale are 0 and 21 respectively, the cut-off point is 11 for the anxiety subscale and 8 for the depression subscale. Subjects with scores above the cut-off point are considered to be in the at-risk group (Aydemir, Guvenir, Kuey, & Kultur, 1997).

Procedure

Prior to data collection, the patients were informed about the purpose and scope of the study, and verbal consent indicating they agreed to participate in the survey was then obtained. The data were collected with the face-to-face interview technique by trained nursing students.

Data Analysis

The SPSS 23.0 software (SPSS, Inc., Chicago, IL, USA) was used to analyze the data. Descriptive statistics, the Kolmogorov-Smirnow test, and Spearman correlation were used for the analysis. The significance level was accepted as $p < 0.05$.

Results

Of the participants, 29.9% were in the ≥75 years age group, 55.9% were male, 53.5% were primary school graduates, 94.5% were unemployed, 72.4% perceived their income as moderate, 44.9% had been diagnosed ≤ 4 years ago, and 49.6% had another chronic disease accompanying the cardiovascular disease.

The distribution of patients' trait anger, anger expression style, anxiety, and depression mean scores is shown in Table 1. The mean trait anger, anger-in, anger-out and anger-control subscale scores of the Trait Anger-Anger Expression Style Scale were 24.28 ± 6.39, 18.37 ± 3.74, 16.78 ± 4.78, and 18.65 ± 5.66, respectively. The mean scores from the anxiety and depression subscales of the Hospital Anxiety and Depression Scale were 9.23 ± 4.13 and 8.23 ± 4.06, respectively. According to the cut-off point of the scale, 35.4% of the patients were at risk for anxiety and 47.2% were at risk for depression.

Tab. 1 **The distribution of patients' trait anger, anger expression style, anxiety, depression mean scores**

Scales	Mean ± SD	Min−Max	Score Range	n (%)
State-Trait Anger Expression Inventory				
Trait anger	24.28 ± 6.39	12−38	10−40	
Anger-in	18.37 ± 3.74	10−28	8−32	
Anger-out	16.78 ± 4.78	9−33	8−32	
Anger-control	18.65 ± 5.66	9−32	8−32	
Hospital Anxiety and Depression Scale				
Anxiety	9.23 ± 4.13	3−18	0−21	90 (35.4)
Depression	8.23 ± 4.06	2−17	0−21	120 (47.2)

According to Spearman's correlation analysis, trait anger level had a strong positive correlation with anxiety (r: 0.712, $p < 0.001$) and depression levels (r: 0.769, $p < 0.001$). Anger-in level had a weak positive correlation with anxiety (r: 0.343, $p < 0.001$) and depression levels (r: 0.432, $p < 0.001$). Anger-out level had a moderate positive correlation with anxiety (r: 0.617, $p < 0.001$) and depression levels (r: 0.689, $p < 0.001$). On the other hand, anger-control level had a moderate negative correlation with anxiety level (r: -0.689, $p < 0.001$) and a strong negative correlation with depression level (r: -0.741, $p < 0.001$) (Table 2).

Tab. 2 **Correlation of trait anger-anger expression style with anxiety and depression levels**

Scales	1	2	3	4	5	6
1. Trait anger	1	0.494[**]	0.735[**]	-0.598[**]	0.712[**]	0.769[**]
2. Anger-in	0.494[**]	1	0.393[**]	-0.158[*]	0.343[**]	0.432[**]
3. Anger-out	0.735[**]	0.393[**]	1	-0.647[**]	0.617[**]	0.689[**]
4. Anger-control	-0.598[**]	-0.158[*]	-0.647[**]	1	-0.689[**]	-0.741[**]
5. Anxiety	0.712[**]	0.343[**]	0.617[**]	-0.689[**]	1	0.774[**]
6. Depression	0.769[**]	0.432[**]	0.689[**]	-0.741[**]	0.774[**]	1

[*]$p < 0.05$, [**]$p < 0.01$

Discussion

Cardiovascular disease (CVD) is a major health problem due to its growing prevalence. Therefore, in this present study intended to determine the anger level and anger expression style in patients with cardiovascular disease, and the association of anger level with anxiety and depression levels, their trait anger level was found moderate, and anger in, anger out, and anger control levels were found low. These findings can be said to be consistent with other reports in the literature. Similarly, Arslan, Arkar and Danaoglu (2011) and Hamedi and Ameri (2013) have compared anger levels in cardiac patients and healthy individuals and found much higher anger levels and inadequate anger control in the patient group.

CVD is one of the most important medical problems at present and causes to serious changes in the patient's lifestyle. The need to eliminate some habits (smoking), start using new behavioral patterns

(diet), use daily medication, and go to the physician for follow-ups can have a negative effect on the mental state of the individual and create a risk for depression (Aggelopoulpou et al., 2017; Bulduk, Aktaş, & Bulduk, 2017). Depression is highly prevalent in patients with CVD and portends adverse cardiovascular outcomes and increased health care costs (Bartoli et al., 2013; Cohen et al., 2015). The depression incidence in CVD patients is reported as being 30–60% (Kelleci, Aydin, Sabanciogullari, & Dogan, 2010; Chauvet-Gelinier & Bonin, 2017; Frasure-Smith & Lesperance, 2008). Similarly, in this present study, of the participants, 47.2% were at risk for depression. Most studies have focused on the role of depression, indicating that depression is an independent risk factor for the development of CVD in the general population as well as a prognostic risk factor in CVD patients (Jiang et al., 2004; Van der Kooy et al., 2007). It is therefore possible to say that depression is an important cause of mortality and morbidity that can influence the development and prognosis of a chronic disorder.

Depression is accompanied by high rates of anxiety symptoms or disorder in cardiovascular patients. Anxiety is common among cardiovascular patients and increases the risk of cardiac events if untreated (Delewi et al., 2017; Roest, Martens, de Jonge, & Denollet, 2010; Rothenbacher, Hahmann, Wüst, Koenig, & Brenner, 2007). The anxiety incidence in CVD patients is reported as being 20–50% (Grace, Abbey, Irvine, Shnek, & Stewart, 2004; Moser et al., 2010). Similar to other reports, in this present study, 35.4% of the participants were at risk for anxiety. These results indicate that detecting mental disorders early, providing effective treatment and care, and ensuring psychosocial support for the patients may help decrease the morbidity and mortality rates of cardiovascular disorders.

Anger is a multidimensional construct consisting of physiological, cognitive, phenomenological, and behavioral variables (Chida & Steptoe, 2009). Anger is significantly associated not only with increased CVD events in initially healthy populations but also poor prognosis in patients with existing CVD (Chida & Steptoe, 2009; Hamedi & Ameri, 2013). The harmful effects of anger might be primarily mediated via behavioral pathways, with anger promoting high-risk behaviors such as poor diet, less physical activity, smoking, poor sleep, or lower treatment adherence (Chida & Steptoe, 2009; Davidson & Mostofsky, 2010; Smeijers et al., 2017). Indeed, anger and anger expression are associated with anxiety and depression among cardiovascular patients (Denollet & Pedersen, 2009; Hamedi & Ameri, 2013; Nakamura et al., 2013; Smeijers et al., 2017). An association of anger level and anger expression style with anxiety and depression was found in this study. This finding conforms to other reports in the literature and emphasizes the importance of interventions directed at anger control in the prevention and treatment of CVD.

Conclusion

In this study, trait anger levels of patients' was found moderate, and anger control skills were found inadequate. A relationship between the patient's anger level and anger expression style and anxiety and depression levels was also present, and almost half of the patients were at risk for these two disorders. This result suggests that successful prevention and treatment of CVD might involve a multidisciplinary approach, including not only conventional physical and pharmacological therapies, but also psychological management focusing on anger, anxiety, and depression. Development of consultation-liaison psychiatry services to reinforce the connection between general medicine and psychiatry is also recommended.

Ethical Aspects and Conflict of Interest

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The necessary permission was obtained from Balikesir General Secretariat of the Association of Public Hospitals. Ethics committee approval was received from the Balikesir University Clinical Research Ethics Committee. Informed consents were obtained from all the participants included in the study. The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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