

# The Warm Temperament (Mizaj) as a Predictor of Anxiety Disorder among Participants in the Kerman Coronary Artery Disease Risk Factors Study (KERCADRS)

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Received: 1 Jun 2022

Revised: 28 Feb 2023

Accepted: 1 Mar 2023

## Abstract

Anxiety disorders are the most common mental disorders in communities. This cross-sectional study assessed the relationship between temperament and other demographic characteristics of participants with anxiety. It also determined the predictors of anxiety disorders among this cohort. This cross-sectional study was conducted in Kerman, Iran from 11 Mars, 2018 to 22 May, 2019. The participants were 1532 people who were selected through convenience sampling from those who attended the second round of KERCARDS in 2017. Physical activity, anxiety, depression, and temperament were assessed through related questionnaires. The collected data were described and analyzed by mean (Standard Deviation (SD)) and logistic regression models in SPSS v.23. The mean (SD) age of the participants was 30.02 (6.83) years (age range: 11 to 40). More than two-thirds of them were married (n=1084, 70.7%) and held a diploma and university degrees (n=1112, 72.6%). The anxiety symptoms were prevalent among more than one-third of the participants (n=574, 37.5%, 95%CI: 35.2, 40.1). According to multivariate logistic regression model, female sex (OR:1.80, 95%CI:1.41, 2.30; P value:0.001), illiteracy, lower education (OR:1.40, 95%CI:1.09, 1.81; P value:0.009), a history of depression (OR:14.51, 95%CI:9.65, 21.80; P value:0.001), and having warm Mizaj (OR:1.31, 95%CI:1, 1.71; P value:0.04) were determined as predictors of anxiety. In the present study, female sex, lower educational status, the experience of depression, and warm temperament increased the risk of anxiety and were determined as predictors of anxiety disorder. Diagnosis of temperament seems to be necessary for recognizing anxiety symptoms and also finding an effective treatment.

**Keywords:** Anxiety; Temperament; Warm temperament; Psychiatry disorders; Iran

## Introduction

Anxiety is one of the most common mental disorders in communities [1], which is defined as too much worry, hyperactivity, and fear of disability. Anxiety disorders have a high prevalence in the world [2], especially in developing countries affecting 8% to 36% of the population [3,4]. Based on reports, there are

more than 40 million people as new cases in the United States each year and one-quarter of the population is affected by these disorders [5]. The largest mental health institute in Australia predicted that anxiety would become the most common health problem by 2020 [6]. Various studies have reported that the prevalence of anxiety is 30.4% in Iran [7].

**Citation:** Tajadini H, Bazrafshani MS, Kamali M. **The Warm Temperament (Mizaj) as a Predictor of Anxiety Disorder among Participants in the Kerman Coronary Artery Disease Risk Factors Study (KERCADRS).** Trad Integr Med 2023;8(2):137-143.

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Various risk factors including chronic diseases, trauma, addiction, pregnancy, and old age [2] are involved in the development of anxiety disorders and a large number of studies have provided strong evidence that genetic and gender-based differences can contribute to the high prevalence of anxiety disorders [8-10]. Based on previous studies, untreated anxiety is associated with personal and social costs of primary care, frequent visits, decreased work productivity, unemployment, and impairment in social relations [2]. Therefore, treating anxiety can be an important issue.

Current diagnostic practices have relied heavily on paraclinical practices and impose enormous costs on the health system of governments and patients [11]. Thus, attention to traditional medicine can help treat diseases. In traditional medicine, many physical and psychological differences of individuals are attributed to "temperament" which is evaluated in two ranges of qualities, including warmth-coldness and wet-dryness [12], and each individual has a unique temperament [13]. Based on previous studies, some dimensions of temperament can predict the property of anxiety robustly [14].

Therefore, given the high prevalence of anxiety disorders in Iran [7] and their economic and social burden, this study aimed to examine the prevalence of anxiety among people who attended the Kerman Coronary Artery Disease Risk-factors Study (KERCADRS) as a population cohort study in the second round. This cross-sectional study also assessed the relationship between temperament and other demographic characteristics of the participants with anxiety to determine the predictors of anxiety among this cohort.

## Materials and Methods

### *Kerman Coronary Artery Disease Risk Factors Study (KERCADRS)*

The study was carried out on 5895 individuals aged 15 and 75 years in 2010-2011 in an urban population in southeastern Iran. Kerman is the biggest city in the Southeast of Iran and according to the 2012 census, has a population of about 720000 people. More details about the city conditions and sampling and data collection methods are previously published at IJPH. One-stage cluster sampling method was applied for sample selection. The primary units of sampling were households living in Kerman for at least one year before the interviews. Using the zip code in the mail office as the seeds, we marked 250 areas and approached households in the area to recruit 5895 individuals in twelve strata of age and sex. The eligible people (6200 subjects) were invited to complete the informed consent and participate in the study, and close to 95% responded to the invitation. They visited the clinical study site located in the city downtown where they

went through several steps of in-person interviews to disclose their demographic characteristics, CAD risk behaviors and a history of diseases, and mental status (anxiety and depression) and also provide fasting blood samples (after 12-14 hours fasting) for serum lipid and glucose level measurement. They were also asked to report their smoking status, opium use, and physical activity level. The sample size was calculated as 5910 persons based on a prevalence of 50% to be efficient for all NCD risk factors considering the precision at the level of 5%, and response rate of 78%, which was corrected according to eight age-sex strata.

### *Subject and setting*

This cross-sectional study was conducted in Kerman, Iran from 11 Mars 2018 to 22 May 2019. The participants were selected through convenience sampling from those aged less than 40 who attended the second round of KERCARDS in 2017. The sampling was not restricted to sex. Subjects with chronic diseases such as hypertension, diabetes mellitus, and dyslipidemia or subjects who used any medications for the treatment of their diseases were excluded from the study.

### *Data collection tools*

#### *Physical activity*

Daily physical activities at home and workplace were recorded using WHO Global Physical Activity Questionnaire (GPAQ). To evaluate the intensity of physical activity, metabolic equivalent (MET) was used. MET is the use of energy in an adult individual while he/she is sitting (equivalent to 3.5 mL oxygen consumption/kg body weight in a minute). Moderate physical activity is considered as consuming energy four times, and intense physical activity is equal to or more than eight times in proportion to sitting. In other words, a combination of walking and other physical activities with at least 3000 METs per week was assigned to intense physical activity. Subjects with less than 1500 METs were regarded as having low physical activity [15].

#### *Body Mass Index (BMI)*

Anthropometric measurements were height (a tape stadiometer with a minimum measurement of 0.1 cm in a standing position without shoes) and weight (light clothing without shoes measured by a calibrated standard weighing balance (Seca, Model 707, Germany) with an accuracy of 100 g). The participants were categorized as overweight and obese if their BMIs were 25-29.9 and above 30 kg/m<sup>2</sup> respectively.

#### *Depression and anxiety*

Depression was measured by a valid translation of the 21-item BECK-BDI questionnaire, and anxiety score

was measured by a valid translation of the 21-item BECK Anxiety questionnaire, both administered via face-to-face interviews. Both questionnaires had a score range of 0-63. Depression scores of more than 30 and anxiety scores of more than 26 were identified as the disease state [16].

All interviewers were trained before data collection and the validity of their collected data was checked by gold standards (chief researcher). As most of the required data were objective data collected by trained interviewers, we did not measure the agreement indices. However, strict quality control was performed during the study conduction to minimize any error. We tried to track all non-response households twice and replace the participants who were not found at the end by their neighbors.

### Temperament (Mizaj)

The Mojahedi Mizaj Questionnaire (MMQ) was used to measure the temperament of the participants. This is a brief self-reported questionnaire designed for indicating Mizaj. The questionnaire contains ten items. Each item is rated on a three-point scale ranging from 1 to 3. Of these, eight items are related to hot/cold and two are related to wet/dry subscales. According to this scale, each respondent finally has two scores: one for the hot/cold subscale (a total score ranging from 8 to 24) and one for the wet/dry subscale (a total score ranging from 2 to 6). The best cutoff point for hot Mizaj is  $\geq 19$  and for cold Mizaj is  $\leq 14$  on the hot/cold subscale. Similarly, the best cutoff point for dry Mizaj is  $\geq 5$  and for wet Mizaj is  $\leq 3$  on wet/dry subscale. The psychometric properties of the MMQ are well documented [17]. The reliability of the questionnaire based on Cronbach's alpha coefficient was 0.71 [18].

### Ethical approval

The ethics committee of the Kerman University of Medical Sciences, Iran, approved the study protocol (Ethic code 88/110KA). Written informed consent was obtained from all participants in the study.

### Data analysis

The data were described using continuous variables as mean  $\pm$  SD and non-continuous variables as n (%) at 95% Confidence Intervals (CI). Bivariate logistic regression models were utilized to compare age, sex, marital status, education, job status, BMI, physical activity, depression, and Mizaj category among the subjects with and without anxiety symptoms. To determine the predictors of anxiety disorders, the variables were inserted with a P value  $\leq 0.20$  into the multivariate logistic regression model. All of the statistical procedures were performed in SPSS v.23. P < 0.05 was considered significant.

## Results

### Demographic characteristics of subjects

In this study, 596 males and 936 females were assessed in terms of anxiety symptoms. The mean (SD) age of the participants was 30.02 (6.83) years (age range: 11 to 40). More than two-thirds of them were married (n=1084, 70.7%) and had a diploma and university degrees (n=1112, 72.6%). Almost half of the participants were unemployed (n=684, 44.6%). Low physical activity was frequent among the participants (n=707, 46.1%). Based on BMI, 38.9% and 34.9% of the participants were normal (n=596) and over-weighted (n=535), respectively. The moderate Mizaj (temperament in both categories of Mizaj was common (58.7% in the cold-warm category and 35.6% in the wet-dry category).

The results of the present study showed depression symptoms were not prevalent among participants (n=220, 14.4%) (Table 1).

### Prevalence of anxiety

The anxiety symptoms were prevalent among more than one-third of the participants (n=574, 37.5%, 95%CI: 35.2, 40.1). The findings of this study showed that more than half of the participants diagnosed as anxious had mild symptoms (n=353, 61.4%). Moderate and severe symptoms were not common among the anxious participants (28.6% and 9.4%, respectively) (Figure 1).

### The characteristic of anxious participants versus healthy group

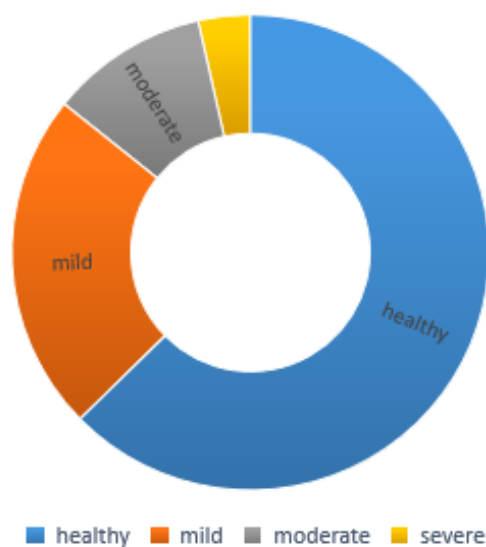
The findings indicated that a majority of anxious and healthy participants were older than 20 years (86.6% versus 89.7%; P value: 0.07). In contrast, anxious participants were mainly females compared to the healthy group (70.7% versus 50.3%; P value: 0.001), and married (74% versus 68.8%; P value: 0.02). They were more illiterate, had lower education (31.7% versus 24.8%; P value: 0.004), were more unemployed (53.7% versus 39.1%, P value: 0.001), more depressed (33.1% versus 3.1%, P value: 0.001), and more obese (20.7% versus 16.2%, P value: 0.009), and had warm Mizaj (29.8% versus 25.25%; P value: 0.04). The anxious and healthy participants were similar to each other in terms of physical activity (P value: 0.52) and wet-dry Mizaj (P value: 0.68) (Table 2).

### Related factors of anxiety

According to bivariable logistic regression models, females versus males (OR: 1.95, 95%CI: 1.56, 2.43), married versus single individuals (OR: 1.29, 95%CI: 1.02, 1.63), low-educated and illiterate persons versus others with a diploma and higher education (OR: 1.40, 95%CI: 1.11, 1.76), unemployed versus employed sub-

**Table 1.** The demographic characteristics of participants

Variables		Frequency (%)
Age	<20	187 (12.2)
	20-40	1345 (87.8)
Sex	Male	596 (38.9)
	Female	936 (61.1)
Marital status	Single	448 (29.3)
	Married	1084 (70.7)
Education	Diploma and more	1112 (72.6)
	Under diploma and illiterate	420 (27.4)
Employment status	Employed	628 (41)
	Student and soldier	220 (14.4)
	unemployed	684 (44.6)
Depression	Negative	1312 (85.6)
	Positive	220 (14.4)
Physical activity	Low	707 (46.1)
	Moderate	588 (38.3)
	Intense	239 (15.6)
BMI	Normal	596 (38.9)
	Underweight	125 (8.1)
	Overweight	535 (34.9)
Cold-warm Mizaj	Obese	276 (18.1)
	Moderate	900 (58.7)
	Cold	217 (14.2)
Wet-dry Mizaj	Warm	415 (27.1)
	Moderate	545 (35.6)
	Wet	442 (28.8)
	Dry	545 (35.6)

**Figure 1.** The prevalence of anxiety and its symptoms among participants

jects (OR:1.67, 95%CI:1.33, 2.09), depressed versus others (OR:15.30, 95%CI:10.22, 22.90), obese subjects versus normal subjects (OR:1.47, 95%CI:1.10, 1.97), and subjects with warm Mizaj versus subjects with moderate Mizaj (OR:1.27, 95%CI:1, 1.61) had great odds of anxiety (Table 2). The levels of physical activity and wet-dry Mizaj did not change the odds of anxiety.

#### *Predictors of anxiety*

According to the multivariate logistic regression model, female sex (OR:1.80, 95%CI:1.41, 2.30; P value: 0.001), illiteracy and lower education (OR:1.40, 95%CI:1.09, 1.81; P value: 0.009), a history of depression (OR:14.51, 95%CI:9.65, 21.80; P value: 0.001), and having warm Mizaj (OR:1.31, 95%CI:1, 1.71; P value: 0.04) were determined as predictors of anxiety (Table 2).

**Table 2.** The bivariable and multivariable linear regressions for determining predictors of anxiety

Variables	Variables level	Healthy (n=958)	Anxious (n=574)	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Age	<20	128 (13.4)	59 (10.3)	1	--	--	--
	20-40	830 (86.6)	515 (89.7)	1.34 (0.97- 1.86)	0.07	--	--
Sex	Male	428 (44.7)	168 (29.3)	1	--	1	--
	Female	530 (55.3)	406 (70.7)	1.95 (1.56- 2.43)	0.001	1.80 (1.41- 2.30)	0.001
Marital status	Single	299 (31.2)	149 (26)	1	--	--	--
	Married	659 (68.8)	425 (74)	1.29 (1.02- 1.63)	0.02	--	--
Education	Diploma and more	720 (75.2)	392 (68.3)	1	--	1	--
	Under diploma and illiterate	238 (24.8)	182 (31.7)	1.40 (1.11- 1.76)	0.004	1.40 (1.09- 1.81)	0.009
Employment status	Employed	421 (43.9)	207 (36.1)	1	--	--	--
	Student and soldiers	162 (16.8)	59 (10.3)	0.74 (0.53- 1.04)	0.09	--	--
	unemployed	375 (39.1)	308 (53.7)	1.67 (1.33- 2.09)	0.001	--	--
Depression	Negative	928 (96.9)	384 (66.9)	1	--	1	--
	Positive	30 (3.1)	190 (33.1)	15.30 (10.22- 22.90)	0.001	14.51 (9.65- 21.80)	0.001
Physical activity	Low	452 (47.2)	254 (44.3)	1	--	--	--
	Moderate	359 (37.4)	227 (39.5)	1.12 (0.90- 1.41)	0.29	--	--
	Intense	147 (15.2)	93 (16.2)	1.13 (0.83- 1.53)	0.41	--	--
BMI	Normal	391 (40.7)	205 (35.4)	1	--	--	--
	Underweight	74 (7.7)	51 (8.7)	1.29 (0.87-1.93)	0.19	--	--
	Overweight	337 (35.1)	198 (34.1)	1.12 (0.87-1.43)	0.36	--	--
	Obese	156 (16.2)	120 (20.7)	1.47 (1.10-1.97)	0.009	--	--
Cold-warm Mizaj	Moderate	580 (60.5)	320 (55.7)	1	--	1	--
	Cold	134 (14)	83 (14.5)	1.12 (0.82- 1.52)	0.45	1.33 (0.95- 1.87)	0.09
	Warm	244 (25.5)	171 (29.8)	1.27 (1.00- 1.61)	0.04	1.31 (1.00- 1.71)	0.04
Wet-dry Mizaj	Moderate	337 (35.2)	208 (36.2)	1	--	--	--
	Wet	287 (30)	155 (27)	0.87 (0.67- 1.13)	0.31	--	--
	Dry	334 (34.9)	211 (36.8)	1.02 (0.80- 1.30)	0.85	--	--

## Discussion

Feelings of tension, worried thoughts, and physical changes associated with anxiety were more prevalent in the participants with mild symptoms. The anxiety

symptoms were more frequent among females and married subjects. In addition, anxious subjects were more illiterate and low-educated, depressed, and obese, and also had warm Mizaj. The female sex, il-

literacy, lower education, a positive history of depression, and warm Mizaj could predict anxiety symptoms among the participants.

Many studies revealed gender differences in the prevalence, course, and burden of anxiety disorders [19-21]. Based on these studies, women experience anxiety disorders more than men with longer periods, which influences their social performance. Besides, anxiety symptoms will get worse at older ages [22]. In the present study, like other related studies, women experienced anxiety symptoms more frequently and finally, the female sex was determined as one of the predictors of anxiety symptoms among adults. Some factors play a role in this discrepancy including biological influences, temperamental factors, stress and trauma, cognitive factors, and environmental factors [23]. More sensitivity of women to confronting unpredictable threats may be considered an important mechanism for higher prevalence of anxiety among them [24].

Education as one of the sociodemographic variables is associated with anxiety disorders [5]. In this study, education was one of the factors that predicted the occurrence of anxiety symptoms among adults. Anxiety disorders lead to premature withdrawal from school [26]. After diagnosis, patients with lower education levels dropped out of the treatment. In contrast, patients with higher education levels had more adherence to the treatment protocols [27]. These findings showed the key role of education in the diagnosis and also the treatment of anxiety disorders.

Previous studies confirmed the relationship and comorbidity of anxiety and depression [28]. Meanwhile, in parallel with this study, a longitudinal study by Jacobson and Newman (2016) in the USA showed that there was a jointly positive relationship between anxiety and depression by avoidance mediated [29]. As described in the previous studies, the presence of anxiety symptoms may increase symptoms of depression, and vice versa [30,31]. The results of the present study showed that the presence of a positive history of depression could predict the occurrence of anxiety symptoms. It means people with symptoms of depression had more odds of experiencing anxiety symptoms. Many studies have addressed the factors associated with the co-occurrence of depression and anxiety. The longstanding vulnerability of people is one of the main factors [32].

According to the findings of the current study, subjects with warm Mizaj were more likely to experience anxiety versus subjects with moderate Mizaj. The relationship between Mizaj and diseases, especially psychiatric disorders [33] was confirmed in the previous studies [34-36]. According to the results of a review by Nadi et al. in 2015, non-psychotic and psychotic disorders including aggression, restlessness, impul-

sivity, and anxiety were classified in the warm temperament group [37]. It is noteworthy that in traditional medicine books, anxiety is one of the symptoms of a warm temperament [13,14]. Meanwhile, Mozaffar Pour et al. (2019) in Tehran, Iran showed that para-clinical factors such as cortisol and FBS were significantly higher among warm-tempered participants [38]. These results were largely consistent with the results of the present study and indicate more irritability and excitement among people with warm Mizaj. One of the limitations of the present study was that the questionnaire used for assessing temperament was designed for healthy people and people with some common chronic diseases such as hypertension, diabetes mellitus, etc. were excluded. Therefore, all findings cannot be generalized to the general population. The other limitation was the sensitivity of this questionnaire as a screening tool. The sensitivity of this tool for both cold and warm temperaments was 52% and 65%, respectively. It means some people with cold or warm temperaments are categorized as having moderate temperaments. Therefore, the prevalence of cold and warm temperament was underestimated.

## Conclusion

The present study showed that female sex, lower educational status, the experience of depression, and warm Mizaj increased the odds of anxiety and determined as were the predictors of anxiety disorder. Diagnosis of Mizaj seems to be necessary for recognizing anxiety symptoms and also finding an effective treatment. Further studies can address other populations with a focus on the environmental factors and the impact of anxiety treatment based on Mizaj.

## Conflict of Interests

The authors have no conflict of interest.

## Acknowledgments

The authors would like to express their gratitude to officials at the Kerman University of Medical Sciences and the participants who contributed to conducting this study.

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