



## The Study of the Relationship between Alexithymia and Type D Personality with Perceived Stress as Mediator on the Blood Pressure of Heart Patients

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### ABSTRACT

The research aimed to study the relationship between alexithymia and type D personality with stress as the mediator variable on blood pressure of heart patients. The research method is descriptive and correlational. The research population consisted of all heart patients who referred to Imam Reza Hospital of Mashhad in 2014. Available sampling method was used and 200 patients have been selected from 623 heart patients. The participants filled the demographic, perceived stress, type D personality and Farsi version of alexithymia questionnaires, and data were analyzed using path analysis and correction coefficient. Results showed that type D personality and alexithymia with perceived stress as mediator can increase blood pressure and other heart diseases. Path analysis pattern had been approved and accordingly, the path of type D personality to blood pressure with standard coefficient of 0.24 and the path of stress to blood pressure with standard coefficient of 0.22 were significant. Moreover, the path of alexithymia to blood pressure with standard coefficient of 0.11 and the path of alexithymia to stress with standard coefficient of 0.02 weren't significant. It must be noted that in this causal model, Type D personality direction to stress, alexithymia to blood pressure, and alexithymia to stress don't have casual effect and the relationship is just correlational. It can be concluded that psychological variables such as type D personality and alexithymia and perceived stress can increase physical chronic disorders such as blood pressure and other heart diseases.

**Key words:** Type D Personality, Alexithymia, Perceived Stress, Blood Pressure

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the case; even those who are asleep (resting) may have hypertension. This disease is hidden in millions of people [2]. Hypertension also doubles the risk of cardiovascular diseases, including coronary artery disease, congestive heart failure (CHF), ischemic and hemorrhagic stroke, kidney failure and peripheral vascular diseases. The disease is associated with other risk factors for cardiovascular diseases, and with increasing risk factors, the odds of these diseases are naturally higher [3]. Obesity, lifestyle, sitting behind a desk, diet and alcohol consumption, family history, various psychological factors, emotional stressors, anger and hostility are issues that affect hypertension. In addition, one of the factors that alone or in combination with other factors plays a major role in hypertension in cardiovascular

### INTRODUCTION

One of the most serious psycho-physiological disorders and the most important risk factors for cardiovascular disease is hypertension. Hypertension makes people susceptible to atherosclerosis, heart attacks and stroke, and due to renal failure it creates, causes death. Therefore, in medical literature hypertension is referred to as silent killer [1]. In addition, it is inferred that hypertension is related to the times when a person feels pressure and tension, but this is not

patients is stress. During stress, the veins of the visceral organs contract and when these vessels contract, the pressure becomes so high that it does not allow blood to flow from the heart muscle; in this case, the pulse pounds faster and the blood pressure goes up. When a person is under constant stress and uses inappropriate defensive styles such as suppressed anger (which can be related to alexithymia), high blood pressure becomes chronic, and it is manifested as a disease. In other words, people who have an internal conflict and do not have the power of expressing themselves and imagination for empathy their negative emotions (catharsis) are more exposed to high blood pressure and cardiovascular disease [4].

During past research, many studies have shown that stressful events are effective in the emergence of physical and mental illnesses [5]. There are catachrestic traits in people that make them potentially prone to the experience of stressors. Personality traits such as having type A behavioral pattern, lack of control over the environment [6], stiffness and flexibility [6, 7], low self-esteem [8], anxious characteristics [5], perfectionism and supremacy and irrationality [6] are among the factors that make an individual susceptible to the experience of stress. According to research (Lungo et al., 2014), people with such characteristics are more likely to be at risk of stress than any other type of physical disorder. In addition to individual factors, there are a lot of situational factors that can contribute to stress. Some researchers [5] believe that different environmental and situational characteristics are effective in experiencing stress. Accordingly, events that create high demands and requests and are considered imminent threat can create a lot of stress in individuals [9]. Changes in environmental conditions and life are also stressful. Environmental factors such as ambiguity in position or role, desirability or lack of desirability of a situation, and control and lack of control of a situation also are effective in the amount of experienced stress [6, 3].

One of the causes of high blood pressure is alexithymia. Alexithymia refers to emotional-cognitive disorder that includes the inability to recognize and describe personal excitements verbally, the extreme poverty of symbolic thinking, the inability to utilize emotions as signs of emotional problems, abstract thinking about low importance external facts, decrease in

remembering dreams and a difficulty in distinguishing between emotional states and physical senses [10]. Investigations have shown that emotionally empowerment of people facilitates their evolving with life challenges and thus gives them more mental health [1]. In addition, the results of the studies showed that anger mediates the relationship between heart disease and alexithymia, that is, alexithymia causes anger and anger causes heart disease. It seems that people with alexithymia use denial and suppression defense mechanisms to control their emotions and retrograde their feelings. Therefore, these people do not show their anger and their negative emotional feelings, and hence harming themselves is a way to express their high levels of negative emotions. The explanation of these mechanisms that relates the psychological and behavioral nature of anger to heart disease are very complicated and in fact lies in a range of mechanisms [10].

In addition, one of the topics that nowadays is the mindset of researchers in the field of health psychology is a relationship of personality characteristics and high blood pressure in heart patients. Interest in personality as a risk factor has been created in the long-term prognosis of heart patients with the advent of type D personality. Type D personality has a strong and stable relationship with a range of health problems including heart problems, myocardial infarction, poor quality of life, and high levels of depression and anxiety [11,12]. first arranged and introduced type D personality, which is an abbreviation for helpless personality [13]. According to [14], the cognitive study of the underlying causes of illness requires looking at personality traits that are constant over time and over situations. Type D personality is characterized by the interaction of two fixed and general personality traits that are: a) Negative Affection (NA) and Social Inhibition (SI) (quoted by [15]. Negative Affection is a tendency to experience negative emotions at different times and situations [16].

People who get a high score in negative emotions, experience high levels of feelings such as blame, anxiety and irritability. They have a negative attitude towards themselves and they imagine a world of imminent problems [17]. Social inhibition has also been defined as inhibition of expressing negative emotions during social contacts due to fear of rejection [16]. Individuals with high social inhibition feel deterrence, tension

and insecurity in the presence of others, and have characteristics such as speaking very little, lack of energy, lack of courage, and a lack of interest for interpersonal communication [17]. People with high scores in social inhibition, see the world around them as threatening, and in fact use avoidance strategies. This means that in social interactions, they avoid situations where there is a risk of not being approved and losing the rewards of others. Social isolation may exacerbate the effects of negative affection [14]. The more a person is socially withdrawn, he/she experiences more decline in the support from social environment [18,14], in a 6-10 years of a follow up study on people with coronary artery disease, showed that type D personality independent of other factors, significantly predicted hypertension, cardiovascular and non-cardiac events, heart stroke, heart death, cancer, signs of vital fatigue and depressive moods, and so on. With regard to what has been said, it can be concluded that both alexithymia and type D personality leads to increased blood pressure both due to increased anger, increased stress and high stress. The perception of disease and the dimensions of this psychological phenomenon are factors that may increase the complications of the disease, reduce healing, and reduce compliance in cardiac and hypertension patients [19]. As a result, negative thoughts and cognitions and mysterious interpretations of heart disease can exacerbate the blood pressure of heart patients due to increased stress. Therefore, the present study addresses this necessity and examines the role of alexithymia and type D personality through the mediation of perceived stress on blood pressure.

## MATERIALS AND METHODS

### Statistical population, sample and sampling method

The present study is a descriptive correlational study. The statistical population of this study included 623 heart patients who visited Imam Reza Hospital in Mashhad, in the winter of 2014. The sample consisted of 200 male and female patients who were selected through available sampling method from patients with hypertension who referred to the hospital. The completion of questionnaires had been done with complete consent of the participants and at the end of the research, the results of completed questionnaires have been announced to sample members who requested. Data analysis of this study was conducted at two levels of descriptive statistics

(mean and standard deviation) and inferential statistics appropriate to the level of data collection; and the assumptions of statistical tests have been analyzed using Pearson correlation coefficient (for hypotheses) and path analysis (for the main hypothesis) and proposed model was analyzed through statistical software spss version 22 and Lisrel.

### Inclusion Criteria

Those patients were selected who had a definite diagnosis of heart disease for at least two years by a cardiologist. Patients with acute conditions such as severe heart failure, severe heart pain, and patients who could not complete the questionnaires were not included in the research sample. Blood pressure of patients was calculated by taking the mean blood pressure in their records and systolic blood pressure of 14 and above were considered as high pressure.

### Research tool

#### Perceived Stress

This scale was created by [20] and has 14 items. Each item is responded based on a 5-point Likert scale (none, low, moderate, high and very high). These options are scored 0, 1, 2, 3, 4, respectively. The scale measures two subscales, which include: (1) the subscale of negative perception of perceived stress; and (2) the subscale of positive perception of perceived stress. Each of these two sub-scales has 7 items. The coefficients of internal consistency of this scale were obtained through Cronbach's alpha coefficient in a range of 0.86 to 0.84 in two groups of students and a group of smokers in the quitting program. The formal validity of this questionnaire was confirmed by 10 professors of Medical Sciences University of Mashhad Hasanzadeh, Torkhan and Taghizadeh, (2013). Mimura and Griffith (quoted from [21]) in a study on Japanese students, obtained the Cronbach Alpha coefficient of Japanese revised version as 0.88 and 0.81 (quoted from [21]). In Iran also [22] obtained Cronbach's alpha coefficient for positive perception of perceived stress as 0.84 and negative perception of perceived stress as 0.81.

#### Type D Personality

This scale consists of 22 questions which includes five factors: depressive anxiety, anger, irritability, social constraints and verbal restraint. This scale has acceptable validity [23]. For reliability of scale, three methods of Cronbach's alpha, re-test and two halves were used which were equal to 0.85

and 0.74 ( $p > 0.001$ ). The results of the factor analysis were derived from the main components of 5-factor Varimax, which were named depression, anxiety, anger and irritability, respectively for the subscales for negative affection; and factors of social constraint and verbal inhibition were named as sub-scale of social inhibition. The total value of the special value of 22 item scale, equal to KMO 14.06 (representing the sampling adequacy), was 0.85 and the Bartlett Spread Test was equal to 1381.59 [24]. The validity of this questionnaire was evaluated through the simultaneous validity by Denollet type D personality questionnaire and it was determined that the correlation coefficient of type D personality questionnaire was 0.95 [24]. In the present study, the overall score of type D personality will be considered.

### Farsi version of Alexithymia

Alexithymia questionnaire of Toronto [25] was used which is based on the alexithymia Scale of Toronto, Bagey, Parker and Taylor (1994), which has 20 questions and 3 subscales of difficulty in identifying emotions, difficulty in describing emotions and objective thinking. The scoring is based on Likert scale from 1 being completely disagree to score 5 totally agree. The sums of the scores of these three sub-scales are considered as the total score for alexithymia. The Cronbach's alpha coefficient in Farsi version for alexithymia and subtypes of difficulty in identifying emotions, difficulty in describing emotions and objective thinking were 0.85, 0.82, 0.75, 0.72 respectively. Validity of the questionnaire has been examined using coincidental validity. The results showed that this questionnaire has a significant correlation with emotional intelligence, psychological well-being and psychological distress [26]. The reliability of the re-test in 2 successions in a sample of 67 people was 0.8 and 0.87 during intervals of four weeks [25].

## RESULTS

The highest frequency was for participants from the age range of 56 - 65 years and the lowest frequency was for the age range of 25 to 35 years. Also, 47.5% were illiterate and/or had a diploma, 30.5% had undergraduate degrees, 16% had master degrees and 6% had PhD degrees.

According to the results of the above table, the mean and standard deviation of personality type variables were 84.96 and 17.33, respectively, and

the mean and standard deviation of alexithymia were 31.66 and 9.07, respectively. The mean and standard deviation of stress were 26.73 and 7.81, respectively, and the mean and standard deviation of blood pressure were 14.41 and 2.51, respectively.

**Table 1: The mean and standard deviation of alexithymia and hypertension personality type variables**

Variable	Mean	Standard deviation
Personality Type	84.96	17.33
Alexithymia	31.66	9.07
Stress	26.73	7.81
Blood Pressure	14.41	2.51

**Table 2: The values of skewness and Kurtosis of the personality type of alexithymia and blood pressure variables**

Variable	Skew	Standard deviation error of skew	Kurtosis	Standard deviation error of Kurtosis
Personality Type	0.579	0.173	0.985	0.344
Alexithymia	0.27	0.173	0.923	0.344
Stress	0.178	0.173	0.159	0.344
Blood Pressure	-0.7	0.173	1.062	0.344

According to the results of Table 2, the values of skewness and kurtosis associated with personality type, alexithymia, stress and blood pressure is in the range of (2, 2) and it can be said that the distribution of data related to these variables is normal.

In order to test the model of path analysis, namely the study of the role of personality type and alexithymia on blood pressure through stress mediator, path analysis is performed using Lisrel software.

To evaluate the fit of the model, the chi-square ratio to degree of freedom ratio  $\chi^2/df$  of Benthaler-Bonte index (NFI), Tucker-Lewis or non-normed Fit Index (NNFI), The Root Mean Square Error of Approximation (RMSEA) and other criteria of GFI, AGFI, and CFI were used. If the Chi-square index with degree of freedom is less than 3 and GFI, AGFI, CFI, NFI values higher than 0.9 and RMSEA index less than 0.1, then we can say that the model has a very favorable fit that is presented in the Table 3.

**Table 3: Fit indicators for research hypothesis**

Model	$\chi^2$	Df	$\chi^2/df$	RMSEA	GFI	AGFI	NFI	CFI	NNFI
Four Factors	2.88	1	2.88	0.098	0.91	0.99	0.89	0.91	0.94

As shown in the table above, the chi-square over degree of freedom is 2.88. Also GFI is 0.91 and AGFI is 0.99. In the model, NFI is 0.89 and NNFI is 0.94 and the RMSEA index is less than 0.1. As a result, we can say that the model has a good fit at a significant level of 0.01.

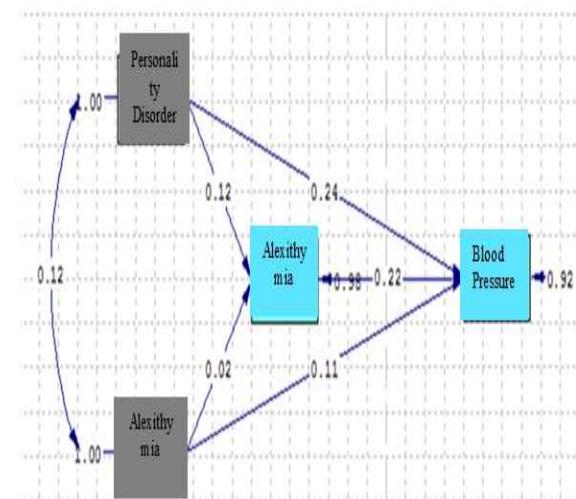
The structural indices produced by the structural equation model are not limited to the general fit indices of the model, but the standard parameters  $\beta$  and  $\gamma$  and the corresponding t values for each of the scientific pathways of the exogenous variables of personality type and alexithymia and endogenous variables of anti-stress and pressure (blood, coefficients Gamma) and the latent mediator variables of stress to the latent blood pressure (beta coefficients) are also exist. These coefficients and indicators also show the relative power of each path. The coefficients  $\beta$  and  $\gamma$  of regression have been standardized and their values must be between 0 and 1, which the results presented in Table 4.

**Table 4: Path Analysis Statistics and Significance of Path Analysis**

Hypothesis	t	Non-standard $\beta$ coefficient	Standard Coefficient	Level of Significance	Test Result
Personality to Blood Pressure	3.47	0.02	0.24	P<0.05	Approved
Personality of Stress	1.70	0.05	0.12	P>0.05	Rejected
Alexithymia to Blood Pressure	1.62	0.02	0.11	P>0.05	Rejected
Alexithymia to Stress	0.32	0.02	0.02	P>0.05	Rejected
Stress to Blood Pressure	2.73	0.02	0.22	P<0.05	Approved

As shown in Table 4, for each of the variables of personality type, alexithymia and hypertension with mediation of stress variable, there are corresponding gamma ( $\gamma$ ) and beta ( $\beta$ ) path coefficients and t values. The gamma path coefficient ( $\gamma$ ) of personality type to hypertension is (0.24) which is a positive and moderate average path coefficient. The t-test showed that this path is statistically significant ( $t = 3.47, p < 0.05$ ).

The path coefficient of gamma ( $\gamma$ ) of personality trait to stress is (0.12), which is a positive and weak path coefficient. The t test showed that this path is not statistically significant ( $p > 0.05, t = 1.7$ ). The gamma path coefficient ( $\gamma$ ) of alexithymia to blood pressure is 0.11, which is a positive and weak path coefficient. The t-test of this pathway is not statistically significant ( $p > 0.05, t = 1.62$ ). Also, the gamma path coefficient ( $\gamma$ ) of alexithymia to stress is 0.02 which is a positive and weak path coefficient. The t-test showed that this path was not statistically significant ( $p > 0.05, t = 3.2$ ). The beta path coefficient ( $\beta$ ) of stress to blood pressure is 0.22, which the path coefficient is positive and moderate. Significant t-test showed that this route was statistically significant ( $p < 0.05, t = 2.73$ ). According to non-significance of the path of personality type to stress and emotional path to stress, it can be said that the stress mediator variable has not played its role as a mediator.



**Figure 1: Path Coefficients in the proposed pattern of personality type, alexithymia, stress and blood pressure**

**Table 5: Relationship between stress, mood and personality type with blood pressure**

Criteria Variable	Predictor	Correlation Coefficient	Level of Significance
Blood Pressure	1. Perceived Stress	0.207**	0.000
	2. Alexithymia	0.257**	0.000
	3. Personality Type	0.284**	0.000

\*\*Correlation at 0.01

Based on the results, there is a significant relationship between stress and blood pressure ( $p$

<0.01) and the beta coefficient ( $\beta$ ) of stress to blood pressure is 0.22, which is a positive and moderate pathway coefficient. Significant t-test showed that this route was statistically significant ( $p < 0.05$ ,  $t = 2.73$ ). Also, there is a significant relationship between alexithymia and hypertension ( $p < 0.01$ ). However, the gamma pathway ( $\gamma$ ) of alexithymia with hypertension is 0.11 which is a positive and poor pathway coefficient. The t-test showed that this route was not statistically significant ( $p > 0.05$ ,  $t = 1.62$ ). The results of Table 4 show that there is a significant relationship between personality type and blood pressure at the 99% confidence level. The gamma path coefficient ( $\gamma$ ) of personality type with blood pressure is 0.24, which is a positive and moderate pathway coefficient. The t-test showed that this path is statistically significant ( $p < 0.05$ ,  $t = 3.47$ ).

### DISCUSSION AND CONCLUSION

The aim of the present study was to investigate the relationship between alexithymia and type D personality with stress mediating cardiac blood pressure. As the results show, the path analysis model was approved with respect to the values of the effect coefficients and significance level. Accordingly, the path of type D personality to hypertension with a standard coefficient of 0.24 and stress path to blood pressure with a standard coefficient of 0.22 was significant. Moreover, the path of type D personality to stress with coefficient of 0.12; alexithymia pathway to hypertension with coefficient of 0.11 and emotional pathway to stress with coefficient of 0.02 were not significant. It should be noted that in this causal pattern, type D personality to stress, alexithymia to blood pressure and alexithymia to stress does not have causal effect. These findings are based on the results of the studies of [1], Asadi Mojre *et al.*, (2013), [10, 27-31].

Researchers have shown that patients with type D personality tend to have maladaptive behaviors such as smoking and not exercising and having a bad diet. The results of another study showed that type D personality creates high risk factors for patients with coronary artery disease and it is correlated with bad prognosis, from a damaged physical condition [32]. Another study on Patients with coronary artery disease and chronic heart disease have showed that negative affection, depression, anxiety and social inhibition variables were the most distinctive variables of coronary artery disease, although negative affection and

social inhibition had more important role [33]. Also, the results of the research indicate that the presence of type D personality in coronary artery disease patients is associated with a lower level of health and lower quality of life [34]. Researchers in a number of studies concluded that personality type, independent of other factors, are an important predictor of the quality of life of patients with coronary artery disease and have a significant and lasting effect on the quality of life and well-being of these patients, and cause a variety of Psychological and physical disturbances in people [11]. Therefore, type D personality can directly increase heart disease such as blood pressure. In this regard, the researchers found in their study that emotional regulation was positively associated with an increase in cheerfulness and humor, and negatively associated with bad mood. Additionally, the ability to perceive emotions positively is associated with increased self-destructive and aggressive humor. Hence, emotional regulation involves the processes in which individuals experience and express emotions and at the required time they affected by emotions they are experiencing [28]. In addition, the results showed that chronic stress can play a key role in the incidence of hypertension. For this reason, patients with increased blood pressure are also evaluated for mental health and their susceptibility to stress and anxiety, in addition to regular medical examinations that are typically performed in the cardiovascular patients. By creating physiological responses in a person, stress can make it possible for veins to stretch and cramps, and can increase the risk of heart attack and stroke. Stress and psychological or behavioral factors have a potential role in the emergence or treatment of almost every kind of physical illness and have a significant impact on development and the end result of physical illness [1]. Additionally, people who are under the influence of chronic stress, as well as those who are vulnerable in terms of personality trait cannot manage stress very well, and therefore they are at increased risk of hypertension Asadi Mojreh *et al.*, (2013). Hence, anxiety and stress play a major role in increasing blood pressure. In fact, it can be said that acute stress occurs because of an event and the person becomes under the influence of intense stress and the body is exposed to the release of substances that increase blood pressure. This increase in blood pressure is temporary because it can be reduced after a short time. People who are affected by chronic stress, such as psychological

stress from family and work environments, and people who are vulnerable in terms of personality trait and cannot manage stress very well have an increased risk of hypertension. In fact, the secretion of substances in the body in long run can lead to an increase of harmful blood fats; the increase of these fats cause the deposition of such fats in the wall of the blood vessels and the deposition of these fats eventually results in an increase in the thickness of the wall of the veins, which in the long run can be accompanied by increased blood pressure [35].

Additionally, high blood pressure is a medical condition that can be caused by excessive stress, obesity, high intake of salt, diabetes, and so on. The risk of developing cardiovascular disease, such as heart attacks, heart failure, and kidney problems is associated with high blood pressure. The stress of the today's world is a big issue. It is said that 75% of physical illnesses are related to stress and it is one of the most important factors in chronic illness, which is the leading cause of death in the world. Therefore, attention has been paid to the sources of stress and its coping strategies in different groups in recent years, especially in patients with various diseases and psychosocial problems [36].

Also, regarding alexithymia, it can also be argued that emotions play an important role in various aspects of life, such as adaptation to changes in life and stressful events. Basically, emotions can be regarded as a biological response to situations that we consider important and challenging opportunity, and these biological responses are accompanied by the response we give to environmental events. It is these internal and external processes that are responsible for controlling and evaluating and changing the individual's emotional responses towards the realization of goals [37]. Research has shown that people with chronic illness use less effective coping strategies such as emotional inhibition, denial, crying, and expressing negative emotions, agitation and feelings of frustration and oppression. Not only does this strategy don't play a role in changing the position of the problem, but it may lead to its prolongation, which tends to prolong the symptoms of the disease [38]

In general, the findings of the present study suggest that psychological and personality characteristics are closely related to the incidence and persistence of hypertension. These factors can create and exacerbate stress, which will be the

consequence of the illness, and can reduce or eliminate stress, which will lead to better compliance with events and, ultimately, mental health [1]. Therefore, it can be concluded that blood pressure is a psychophysiological disorder that in addition to biological and physical risk factors as the physio-pathological process, psychological factors such as the ability to control and manage emotions, stressful events, personality characteristics and coping strategies play an important role in the development and aggravation of hypertension. Moreover, the variables affecting quality of life are both direct and indirect. In fact, personality type and alexithymia, causes more stress in addition to direct effect on blood pressure, and in fact, it determines the level of perceived stress from the environment.

The limitations of this research should also be considered. The ability to generalize the findings needs to be addressed. Given the availability of samples in generalizing the research findings to patient groups, especially those with a previous illness, the generalization should be done with caution. Since the research method is correlational, it is not possible to investigate the cause and effect relationship. Another research constraint was the use of self-reporting tool for collecting research data that can be biased. Given the research constraints, it is suggested that similar research should be done in patient groups such as people with heart disease, hypertensive patients, and those with other psychosomatic disorders, and even patients with psychological disorders. It is also suggested that, if possible, research should be conducted experimentally with the use of objective tools such as interviews.

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