Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2015; 3(2F):932-939 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2015.v03i02.079

Research Article

Comparison of Temperament and Character Pattern in Patients with Type 2 Diabetes and Acute Myocardial Infarction and Healthy Individuals

Mohammad Nadi Sakhvidi[1], Nahid Mazloom Bafrooi[2], Sahar Pak[3], Lida Jafari[4], Nastaran Ahmadi[5*]
[1]Department of Psychiatry, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
[2]Counseling Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
[3]Clinical Psychologist, imam khomeini relief committee of Sirjan, Kerman, Iran
[4]Psychiatry & Psychology Research Center, Tehran University of Medical Sciences, Tehran, Iran
[5]Yazd Cardiovascular Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

***Corresponding author**
Nastaran Ahmadi
Email: ahmadi.psy@gmail.com

Abstract: The role of personality and behavioral factors in the development of diseases has been acknowledged. The present paper aims at examining and comparing the temperament and character patterns, based on Cloninger`*s* questionnaire (TCI) in healthy individuals and Patients with Type 2 diabetes and acute myocardial infarction. The present investigation is of descriptive-comparative type. The sample includes 50 healthy individuals, 50 patients with acute myocardial infarction and 50 with type 2 diabetes. The patients were selected using multistage random sampling while normal subjects were selected by simple sampling from the same areas. Self-directedness in both patient groups was lower than the control subjects. Harm avoidance and persistence was higher in patients with acute myocardial infarction and 50 with in comparison with healthy individuals and subjects with type 2 diabetes while cooperativeness in patients with acute myocardial infarction was lower than in the other two groups. Apart from self-directedness, no factor was different between diabetic patients and healthy individuals. Character dimensions such as self-directedness and temperamental traits such as harm avoidance, novelty seeking and persistence may predict the onset of physical disorders such as cardiovascular diseases and type 2 diabetes.
Keywords: Personality traits, Temperament, Character, Acute myocardial infarction, Type 2 diabetes.

INTRODUCTION

Since 1980's, increasing interest in psychobiological components of personality have led to increased multi-dimensional personality interventions. In this regard, Cloninger's psychobiological model includes both genetic and environmental factors which may influence the personality [1]. Cloninger, one of the well-known temperament theorists, has presented TCI questionnaire including 4 temperament dimensions and 3 character dimensions. Cloninger assumed that personality is divided into character and temperament. While the temperament has been genetically determined includes pre-conceptual biases in perceptual memory and behavior learning. The character matures adulthood as self-concepts grow up and influences the individual's social and personal efficiency through insightful learning about self-concepts [2]. Cloninger's model is based on biopsychological components of personality and distinguishes between character and temperament. Dimensions which describe temperament are based on this hypothesis that neurotransmitters determine the fixed patterns of stimulus-respond which may be considered as a basic for personality traits. On the other hand, character types are differences in goals, values, views and self-conscious emotions. They are not fixed dimensions and are influenced by social growth [1, 3].

Also, temperament is defined as automatic emotional reactions to experience. The character dimension is referred to self-conscious in goals and values which are explained in self-conscious related reaction and is associated with changes in self concepts and recognition which is related with moral, spiritual social and personal growth [4].

The Cloninger's Temperament and Character Inventory (TCI) is unique because it has been formulated based on the information obtained from twins, family studies, longitudinal development study, neurobehavioral studies on learning in humans and other animals and personality psychometric analysis in individuals and in twins. This model identifies the pharmaneural processes of the transmitters which can indicate the personality dimensions [5].

Cloninger's model is based on the combination of information on society and the identification of personality development in humanistic and transpersonal psychology [6]. This model is useful both for diagnosis and prediction of personality disorders. Cloninger's dimensions of temperament and character present the interaction between developmental factors and the biologic aspect of personality. This questionnaire can predict the cognitive aspects of behavior and the behavioral correlates of individual differences in personality dimensions for psychiatric disorders. This test is useful in planning the treatment for psychological disorders. The temperamental traits proposed by Cloninger include: novelty seeking, reward dependence, harm avoidance and persistence which are constant, intrinsic, neurobiological and automatic behavioral responses to specific environmental stimuli, though the temperamental traits change with development and are closely related to higher cognitive processes which include internal and formal interpretation. One may expect the weak temperamental traits be observed in all of personality disorders [7].

Temperament dimensions are behavioral activity (novelty seeking), harm avoidance (inhibition), reward dependence (conservation), and persistence (diligence, stability) [2].

Novelty Seeking shows the behavioural active system and individual differences in the activation of behaviour in response to new signals or cues for reward or relief of punishment [4]. The behavioral maintenance system is referred to as Reward Dependence which is characterized by behavioral differences in the maintenance of rewarding behavior without permanent reinforcement [4]. Novelty Seeking is defined as activation in response to novel stimuli, active avoidance of monotony, approach to reward and escape from punishment and impulsiveness [3, 5, 8]. Novel Seeking means the bias in novel and unfamiliar products and signals and/or the extent to which one adopts himself/herself to a novelty more quickly than other society members [9].

Harm Avoidance refers to a bias in the inhibition of behavior in response to new stimuli, signals of punishment and frustrative non-reward and maladaptive inhibition of null and punishing stimuli. People high in harm avoidance worry in anticipation of problems, ashamed of strangers and escape easily [3, 4, 10]. Reward Dependence reflects a bias in response to rewarding signals and maintenance of behavior associated with reward or decreased punishment and tendency towards sentimentality [5, 8, 11]. Persistence refers to the maintenance of behavior despite frustration and fatigue [5, 12].

Three character dimensions vary according to the extent to which a person identifies the self as an autonomous individual (self-directedness**)**, an integral part of humanity (cooperativeness**)**, and an integral part of the universe as a whole (self-transcendence**)** [2].

Characters are views learned from the development experienced with family structure. Self-directedness refers to the ability to stabilize long-term personal goals and to create necessary and reliable resources to achieve them. Self-directedness means an individual control, to regulate and adapt one's behaviour to fit the situation in accord with individually chosen goals and values [4, 6]. Self-directedness refers to one's ability to adapt, regulate and control one's behavior to fit the condition according to individually chosen goals and values [11].

Other dimension of this model is cooperativeness showing the individual differences in identification with and acceptance of other people. Cooperative persons are empathic, helpful and tolerant. Cooperativeness means one's ability to empathize with others and to create targeted communication with other people. It refers to social growth, empathy, adaptation and cooperation. Self-Transcendence is referred to as spiritual maturity and self-forgetfulness [1, 4].

Self-transcendence is the awareness that everything which includes the self is involved in the world evolution. Self-transcendence is a character dimension which associated with spirituality and, in general, referred to identification with everything which part of a unified whole [6]. Self-transcendence is the tendency towards recognition of identity with a unit of everything and it reflects the level of moral growth, consciousness and recognition [4]. Studies show that psychiatric situations significantly affect moral and anxiety disorders and character and temperament. Evidences also show that demographic factors such as age, gender and education attainment may influence temperament and character but the findings are not similar [13].

Psychological or physical stress, emotional excitation is the onset of illnesses. Cloninger's character and temperament theory is widely used in behavioral studies because it links temperament to biological origin and provides evidence for the mechanism through subjective experiences related to changes in physiological symptoms [14]. During the recent years they tried to examine the association between cognitive and psychological factors and the experience of pain in different fields. The relationship between illness and pain and psychological factors and personality traits is undeniable. Type 2 diabetes and acute myocardial infarction are among those diseases which are strongly affected by psychological factors. These diseases are the major causes of death worldwide. These patients have problems of adaptation. They are affected by these diseases as a result of certain temperament and character features they may have.

There is a research gap in studying such patients' features. Therefore, the present paper aims at examining the Cloninger 7-factor model in healthy people and patients with diabetes and acute myocardial infarction in order to achieve more knowledge on these patients and the risk factors.

METHODOLOGY

The present paper used a causal-comparative approach. The population includes everyone suffering from type-2 diabetes and acute myocardial infarction having been referred to Emam Jafar Sadegh (Meybod) and Ziaei (Ardakan) hospitals as well as all healthy individuals in both Meybod and Ardakan cities. The sample includes 150 subjects (50 patients with acute myocardial infarction, 50 with type-2 diabetes patients, and 50 healthy individuals).

The inclusion criterion for type 2 diabetes and acute myocardial infarction patients was the diagnosis based on routine and standard tests as well as specialist confirmation. The exclusion criterion was the patients' affection by chronic physical illnesses other than type 2 diabetes and acute myocardial infarction.

Also, to avoid biases and in order to come to more convenient conclusions, patients suffering from both type 2 diabetes and acute myocardial infarction were excluded. After necessary coordination with the authorities in the said two hospitals, the heart and diabetes clinics were visited and after explaining to the patients on their condition and the questionnaire and the benefits of this research project, letters of consent were signed by the participants who were told that they could exit the study whenever they wanted.

Afterwards the patients answered the questions upon a psychologists' supervision. They were asked to read the questions patiently and to demand explanation where necessary. Some patients completed the questionnaires in more than one session. The referral time was when the patient had passed the acute conditions and reached stability in symptoms and pain control. Type 2 diabetic and acute myocardial infarction patients were selected by available sampling. Healthy individuals were also selected from the same areas by random sampling and were homogenized to the experiment group (type 2 diabetic and acute myocardial infarction patients) in terms of age, residence and education. The statistical method used for the present purpose was Multivariate Analysis of Variance (MANOVA).

Research Tool

Cloninger's Temperament and Character Inventory (TCI)

The TCI comprises four temperament scales and three character scales. The temperament scales are called Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD) and Persistence (PE). The character scales are: Self-Directedness (SD), Cooperativeness (CO) and Self-Transcendence (ST). The 240 questions of the TCI are answered with "YES" or "NO" [15]. This model is beneficial for both diagnosis and prediction of personality disorders. Each personality disorder in Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition, corresponds to a unique profile of scores according to the TCI [16].

RESULTS

Table 1 illustrates the frequency and percentage frequency of sex, marital status, and job in individuals with type 2 diabetes and acute myocardial infarction.

Table 1: The frequency and percentage frequency of sex, marital status, and job in individuals with type 2 diabetes and acute myocardial infarction

		Variable	Frequency	Percentage frequency
Sex	Type 2 diabetes	Female	30	60
		Male	19	38
	Acute myocardial infarction	Female	21	42
		Male	29	58
	Healthy individuals	Female	24	48
		Male	26	52
Marital status	Type 2 diabetes	Single	2	4
		Married	48	96
	Acute myocardial infarction	Single	-	-
		Married	46	92
	Healthy individuals	Single	3	6
		Married	47	94

Table 2 indicates the mean and standard deviation of the scores on novelty seeking, harm avoidance, reward dependence, diligence and persistence, self-directedness, cooperativeness and self-transcendence in diabetic and acute myocardial patients and in healthy individuals.

Table 2: The mean and standard deviation of the scores on personality components in diabetic and acute myocardial infarction patients and in healthy individuals

Mean ± Standard deviation	Novelty seeking	Harm avoidance	Reward dependence	Diligence and persistence	Self-directedness	Cooperativeness	Self-transcendence
Type 2 diabetes	25.26±2.34	27±1.33	21.76±1.96	6.3±1.14	35.2±2.87	35.7±1.99	16.5±2.25
Acute myocardial infarction	23.33±2.4	30±3.88	21.22±3.12	8.14±0.64	34.3±3.3	32.2±2.78	17.27±2.09
Healthy individuals	24.2±2.5	26±1.2	21±2.13	6.2±2.14	37±2.15	36.3±2.43	17.16±2.2

Fig.1 illustrates the mean scores on novelty seeking, harm avoidance, reward dependence, diligence and persistence, self-directedness, cooperativeness and self-transcendence in diabetic and acute myocardial patients and in healthy individuals.

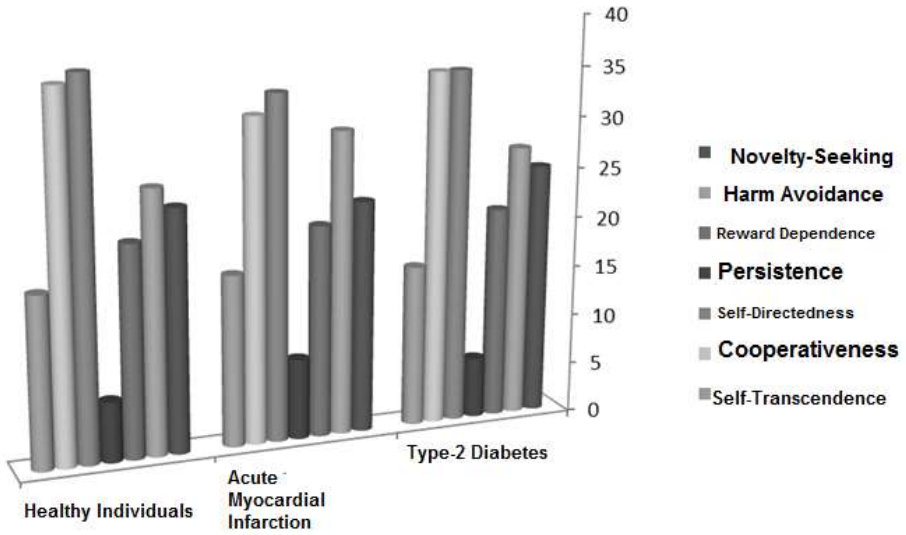

Fig 1. Personality components' mean scores in diabetic and acute myocardial infarction patients and in healthy individuals

Table 3 shows the results of multivariate analysis of variance (MANOVA) on the mean scores on novelty seeking, harm avoidance, reward dependence, diligence and persistence, self-directedness, cooperativeness and self- transcendence in sample group.

Table 3: Results of multivariate analysis of variance on the mean scores on personality components

Test	Value	df error	df error	F	Level of significance
Pillai's trace	0.85	41.6	7	48	$p < 0.001$
Wilks ' Lambda	0.14	41.6	7	48	$p < 0.001$
Hotelling's trace	6.06	41.6	7	48	$p < 0.001$
Largest Root Roy's	6.06	41.6	7	48	$p < 0.001$

As seen in Table 3, the significance levels of the tests ($p<0.001$) indicate that among diabetic, acute myocardial infarction and healthy individuals, there is a significant difference at least in terms of one dependent variable (novelty seeking, harm avoidance, reward dependence, diligence and persistence, self-directedness, cooperativeness and self-transcendence).

To find out that in terms of which variable these groups differ, seven one-way analyses of variance were performed in the context of MANOVA the results of which are as displayed in Tables 4, 5 and 6.

Table 4: Results of one-way analysis of variance in the context of MANOVA on personality components scores in diabetic and acute myocardial infarction individuals

Variable	Sum of Squares	Degree of Freedom	Mean Squares	F	Significance Level
Novelty seeking	148.34	1	148.34	30.55	0.21
Harm avoidance	73.81	1	73.81	6.87*	0.01
Reward dependence	22.01	1	22.01	3.06	0.18
Diligence and persistence	6.51	1	6.51	5.5*	0.02
Self-directedness	369.34	1	369.34	73.26	0.42
Cooperativeness	251.9	1	251.9	89.6*	0.001
Self-transcendence	8.4	1	8.4	1.76	0.19

As seen, there is a significant difference between the two groups (those with acute myocardial infarction and type 2 diabetes) in harm avoidance (p=0.01; f=6.87); diligence and persistence (p=0.02; f=5.5); and cooperativeness (p=0.001; f=89.6). Table 2 indicates that damage avoidance and diligence and persistence are higher in patients with acute myocardial infarction than in those with type 2 diabetes. Also, cooperativeness is higher in type 2 diabetic patients than in those with acute myocardial infarction. There is no significant difference between the two groups in terms of other dimensions of temperament and character.

89.Table 5 presents the results of one-way analyses of variance in the context of MANOVA on novelty seeking, harm avoidance, reward dependence, diligence and persistence, self-directedness, cooperativeness and self-transcendence scores in diabetic patients and healthy individuals.

Table 5: The results of one-way analysis of variance in the context of MANOVA on the scores on personality components in diabetic patients and in healthy individuals

Variable	Sum of Squares	Degree of Freedom	Mean Squares	F	Significance Level
Novelty seeking	123.12	1	123.12	23.45	0.1
Harm avoidance	65.34	1	65.34	74.7	0.01
Reward dependence	17.12	1	17.12	5.01	0.08
Diligence and persistence	5.4	1	5.4	3.4	0.02
Self-directedness	357.23	1	357.23	52.78*	0.001
Cooperativeness	276.4	1	276.4	67.7	0.1
Self-transcendence	6.3	1	6.3	5.45	0.19

As seen, there is a significant difference between the two groups (patients with diabetes and healthy individuals) in self-directedness (p=0.001; f=52.78). Table 2 illustrates that self-directedness is higher in healthy individuals than in those with type 2 diabetes. There is no significant difference between the two groups in terms of other dimensions of temperament and character.

Table 6 displays the results of one-way analysis of variance in the context of MANOVA on the scores on novelty seeking, harm avoidance, reward dependency, diligence and persistence, self-directedness, cooperativeness and self-transcendence in patients with acute myocardial infarction and in healthy individuals.

Table 6: The results of one-way analysis of variance in the context of MANOVA on the scores on personality components in patients with acute infarction patients and in healthy individuals

Variable	Sum of Squares	Degree of Freedom	Mean Squares	F	Significance Level
Novelty seeking	20.4	1	20.4	34.56*	0.002
Harm avoidance	60.57	1	60.57	24.32*	0.03
Reward dependence	6.12	1	6.12	5.23	0.17
Diligence and persistence	4.74	1	4.74	7.02*	0.04
Self-directedness	324.56	1	324.56	63.6*	0.001
Cooperativeness	245.56	1	245.56	25.4*	0.04
Self-transcendence	7.4	1	7.4	7.65	0.19

As shown in Table 6, there is a significant difference between healthy individuals and patients with acute myocardial infarction in novelty seeking (p=0.002; f=34.56); harm avoidance (p=0.03; f=24.32); diligence and persistence (p=0.04; f=7.02); self-directedness (p=0.001; f=63.6); and cooperativeness (p=0.04; f=4.25). Table 2 indicates that novelty seeking, cooperativeness and self-direction are higher in healthy subjects than in

patients with acute myocardial infarction. Also, diligence and persistence and harm avoidance are higher in acute myocardial infarction patients than healthy individuals. There is no significant difference between the two groups in terms of other dimensions of temperament and character.

DISCUSSION

The present paper examined the Cloninger's Temperament and Character Inventory (TCI) in healthy individuals, type 2 diabetic and acute myocardial infarction patients. The results show that patients with acute myocardial infarction had higher harm avoidance and diligence and lower novelty seeking, cooperativeness and self-directedness compared to healthy individuals. The diabetic patients differed from the healthy controls only in terms of self-directedness, obtaining lower scores on this variable. In the comparison between two patient groups it was observed that patients with acute myocardial infarction had higher harm avoidance and diligence and lower cooperativeness scores than the diabetic ones. The analysis showed that both patient groups were weaker than the healthy controls in terms of self-directedness.

Self-directedness is an individual's ability to regulate and adapt behavior to the demands of a situation according to his/her chosen goals and values [11]. In line with this definition, and as seen in the results, weakness in this factor may lead to behavioral maladaptation, allowing the onset and development of various physical and mental diseases by creating inappropriate methods and patterns of life.

Cooperativeness means one's ability to empathize with others and to create targeted communication with other people. It refers to social growth, empathy, adaptation and cooperation [1, 4]. In the present investigation, the heart patients had lower cooperativeness than the healthy subjects. The cooperativeness dimension may lead to reduced stress and the projection of this pathogenic factor by creating emotional supports from the members of the leading group.

In this study, the diabetic patients were weaker than the healthy individuals only in self-directedness. In this respect, it can be concluded that these patients are more similar to healthy individuals in terms of personality factors, having lower psychopathology than the heart patients.

Type 2 diabetic patients had only lower self-directedness than the healthy individuals which may indicate that they physically differ from healthy subjects only in their inability to adapt to environmental conditions and problems (such as adopting a suitable diet, exercise and weight loss) which is apparent in the lower scores of self-directedness [11].

A comparison of personality factors between heart and diabetic patients confirms that the diabetic ones are closer to the healthy controls in terms of personality factors. The diabetic patients obtained higher scores in cooperativeness and lower scores in harm avoidance and diligence as compared to heart patients.

According to Schulze, M. & Hu [18] and Huang [19], numerous demographic, physical, social-psychological and life style factors affect the development of diseases and adaptation to it [18, 19]. Cardiovascular diseases are chronic conditions which considerably influence the patients' quality of life.

The relationship between cardiovascular diseases and psychiatry is a complex one such that either psycho-social issues affect the cardiovascular system or the cardiovascular problems affect the psychological condition of the patients. Many psychological conditions and disorders such as anxiety, anger, type A behavior pattern, depression, stress and sleep disturbance are recognized as factors that cause and intensify cardiovascular diseases. The relationship between illness and pain and the psychological factors and personality traits is undeniable [1]. One of the diseases highly affected by psychological factors is the cardiovascular one [14]. Maattanen *et al*.; (2011) performed an investigation on patients with cardiac disease. The results they obtained showed that the harm avoidance scores in these patients were higher than normal population [14].

Heart diseases expose patients to unpredictable, uncontrollable and disabling conditions. When individual feel that they can do nothing to change the stressful conditions or believe that their resources are not sufficient for responding to the requirements of a stressful situation, they always suffer from a chronic stress and as a result, they cannot establish a good emotional relationship with others and the environment as well [20].

Lower sense of cooperativeness in acute myocardial infarction patients may be associated with such a reason. Diligence and persistence refers to remain determined in spite of numerous disappointments [20].

Self-directedness refers to one's impression of himself/herself as an independent individual and has such subsets as integrity, respect, etc. One might say that acute myocardial infarction and type-2 diabetic patients consider themselves as relying on medications as a result of their being affected by this disease [17] and have had fewer chances to develop this trait.

Like most other studies, the present paper obtained lower harm avoidance scores for heart patients compared to the healthy subjects. Harm Avoidance

refers to a bias in the inhibition of behavior in response to new stimuli, signals of punishment and frustrative non-reward and maladaptive inhibition of null and punishing stimuli. People high in harm avoidance worry in anticipation of problems, ashamed of strangers and escape easily [3, 4, 10].

Obviously, continuous concern and anxiety may be a leading cause of heart diseases through the stimulations of physical systems such as sympathetic nervous system, especially in a chronic form.

In the present study it was observed that persistence factor in patients with acute myocardial infarction was higher than healthy individuals. Diligence and persistence refers to the maintenance of behavior despite frustration and fatigue [5, 12].

Perhaps incurring numerous failures and disappointments provides a background for cardiovascular diseases. For confirming, of course, it is required to study more on this factor and to examine its relationship with diseases such as acute myocardial infarction. Novelty seeking is defined as activation in response to novel stimuli, active avoidance of monotony, approach to reward and escape from punishment and impulsiveness [3, 5, 8].

Novel seeking means the bias in novel and unfamiliar products and signals and/or the extent to which one adopts himself/herself to a novelty more quickly than other society members [9].

The ability to adapt to the environment and promptness in it can lead to serenity and reduced stress which in turn can lead to reduced level of pathogenic factors.

CONCLUSION

It is noteworthy that one way to manifest this factor is anger; and some studies consider hostility as one factor for the onset of heart diseases [1] while in the present paper, novelty seeking, which is usually associated with anger and its manifestation, was lower in heart patients. One explanation could be that perhaps the feeling of hostility, which is a leading factor for heart disease [1], could be considered as different form manifestation and projection of anger. In this case, projection of anger, which is a negative feeling associated with high novelty seeking, could be a protective agent against illnesses while hostility in the sense of possession and maintenance of anger may lead to the onset of various diseases. More studies are needed to verify this.

The limited population, which was a result of specific conditions of the patients, their knowledge levels, limited study and follow-up period, and, the type of study (descriptive) brought about some limitations in generalization of findings, interpretation and etiological attributions of the study variables which should be taken into account. The application of this questionnaire in clinical works can be promising for many diagnostic problems. By investigating clinical populations including patients with mood disorder, anxiety disorders, depressive disorders etc. a psychological profile for any of such disorders can be prepared. Undoubtedly, the clinical profile obtained from various diagnostic units can help clinicians in their diagnosis. One aspect that can be investigated by future studies is finding the psychological profile of personality disorders that can be realized by using TCI questionnaire.

REFERENCES

1. Gourion D, Pelissolo A, Lepine JP; Test- retest reliability of temperament and character inventory in patients with opiate dependence. Journal of Psychiatry Research, 2003; 118(1): 81-88.
2. Tomita T, Aoyama H, Kitamura T, Sekiguchi C, Murai T, Matsuda T; Factor structure of psychobiological seven- factor model personality: a model revision. Journal of Personality and Individual Differences, 2000; 29(4); 709-727.
3. Wiborg IM, Falkum E, Dahl AA, Gullberg C; Is harm avoidance an essential feature of patients with panic disorder? Journal of Comprehensive Psychiatry, 2005; 46(4): 311-314.
4. Richter J, Polak T, Eisemann M; Depressive mood and personality in terms of temperament and character among the normal population and depressive inpatients. Journal of Personality and Individual Differences, 2003; 35(4); 917-927.
5. Levental AM, Waters AJ, Boyd S, Moolchan ET, Heishman SJ, Lerman C *et al.*; Associations between cloninger's temperament dimensions and acute tobacco withdrawal. Journal of Addictive Behavior, 2007; 32(12): 2976-2989.
6. Hansenne M; P300 and personality: and investigation with the Cloninger's model. Journal of Biological Psychology, 1999; 50(2): 143-155.
7. Basoglu C, Oner O, Ates A, Algul A, Bez Y, Ebrinc S *et al.*; Temperament traits and psychopathy in a group of patients with antisocial personality disorder. Journal of Comprehensive Psychiatry, 2011; 52(6): 607-612.
8. Duclot F, Hollis F, Darcy M, Kabbaj M; Individual differences in novelty- seeking behavior in rats as a model for psychosocial stress- related mood disorders. Journal of Physiology & behavior, 2011; 104(2): 296-305.
9. Jabari Y, Gharache M, Azizi Sh.; Investigation effect of novelty- seeking, knowledge and confidence to argument. Researches Biz Administrator Ship, 2009; 1(2): 31-55.
10. Pud D, Eisenberg E, Sprecher E, Rogowski Z, Yarnistky D; The tridimensional personality theory and pain: harm avoidance and reward dependence traits correlate with pain perception in healthy volunteers. Journal of Pain, 2004; 8(1): 31-38.

11. Smith DJ, Duffy L, Stewart ME, Walter JM, Blackwood DHR; High harm avoidance and low self –directedness in euthymic young adults with recurrent, early –onset depression. Journal of Affective Disorders, 2005; 87(1): 83-89.
12. Wiesberg JN, Boatwright B; Mood, Anxiety and personality traits and states in chronic pain. Journal of Pain, 2007, 133(1-3): 1-2.
13. Mendlowicz MV, Jean-Louis G, Gillin C, Akiskal HS, Furlanetto LM, Rapaport MH *et al*.; Socio demographic predictors of temperament and character. Journal of Psychiatric Research, 2000; 34(3): 221-226.
14. Maattanen I, Hintsa T, Toivonen L, Swan H, Raback L, Hintsanen M, Kontula K *et al*.; Cloninger's temperament traits and inherited long QT syndrome. Journal of Psychosomatic Research, 2011; 71(4): 245-249.
15. Faridhoseini F, Kaviani H, Asadi SM, Alimalayeri N, Mohadasbayat MR; Pattern of temperament and character in antisocial disorder and comparison with social bevel, Cognitive Sciences News, 2006; 9(2): 54-60.
16. Dadfar M, Bahrami F, Dadfar F, Younesi G; Investigation of reliability and validity of temperament and character questionnaire, rehabilitation, 2009; 11(3): 43-53.
17. Moosavi A, Aghayan Sh., Razavianzade N, Noroozi N, Khosravi A; The investigation of depression and general health status in type II diabetic patients. Knowledge and Health, 2008; 3(1): 44-48.
18. Schulze M, Hu FB; Primary prevention of diabetes: what can be done and how much can be prevented? Annual Review of Public Health, 2005; 26: 445-467.
19. Huang M; Resilience in chronic disease: the relationship among risk factors, protective factors, adaptive outcomes and the level of resilience in adults with diabetes. Institute of Health and Biomedical innovation School of Nursing and Midwifery, Queensland University of Technology, 2009.
20. Besharat MA, Pourang P, Sadeghpour Tabaee A, Pournaghash Tehrani S; The relationship between coping styles and psychological adaptation in the recovery process: patients with coronary heart disease, Tehran University Medical Journal, 2008; 66(8): 573-579.