

Psychological factors and coronary heart disease

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Review Article

Abstract

BACKGROUND: Although psychological factors play an important role in coronary heart diseases (CHD), it seems there is a need for more researches in this respect. The present study aimed to review psychological factors, including depression, anxiety and stress related to etiology and prognosis of CHD.

METHODS: This was a review on medical and psychological literatures, particularly in the years 1995-2012.

RESULTS: As protective factor or risk factor, psychological factors play an important role in CHD.

CONCLUSION: Given the findings of this study, it seems necessary that we pay attention to psychological factors, as independent risk factors or protective factors for CHD.

Keywords: Coronary Heart Disease, Psychological Factors, Depression, Anxiety, Stress

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Introduction

Coronary heart disease (CHD) is one of the most important health issues of the twenty first century, and the most important cause of mortality in our community.¹⁻³ According to statistics, 2 million Iranians are suffering from coronary heart disease. The Research Committee of the Iranian Society of Cardiac Surgeons has announced that the age of exposure to cardiovascular disease in Iran is approximately 7 to 10 years less than other countries. In developed countries, people are exposed to this disease in the sixth decade of their lives. However, people in Iran are exposed to this disease during the fifth decade of their life. There are about 50 thousand heart surgeries performed annually in Iran. In China, with a population of one billion and 300 million, the same amount of heart surgeries are performed.⁴

Although most of the studies on CHD are mainly focused on the biological risk factors and life style, some evidences have revealed that psychological and psychiatric factors have a very important role in the etiology, development,

duration, and outcome of this disease.^{1,5,6} The most important factors are depression,⁷⁻²⁹ anxiety,¹²⁻⁴⁰ and stress.^{30-32,41-53} Increasing evidence suggests that psychological factors, as independent risk factors, have an important part in physical chronic diseases, particularly coronary heart disease.^{5,9,38,48,53-58}

The purpose of this paper is to review psychological risk factors of CHD such as depression, anxiety and stress. Then via a computerized literature search in ProQuest, Elsevier, and PubMed covering the period from 1995 to 2012, all studies focusing on psychological factors in the etiology and prognosis of CHD were reviewed.

In recent years, researchers and clinicians have been attempting to reduce CHD occurrence by primary and secondary prevention strategies such as behavioral changes and risk factor modification.³⁴⁻³⁶ Secondary prevention of CHD is also a main objective that results in the reduction of cardiac events especially acute myocardial infraction.⁵⁹

Psychological risk factors in CHD

The biological risk factors for CHD have been studied in many researches, but this paper focused

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exclusively on psychological risk factors for CHD etiology, prognosis and mortality.^{60,61}

Depression

Depression is a risk factor for morbidity and mortality in patients with coronary heart disease, especially following acute coronary syndrome.⁷⁻²⁹ Most studies showed depression as an important disorder that leads to an increase in cardiovascular events, re-admission to hospital and CHD mortality.¹⁶ Depression is common among CHD patients; there is ample evidence that prevalence of depression is 20% higher in patients with heart failure than in healthy individuals.^{11,31,47,62-65}

Depression has been found to be a risk factor in the etiology of CHD.^{16,64-70} However previous research has had several potential limitations concerning causal inference. The greatest challenge in research on prospective association between depression and CHD is the possibility that both depression and subsequent CHD are caused by subclinical manifestation of cardiovascular disease.⁶⁸ Atherosclerosis, the underlying pathophysiological mechanism of CHD, is known to develop during the decade before the first clinical symptoms. Therefore, atherosclerosis may facilitate depressive symptoms even before clinical CHD symptoms.^{48,68}

Balog et al. studied depression symptoms associated with job stress and stress in marital relationships in women with and without coronary artery disease.¹⁷ They found that in women, marital stress is associated with depression symptoms and results in the intensification of CHD. Therefore, it appears that depression has a mediating role for marital stress that ultimately results in CHD.

Anxiety

Although evidence suggests that anxiety has an adverse impact on prognosis in CHD patients independent of depression, the role of anxiety as an etiological risk factor is less clear.^{68,71-74}

In a systematic review, 12 studies evaluated clinical endpoints, such as myocardial infarction (MI) and cardiac death, 5 studies reported significant association, 3 studies reported marginally significant associations, and 4 studies reported no association between indexes of anxiety and cardiac patients.⁷⁵

Roest et al. (2010) in their meta-analysis studied the connection between anxiety and the risk factors of coronary artery disease, and found that anxiety is an independent risk factor for CHD and cardiac deaths. However, the association between anxiety and CHD was somewhat less than the corresponding association between depression and

CHD, but this connection was stronger than the relationship between anger and CHD occurrence.³⁸

A survey conducted about physical and psychological symptoms of anxiety in CHD patients revealed that anxiety is correlated with physical factors such as palpitation without any physical exercise, anger and redness in the face, abnormal heart beat, and muscle tension that increases the risk of CHD especially in women.⁷⁶

A research showed that somatic symptoms of anxiety were associated with an increased risk of CHD in women. This finding lends support to the physiological pathway for the relation between psychological factors, anxiety in particular, and CHD.³⁷

A longitudinal research conducted by Janszky et al. over a period of 37 years on 49321 young Swedish men aged 18-20 years evaluated the effects of anxiety and early depression on risk factors of coronary artery disease. This research revealed that both anxiety and depression are associated with low physical activity and high rate of cigarette smoking. Depression was also associated with high levels of alcohol consumption and anxiety had a connection with high blood pressure. Finally, this study indicated that anxiety independently predicted subsequent CHD events such as morbidity and mortality. In contrast, it found no support for such an effect concerning early onset of depression in men.²⁸

In another study, it was indicated that high and low levels of trait anxiety do not have a different effect on cardiovascular reaction. Expressing and inhibiting styles of anger did not have a different effect on cardiovascular reactions, but anger expression and management styles and trait anxiety levels had an opposite effect on cardiovascular reactions. This means that the outward (behavioral) expression of anger with high level of anxiety is associated with low cardiovascular reaction (heart beat), and the outward expression of anger with low level of anxiety is associated with high cardiovascular reaction. In contrast, inner expression of anger with high level of anxiety is associated with high cardiovascular reaction, and inner expression of anger with low level of anxiety is associated with low cardiovascular reaction.⁷⁷ In addition to depression, other psychological factors such as anger, hostility and anxiety are associated with increase in risk factors of cardiovascular disease.^{78-81,34}

Stress

To fully understand the relationship between cardiovascular disease and stress is simply not

possible, but empirical evidence indicates a relationship between the heart and mind.⁸¹

A number of experts have suggested that those variables that are commonly regarded as components of stress include: depression and anxiety, social isolation and lack of social support, acute and chronic life events, psychosocial work characteristics, and type A behavior and hostility.⁶⁶

Depression and anxiety

The association between depression and anxiety with CHD has been previously discussed in this essay.^{11,16,31,34,37,47,61-64,67-70,75-77,80-84}

Social isolation and lack of social support

In many studies lack of social support was indicated as a predictor of onset and prognosis of CHD, and mortality among both sexes; however, it was more consistent in males.^{47,84,85} The risks are increased 2–3-fold and 3–5-fold for females and males, respectively. The association between social isolation and lack of social support with CHD exists for subjects who live in different countries and are of various age groups.⁴⁷ A study aimed to investigate and identify psychological factors in patients with ischemic heart disease within 4 months after discharge.¹⁴ This study indicated that coping style, social network and social support, within 4 months after discharge, caused these patients to be less focused on their illness and feel less threatened in comparison with the control group that did not have these types of support. These patients were also less excited and benefited more from the health services provided by the professionals. Moreover, people who suffered from this disease for the first time were seeking social support and coping style more in comparison to those that had previous history of hospitalization due to ischemic heart disease.¹⁴ In another study, loneliness and social support were studied in patients with heart failure (CHF). They realized that loneliness is one of the important risk factors for patients with heart failure, and the more the patients feel lonely the more severe the heart failure is.⁸⁶

Acute and chronic stressors

Some studies have shown that acute and chronic psychological stressors are associated with acute coronary syndromes (ACSs).⁸⁷ Acute stressors such as earthquakes or loss of a child may trigger death.^{88,89} However, it is very difficult to study and quantify the magnitude of effects.⁶ Moreover, there has been less focus on how chronic and low-key stress of everyday life affects mortality rate of individuals.⁹⁰

Psychosocial work characteristics

This topic refers to the characteristics of the work environment. Few associations supported the hypotheses that high job demands, low decision latitude, or job strain are associated with increased levels of CHD risk factors.⁹¹ When the results for job control, demands and strain were studied, there was not a preponderance of positive over negative studies. The expert working group found no consistency between this review and the other two reviews of work-related stressors.^{6,64,92} A study on the association between adverse psychosocial characteristics at work and risk of coronary heart disease among males and females with low job control, reported a higher risk of newly reported coronary heart disease during follow up. Subjects with low job control on both follow-ups had an odds ratio for any subsequent coronary event compared with subjects with high job control at both follow-ups.⁹³ One study characterised occupational cohort of British men well. This study reported that the association between psychosocial factors at work and CHD was largely independent on family history of CHD, education, paternal education and social class, number of siblings, and height.^{93,94} Therefore, the results of these studies were heterogeneous. Future research will need to clarify this subject with the role of moderator variables.

Type A behavior and hostility

Early research data indicated that type A behavior pattern, which is primarily characterized by hostility, intense ambition, competitive drive, constant preoccupation with deadlines, and a sense of time urgency, was related to the development of CHD. However, these original findings were not supported by subsequent research.^{51,95,96} Recent studies do not confirm the correlation between type A behavior and coronary artery diseases.⁶⁴

Studies on American and European populations have demonstrated that high levels of anger and hostility are predictive of coronary heart disease (CHD) mortality.⁹⁷ Moreover, a Japanese study indicated that higher levels of cynical hostility increased the risk of acute myocardial infarction syndrome (AMIs), and that anger-control strategies could have some benefit in reducing the risk of AMIs in middle-aged Japanese men.⁹⁶ However, another review indicated that there was no evidence of such an association.⁶⁴ Beside some studies demonstrated no clear association between hostility and CHD.⁶ More research is needed in order to understand this

relationship in the future.

Materials and Methods

This study was conducted through searching in related books and articles. The related articles were retrieved from authorized database such as ProQuest, Elsevier and PubMed using keywords such as (psychological factors), (psychological risk factors), (depression, anxiety, stress), (social isolation and lack of social support, acute and chronic life events, psychological work characteristics, Type A behavior and hostility) (coronary heart diseases) from 1995 to 2012. Accordingly, articles that were most related to the subject were selected and the relationship of psychological factors to coronary heart disease were studied.

Results

This study showed that psychological factors as protective or risk factors have an important role in CHD; the most important of which are depression, anxiety, stress, occupational status, and⁹⁴⁻⁹⁷ social support.^{4,6,7-29,30-40,41-53,48,62-66,80,82,86-89,94-98} Strong evidences regarding the role of depression in enhancing morbidity and mortality of CHD showed that depression is an independent predictor.^{8,13,14,68,99-105} Depressed people are 64% more at the risk of suffering from CHD than non-depressed people.⁶⁸ Depression is also a negative predictor for improvement of CHD. Conducted studies have illustrated that after controlling demographic variables, low social support and anxiety were also independent risk factors for mortality.¹⁰⁶ Moreover, the results of these studies have demonstrated that anxiety, stress, and type of stress, such as lack of social support and psychological work characteristic, were associated with coronary artery disease.

One of the major protective factors for CHD is social support. Some studies have shown that perceived social support during hospitalization decreases depressive symptoms in subsequent months.¹⁰⁷ In addition, many studies have shown that after myocardial infarction the rate of depression depends upon the amount of social support.¹⁴ This study also showed different types of stress such as anxiety, depression, social isolation, social support, acute and chronic life event, hostility, and type A behavior. Among these variables, social support is more important than other variables. Not only is the lack of social support associated with the occurrence of CHD, but it is also an independent risk factor for

mortality.^{6,66,71,108}

Research has highlighted the importance of stresses caused by acute and chronic life events in CHD incidence. Acute life event stressors can trigger CHD events, but it is very difficult to study and quantify the magnitude of these effects. Although the deleterious physiological effects of acute stressors as CHD triggers are well documented, the role of chronic stressors in CHD onset and prognosis remains unclear.⁶ Many researches on hostility as type A behavior were inconsistent. Some studies confirm the role of hostility in the etiology of coronary artery disease, while other researches refute this assumption.^{64,72} Moreover, some studies have conflicting views about the role of hostility in the etiology and prognosis of coronary artery disease.^{6,109}

Discussion

Coronary artery diseases are caused due to insufficient blood and oxygen flow to the heart muscle and will be the main cause of death until the year 2020.^{110,111} The risk factors of CHD are divided into unchangeable factors (age, and genetic factors) and changeable factors (smoking, obesity and psychosocial factors).^{112,113} Only half of the variances of CHD are explained by unchangeable factors (such as age and genetic factors).¹¹³ Due to the high expenses of treatment of these diseases and their complications, appropriate scientific approach, and prevention and treatment of these diseases result in saving millions of Rials in health costs. In this regard, it seems necessary to concentrate on the changeable factors that are mostly the psychosocial factors and life style.

Different reasons such as increasing prevalence in developing countries, like Iran, the high expenses of surgical and other treatment programs, side effects, and the resultant inability make CHD one of the most important medical and health issues.⁷⁴ Although most of the researches on CHD are focused on the biological risk factors and life style, evidence shows that psychological and psychosocial factors have an important part in etiology, development, continuity and the consequence of this illness.^{1,5,9,47,64,112} Today, psychological factors are considered as independent risk factors in chronic diseases.^{112,113}

However, psychosocial factors are not recognized clinically. Cardiologists frequently state that the psychosocial factors identified in the literature are not apparent in clinical practice. There are probably three reasons for this. First,

psychosocial factors are risks rather than inevitable causes; they vary widely in importance for different patients, and will not be apparent in every case. Second, psychological characteristics such as hostility may only be elicited under appropriate provocation. Therefore, they are unlikely to be expressed during a typical clinical consultation. Finally, there is a tendency to search for psychosocial explanations only for patients who do not have other clear risk factors such as hypertension, diabetes, or smoking. Many clinicians work based on implicit models that place biological and psychosocial causes as alternatives. However, psychosocial factors may be associated with other risk factors.⁵⁴ For example, the Whitehall II study by Marmot et al. showed that social isolation, lack of control at work, and hostility are more prominent in low social class groups where smoking, insulin resistance, and other factors are clustered. Therefore, 10,308 women and men, all of whom were employed in the London offices of the British Civil Service, would provide advice to patients, and refer more extreme cases to psychiatric or psychological services.¹¹⁴

Most studies discussed depression and anxiety as an important disorder that results in increase of cardiovascular incidents, re-admittance to hospital, and death in coronary artery patients.^{34,36} Depression is common among coronary artery patients; extensive research evidence showed that prevalence of depression in patients with heart failure is more than 20%.^{47,62-64,115}

The health system in Iran is experiencing different problems such as unfair and inadequate access to health services for the society, high cost of health care, emphasis on health care and neglect of preventive care, intervention on the individual level and neglect of community intervention, lack of balance between the interests of patients, society and the health system, and especially little attention to mental health. Furthermore, the age of exposure to cardiovascular disease, mainly heart failure, is decreasing in Iran and is reaching the teenage years. This is mostly due to psychological and life style reasons, therefore, a new psychological perspective to CHD is crucial. It is obvious that today one of the main aims of psychology is the prevention of psychosomatic disease, that results in decreasing expenses and improving health and quality of life.^{116,117} The new trend in psychology under the name of health psychology, and extensive research and publications in this field are a confirmation of this matter. Thus, by knowing the psychological risk

factors and protective factors of coronary artery disease, prevention, control and adjustment can be performed. These performances result in a decrease in risk factors, decrease in treatment expenses, improvement in life quality, and eventually decrease in illnesses and inabilities.^{68,105,117,118}

Conclusion

This study dealt with this topic using a modern psychological perspective and with the aim to evaluate the role of psychological factors in the etiology and prognosis of coronary heart diseases. The findings of this study showed that although psychological factors are independent risk factors for CHD, the diagnostic and therapeutic procedures of this illness had a favorable process. Prevention is better than cure; therefore, considering the increase in CHD risk factors during recent years, it is necessary that more attention be paid to psychological factors and preventive actions. Without doubt, performing psychological and educational interventions in the community and increasing people's awareness about the psychological factors of CHD can have an effective role in promoting the people's health in the future.

Conflict of Interests

Authors have no conflict of interests.

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