ReviewArticle

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Investigating the Causes of Heart Failure based on Persian Medicine Point of View

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ABSTRACT

BACKGROUND AND OBJECTIVE: Nowadays, heart failure is one of the most common diseases and is the cause of death in a high percentage of the population. Despite all the progress made, researches continue for achieving a better understanding of its causes. The present study aims to evaluate the causes of heart failure from Persian medicine (PM) point of view.

METHODS: In this review article, first PM books with references to causes of heart failure and weakness such as Al Qanun Fi Al-Tibb (The Canon of Medicine) and Exir-e-azam were reviewed and compared with modern medical findings in Braunwald's Heart Disease, Harrison's Principles of Internal Medicine and Cecil medicine books as well as online databases including PubMed, Science direct, Scopus and Google scholar.

FINDINGS: Reviewing the documentation revealed that, according to definitions and symptoms, heart failure is the equivalent of the term “heart weakness” in PM. Accordingly, results of the study demonstrated that according to PM, causes such as Sue-e-Mizaj, obstruction, tissue detachment, mental disorders, direct and indirect excessive disposal of body essential materials may underlie the heart’s inability to meet the needs of the organs.

CONCLUSION: Several factors are mentioned as the cause of heart failure or heart weakness in PM, only a few of which are considered in modern medicine. However, some of these less considered theories can be used as new assumptions to prevent and control this disease.

KEY WORDS: *Heart Failure, Persian Medicine, Metabolic diseases, Vascular obstruction.*

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Introduction

Heart failure (HF) is an increasing worldwide problem (1, 2) and the increase in the prevalence of this disease is partly due to successful treatments of heart diseases (such as myocardial infarction, valvular diseases and arrhythmias), and the patients' longer life expectancy (3). Due to weakness and dysfunction, the defective heart is unable to provide enough blood flow to meet the metabolic demands of the body tissues, and with significant increase in capillary pressure, disturbance occurs in cell surface interactions. In most cases, myocardial dysfunction also affects the ventricular filling and discharge (4).

Despite multiple treatments for heart failure, the symptoms of the disease are not significantly improved in many patients (1). Despite the recent improvements in heart failure, symptomatic heart failure continues to be associated with dire prognosis. Demographic studies have shown that 30 - 40% of patients die within the first year after diagnosis, and 60 - 70% of them die within the first five years, mainly due to chronic heart failure exacerbations or acute events (possibly ventricular arrhythmias) (5). Considering these problems, it seems that using all available potentials, such as referring to therapeutic approaches of complementary therapy seems reasonable. Today, the use of these methods in many chronic diseases along with allopathic therapies in the form of Integrative Medicine is one of the general policies of the World Health Organization and paying attention to them can play an important role in improving patients and increasing their length of life and quality of life (6).

Persian medicine, a rich, documented and written source of ancient medicine, can be considered as one of the important sources of research in this field. It presents the experience and knowledge of Persian medicine scholars (7). As one of the key organs of the body, heart was much considered in ancient medical texts as a part of all treatment books that were dedicated to heard diseases and their treatments (8, 9). Obviously, before examining the therapeutic approaches from the perspective of traditional Persian medicine, it is first necessary to examine the etiology of this disease from the viewpoint of this medicine.

The purpose of this qualitative study is to investigate the causes of impaired performance and heart failure from the viewpoint of Persian medicine.

Methods

In this study, all of the topics discussed in the sections related to heart disease were first studied in the book, Exir-e-Azam (Hakim Azam Khan, 1317 AH) as the most complete source of treatment and the diseases in which heart performance is disturbed as a circulatory factor were extracted, and then the causes of extracted entries related to heart failure were reviewed in other medical books (al-Qānūn fī aṭ -Ṭib [Avicenna, 370 – 428 AH], Sharḥ al-asbāb wa-al-ʿalāmāt [Nafīs Ibn ʿIwaḍ, 812 AH], Ṭibb-i Akbarī [Arzānī Muḥammad Akbar 1134 AH] and Moalejat-E-Aghili [Aghili Khorasani, 12th century AH]). After reviewing the texts and targeted sampling from books and available resources, the data were collected, categorized and analyzed.

Then, the causes of heart failure from modern medical books (Braunwald's Heart Disease, Harrison's Principles of Internal Medicine) were studied and compared with the findings of traditional medicine. In addition, the English equivalents of the main causes of heart failure in Persian medicine (Obstruction, Metabolic Disorder, Disruption, Anxiety and Mood Disorder) were investigated in several online databases including PubMed, Scopus, Science Direct, and Google Scholar, and the findings were adapted in the final conclusion.

Results

Definition of disease: From the perspective of allopathic medicine, heart failure is a clinical syndrome, in which the patient suffers from a range of clinical signs and symptoms, such as dyspnea and respiratory distress, fatigue and edema due to inherited or acquired cardiac disorders or cardiac function and as the symptoms intensify, the patient will need frequent hospitalization (10).

In this condition, the heart does not have the ability to meet the needs of the body adequately, and the blood withdrawn from the heart does not respond to the metabolism of the tissues. This mismatch between cardiac need and cardiac output may result from impaired cardiac structure and reduced blood pumping, or secondary to pathological changes in the body's metabolism (for example in thyrotoxicosis) (1–3). In fact, heart failure is more likely to be defined as a secondary illness than a primary illness, as a result of other heart disease and as a multifactorial disease defined with its symptoms (10). After reviewing and studying heart disease from the perspective of Persian medicine and collecting definitions, causes and symptoms, it was concluded that in Persian medicine resources, an independent discussion that comprehensively defines the causes and symptoms of heart failure does not exist. However, Persian medicine scholars have considered what today is presented as heart failure under the broad concept of "weakness of the heart" (11,12). The weakness of the heart in Persian medicine

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sources is defined as a failure in the function of the heart and is known in many headlines of heart disease such as Sue-e-Mizaj and mechanical disorders as complications and in headlines such as palpitations is known as the cause. In terms of symptoms, its range is broadly defined from mood disorders to reduced consciousness and patient's death. In this condition, the heart does not fulfil its duties (blood circulation, vital force and oxygen required for tissues), and after its performance drops, the patient experiences clinical symptoms such as fatigue, lethargy, heart rate irregularity, dizziness, respiratory distress, weight loss or weight gain, loss of strength and libido, and extreme cases of decreased consciousness (12-14). In fact, weakness of health, more than other cardiovascular diseases, is an expression of the current concept of heart failure and is common in many types of heart diseases and is therefore not referred to as an independent disease in most medical resources, but is a subset of all cardiac disorders (11, 12).

Etiology

The viewpoints of allopathic medicine: Different categorizations have been proposed from the viewpoints of allopathic medicine to investigate the causes and development of heart failure. In one approach, the underlying causes of the disease are the basis of categorization and accordingly, six reasons have been proposed including systolic disorders (reduced strength of contraction), diastolic disorders (loss of power and expansion), mechanical disorders (valve disorders, etc.), metabolic disorders, pulse rate and rhythm disorder and pulmonary problems (1 – 3). On the other hand, the underlying causes of heart failure are categorized and evaluated based on the level of cardiac output (10). In this case, the etiology of heart failure is divided into three general categories of reduced, normal or increased cardiac output (Fig 1).

The viewpoint of Persian medicine: Similar to allopathic medicine, according to the viewpoint of Persian medicine, several causes has been considered by scholars primarily due to the involvement of the heart tissue or secondary as a result of impaired function of other organs such as the liver, the brain, the stomach and the womb (in women), which may reduce the function of the heart and affect Sue-e-Mizaj of the heart, increase the volume of the material in the body or the vessels and block the free flow of blood in body, weakness and impaired function of the involved organs and non-organic causes (weakness of power) (13). Each of the above-mentioned issues may reduce cardiac output and power primarily or secondarily (Fig 2). Figure 2 was designed as an easy way to analyze the causes of heart failure and is not meant to differentiate each cause from another one, since the function of the organs directly and indirectly affects one another and can cause disorder or disease in other organs.

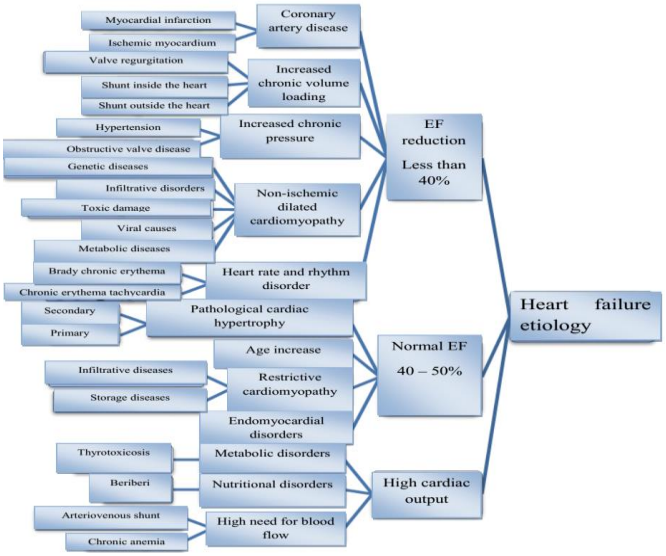


Figure 1. Causes of heart failure from the viewpoint of allopathic medicine

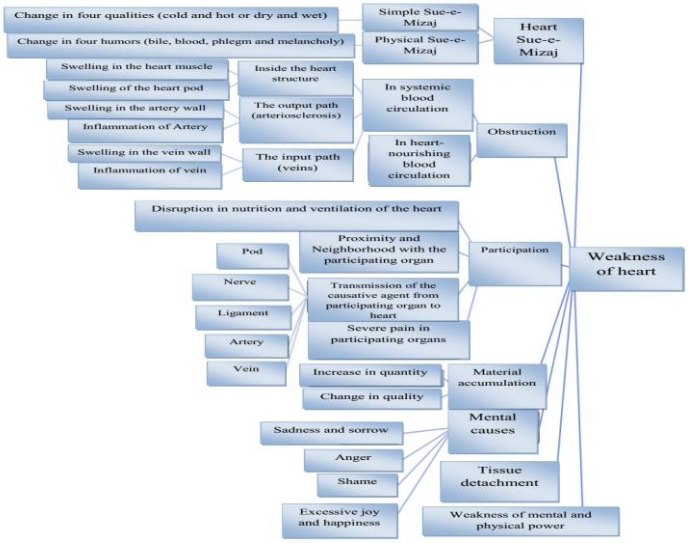


Figure 2. Causes of performance loss (weakness of the heart) from the viewpoint of traditional Persian medicine

Sue-e-Mizaj: From the viewpoint of Persian medicine, each organ has its own Mizaj (Temperament) and nature, which ensures proper performance. Sue-e-Mizaj occurs when Mizaj exists the normal state, which causes disorder in the performance of the organs and causes weakness and failure (11-13). Different types of Sue-e-Mizaj can be one of the causes of heart failure and other cardiac disorders, such as palpitation and faint (almost corresponding to fainting, or presyncope), accompanied by weakness in physical and sensory movements, underweight, decreased energy and fatigue in organs (11-15).

Accumulation of materials in the body and obstruction: One of the important causes of heart

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failure and weakness in Persian medicine is the incomplete digestion and the accumulation of substances inside or adjacent to the ventricles and branches of the vessels that led to obstruction and decreased blood flow to the heart and performance loss (12). The presence of these waste materials in various parts of the heart and vessels (myocardium, pericardium, space between the myocardium and the pericardium and the artery wall), caused by swelling, can reduce or stop the flow of blood that enters or exits from the heart and the blood that feeds the heart, or physically prevent full expansion of the heart and entrance of enough blood flow into the heart (11). Overweight, some types of hypertension and pericardial effusion are subsets of these diseases (13).

Underlying disease: In this category of disease, the heart is not primarily impaired, but due to the presence of a disease or a disorder in another organ, it suffers from weakness or failure as a secondary disease, and in this case, paying attention to the source organ and treating the disorder in that organ is the main key to cure heart failure (13). For example, in neurological diseases, the weakness of the brain and the nervous system in supporting and directing the respiratory system prevents the proper ventilation of the heart and may cause Sue-e-Mizaj, palpitations, and faint (16, 17). In addition, decreased liver function, altered and impaired hepatic metabolism and inappropriate material production (Anabolism and Catabolism), the presence of swelling and stretching in the liver, and pain due to connective tissue attachment are among the heart failure mechanisms with hepatic origin (13).

Mental and sensual states: From the perspective of Persian medicine, one of the most important factors in heart failure and metabolic disorders of the liver is the mental and sensual states of patients. Overall, sadness and anger are the factors of weakness, while hope and happiness improve the performance of heart (11). Excessive sadness, fear, anger, shame and joy change the Mizaj of heart and cause weakness and failure in its performance, due to excessive stimulation and weakness of the body's strength. Conversely, joy and happiness prevent the loss of power and improve cardiac strength due to strengthening natural forces and expanding vital power in the body (16-19).

Cardiac tissue detachment: One of the factors presented by traditional medicine scholars in the formation and development of cardiac dysfunction is the cardiac tissue detachment, which may occur because of swelling, wounds and injuries (11).

Weakness of mental and physical power: One of the concepts of Persian medicine, which has not yet been adequately identified for this purpose, is the concept of mental power, which is one of the main concepts associated with health and disease. From the viewpoint of Persian medicine scholars, in addition to the production of humor (bile, blood, phlegm and melancholy), which are the main constituents of various parts of the human body, other materials are also produced in the course of metabolism, referred to as the medical mental power (this concept is completely distinct from the immaterial spirit), and the Persian medicine scholars specify a certain function for it. Any disorder (change in quantity or quality) in this vital index can lead to disease in different organs (18-20). Symptoms of this disorder can be detected and tracked by examination and evaluation of the function of the affected organ. For example, one of the reasons for weakness in mental and physical power is intense bleeding, such as menstruation or long diarrhea. In addition, the presence of a disorder or illness with severe and chronic pain is another reason for the weakness of mental and physical power (12).

Discussion

As modern knowledge presents heart failure as a clinical syndrome that may manifest for several reasons (10), a comparative study of the definition, symptoms, and etiology of heart failure with the concepts of traditional medicine suggests that heart failure in Persian medicine is a broad concept that includes inadequacy of cardiac performance and may cover a wide range of heart failure symptoms based on the severity and degree of failure (11-16). By reviewing traditional Persian medicine resources in the field of heart disease, especially heart failure and weakness, it seems that the precision of Persian scholars in the analysis of the causes of inefficiency of cardiac performance led to the formation and collection of documented, comprehensive and deep knowledge in the area of cardiovascular disease and has the ability to adapt to the findings of the modern studies in many cases (19).

From the viewpoint of traditional medicine, lifestyle disorders such as the use of concentrated foods, sleeping late, mental stress, and inappropriate physical activity lead to accumulation of wastes (obesity and hypertension, etc.), metabolic disorders, blockage in the route delivering intravascular substances and atherosclerosis, or secondary to disorders in participating body organs such as the liver and kidney provide the conditions for heart failure (12-20). In modern medicine, lifestyle disorders, mental stress, decreased physical activity, excessive intake of food by disturbing the metabolism of the body lead to increased fat, insulin resistance, increased abdominal fat and blockage of blood vessels to the heart (CAD),

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which is known as a significant factor in the development of cardiovascular disease, and overlaps with what is considered as a risk factor for heart failure in traditional Persian medicine sources (21-28).

One of the cases of accumulation of substances in the body is premature menopause and its cardiac complications, which is considered as one of the causes of heart failure in traditional medicine sources (12-15, 29). Although this relationship has been reported in recent epidemiological studies (30), more precision is needed to prevent heart failure and specific recommendations are necessary to increase body clearance and facilitate the removal of waste. Anemia and other metabolic abnormalities as one of the causes of cardiac dysfunction in traditional medicine sources, also have several effects in the prognosis of patients with heart failure in modern epidemiological studies, provide grounds for exacerbating symptoms, and reduce the patient's longevity (31-33).

The concept of Mizaj is one of those unique subjects in Persian medicine. Although it does not have an exact equivalent in allopathic medicine, but by comparing the causes and symptoms described in the Persian medicine and current known diseases, a consolidated view can be achieved and it is possible to use the experiences of several thousands of years to help control these diseases (23, 24). In this view, different types of Sue-e-Mizaj including cold and hot or dry and wet can provide the basis for creating various types of heart failure in terms of being systolic or diastolic. Therefore, a different protocol for controlling the disease can be described by analyzing the causes of these disorders. In the above cases, attention to other symptoms of the patient, including moisture and dry skin, softness, stiffness and pulse strength, sleep patterns and digestive symptoms, can be used to differentiate the cause of the disease along with new methods for identifying cardiac performance such as measuring cardiac output and can be efficient for choosing the right treatment (11-16).

Considering the fact that each type of Mizaj in Persian medicine causes unique physical and mental characteristics, the incidence of heart disease is also different in them and accordingly, personal patterns can be provided according to the basic Mizaj to improve cardiac performance and prevent heart failure. Today, the subject of Individualized Medicine or Personal Medicine is one of the new topics that address personal differences in gene expression and psychosocial indices, and it has been considered as a new window in recognizing the mechanism of the incidence of diseases (25, 34). Therefore, in future studies, patients with heart failure should be evaluated in terms of frequency of the types of Mizaj and causes of heart failure in order to evaluate the above hypotheses. Psychological actions and reactions specifically affect cardiac performance. However, in recent epidemiological studies, the effects of stress, anxiety, and anger in heart failure have been evaluated (35, 36). In a systematic review, many patients with heart failure suffer from anxiety and the treatment of this disorder is helpful in improving quality of life, longevity and reducing disease complications (37).

From the viewpoint of Persian medicine, if heart failure occurs due to the incidence of mental symptoms in the patient, treatment is incomplete without paying attention to the patient's mental states, and no permanent recovery will occur in the patient. That is because the effects of mental states are fast, stable and powerful, to an extent that, in some circumstances, improving the mental status of patients will have priority over cardiac treatments. Another important point is the role of the stomach and digestion in all diseases, including cardiovascular diseases (38); therefore, modification of digestion pattern and applying digestive recommendations can help to improve heart failure (11-13).

Reducing the amount of food per meal, reducing the consumption of liquids with meals, reducing the consumption of legumes and foods that cause flatulence, and using stomach-nourishing foods such as marmalade, gooseberry, jam, thyme and cinnamon with or after meals to improve gastric performance and material metabolism, will be helpful in these patients (39). The majority of stomach-nourishing medicinal plants have a direct effect on increasing cardiac contractility and improving its performance, in addition to improving gastric performance (13). In addition, certain exercises such as deep breathing or singing may improve cardiovascular circulation (40, 41). Regarding the aim of this study, which is to extract the opinions of the Persian scholars regarding the causes of cardiac performance loss, the proposed theories including the topic of Mizaj can be evaluated by designing laboratory and human studies and can be used to achieve a modern and integrated approach. Referring back to the written sources and the views of the Persian medicine scholars based on their observations on a wide range of patients over the years, one can study the appropriate preventive and therapeutic strategies for this type of heart diseases.

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References

1.Massie B.M. Heart failure: pathophysiology and diagnosis. 23rd: Cecil medicine. 2008;sec8.P. 345-53.

2.Ponikowski P, Anker SD, AlHabib KF, Cowie MR, Force TL, Hu S, et al. Heart failure: preventing disease and death worldwide. ESC Heart. 2014;1(1):4-25.

3.Kasper, Dennis L, Tinsley R. Harrison's principles of internal medicine. 17th ed New York: McGraw-Hill; 2008. P.227-36.

4.Chaudhry SP, Stewart GC. Advanced heart failure: prevalence, natural history, and prognosis. Heart Fail Clin. 2016;12(3):323-33.

5.Hobbs FD, Roalfe AK, Davis RC, Davies MK, Hare R. Prognosis of all-cause heart failure and borderline left ventricular systolic dysfunction: 5 year mortality follow-up of the echocardiographic heart of england screening study (ECHOES). Eur Heart J. 2007;28(9):1128-34.

6.Kemper KJ, Carmin C, Mehta B, Binkley P. Integrative medical care plus mindfulness training for patients with congestive heart failure: proof of concept. J Evid Based Complementary Altern Med. 2016;21(4):282-90.

7.Moeini R, Gorji N, Ghods R, Mozaffarpur S A. Quantitative and qualitative assessment of persian medicine articles indexed in pubmed by the end of 2015. J Babol Univ Med Sci. 2017;19(1):21-6.[In Persian].

8.Zargaran A. Ancient Persian medical views on the heart and blood in the Sassanid era (224–637 AD). Int. J Cardiol. 2014;172(2): 307-12.

9.Avicenna. The book on drugs for cardiovascular diseases. Translated to Persian by Razavi Borghei H. Nashre Ney, Tehran (2009) . [in Persian]

10.Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE, Drazner MH, Fonarow GC, Geraci SA, Horwich T, Januzzi JL, Johnson MR. 2013 ACCF/AHA guideline for the management of heart failure. Circulation. 2013 1:CIR-0b013e31829e8776.

11.Azam Khan HM. The Greatest Elixir (Exir Azam). Tehran; Research Institute for Islamic and Complementary Medicine. 2009:277-80. [in Persian]

12.Avicenna. Canon (Qanoon Fi Teb). Beirut; Alaalamy Foundation Publications; 2005. [in Arabic]

13.Aghili Khorasani MH. Treatments (Moalejat Aghili). Tehran; Research Institute for Islamic and Complementary Medicine; 2009:579 . [in Persian]

14.Kermani NIA. Explain of the causes and signs (Sharh Asbab va Alaem). Qom; Jalaleddin Publications; 2009. Vol1:567. [in Arabic]

15.Aghili Khorasani MH. Summary of wisdom (Kholasat Alhekma). Tehran: 1346;Ismaeilian Pub; 2006. [in Persian]

16.Al-Akhvini Al-Bokhari ARIA. Guides for medicine learners (Hedayat Almoteallemin Fi Teb). Mashhad Ferdowsi Uni Mashhad Pub. 1992. [in Persian]

17.Razes MIZ: Contains of Medicine (Alhvi Fi Teb). Beirut (Esmaeil MM, Ed.) Scientific Library; 2000. [in Arabic]

18.Arzani MA. Akbari's Medicine (Teb Akbari). Qom; Jalaleddin Publications; 2009. [in Persian]

19.Zarshenas MM, Zargaran A. A review on the Avicenna's contribution to the field of cardiology. Int J Cardiol. 2015;182:237-41.

20.Jorjani SI. Medical purposes and treatment discussion (Alaghraz Altebbieh va Almabahes Alalaeieh). Tehran Univ Pub. 2006. [in Persian]

21.Jackson JL, Emery CF. Illness knowledge moderates the influence of coping style on quality of life among women with congestive heart failure. Heart Lung. 2011;40(2):122-9.

22.Borné Y1, Engström G, Essén B, Hedblad B. Immigrant status and increased risk of heart failure: the role of hypertension and life-style risk factors. BMC Cardiovasc Disord. 2012;26(12):20.

23.Parvinroo S, Zahediasl S, Sabetkasaei M, Kamalinejad M, Naghibi F. The effects of selected hot and cold temperament herbs based on Iranian traditional medicine on some metabolic parameters in normal rats. Iran J Pharm Res. 2014;13(l):177-84.

24.Parvinroo S, Kamalinejad M, Sabetkasaei M. Pharmacological concepts of temperament in Iranian traditional medicine Iran J Public Health. 2014;43(10):1463-5.

25.Scott CT, Caulfield T, Borgelt E, Illes J. Personal medicine--the new banking crisis. Nat Biotechnol. 2012;30(2):141-7.

26.Kannan A, Janardhanan R. Hypertension as a risk factor for heart failure. Curr Hypertens Rep. 2014;16(7):447.

27.Alosco ML, Spitznagel MB, Gunstad J. Obesity as a risk factor for poor neurocognitive outcomes in older adults with heart failure. Heart Fail Rev. 2014;19(3):403-11.

28.Lavie CJ, Ventura HO. Impact of obesity on the prevalence and prognosis of heart failure-It is not always just black and white. J Card Fail. 2016;22(8):598-9.

29.Razes B. Summary of Experiences (Kholasat Altakarob). Tehran; Research Institute for Islamic and Complementary Medicine;2004:324-5. [in Persian]

[DOR: 20.1001.1.15614107.1396.19.7.10.3]
[DOI: 10.22088/jbums.19.7.10]

30. Rahman I, Åkesson A, Wolk A. Relationship between age at natural menopause and risk of heart failure. Menopause. 2015;22(1):12-6.
31. Sharma SK, Agarwal SK, Bhargava K, Sharma M, Chopra K, Arumugam G. prevalence and spectrum of iron deficiency in heart failure patients in south Rajasthan. Indian Heart J. 2016;68(4):493-7.
32. Cleland JG, Zhang J, Pellicori P, Dicken B, Dierckx R, Shoaib A, Wong K, Rigby A, Goode K, Clark AL. Prevalence and Outcomes of Anemia and Hematinic Deficiencies in Patients With Chronic Heart Failure. JAMA Cardiol. 2016;1(5):539-47.
33. Goldberg JF, Shah MD, Kantor PF, Rossano JW, Shaddy RE, Chiou K, et al. Prevalence and severity of anemia in children hospitalized with acute heart failure. Congenit Heart Dis. 2016. doi: 10.1111/chd.12355.
34. Moeini R, Memariani Z, Pasalar P, Gorji N. Historical root of precision medicine: an ancient concept concordant with the modern pharmacotherapy. DARU J Pharma Sci. 2017;25(1):7.
35. National Institute for Health and Care Excellence. Clinical guideline 90. depression: the treatment and management of depression in adults. london, england: national collaborating centre for mental health; 2009
36. Shen BJ1, Eisenberg SA, Maeda U, Farrell KA, Schwarz ER, Penedo FJ, et al. Depression and anxiety predict decline in physical health functioning in patients with heart failure. Ann Behav Med. 2011;41(3):373-82.
37. Easton K, Coventry P, Lovell K, Carter LA, Deaton C. Prevalence and measurement of anxiety in samples of patients with heart failure: meta-analysis. J Cardiovasc Nurs. 2016;31(4):367-79.
38. Shirzad M, Mosaddegh M, Minaii B, Nikbakht Nasrabadi A, Ahmadian-Attari MM. The relationship between heart and stomach in Iranian traditional medicine: a new concept in cardiovascular disease management. Int J Cardiol. 2013;165(3):556-7.
39. Aghili Khorasani MH. Store of Medicine (Makhzan Aladvieh). Qom; Bavardaran Publications; 2001.
40. Gorji N, Moeini R, Mozaffarpour S, Mojahedi M. Breath holding as a specific type of breathing training from the viewpoint of Avicenna. Polish Arch Inte Med. 2017;127(3):214.
41. Gorji N, Moeini R. Singing as a rehabilitation method from the viewpoint of Avicenna (980–1037 AD). npj Primary Care Respiratory Medicine. 2017;27(1):16.

[DOR: 20.1001.1.15614107.1396.19.7.10.3]
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