INJ INTERNATIONAL NEUROUROLOGY JOURNAL

# Evaluation of the Relationship between Neurological and Cardiovascular Diseases in Adults and Children with Infection and HTN Basen on pharmacological points

**Mehrnoosh Lak[1], Farshad Divsalar[2], Forugh Charmduzi[3], Setareh Reza Soltani[4], Mohammad Reza Azadi[5]***

[1.]School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[2.]Firoozgar General Hospital, Department of Infectious Disease, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

[3.]Assistant Professor of Pediatrics, Department of Pediatrics, Ali Asghar Children's Hospital, Iran university of Medical Sciences, Tehran, Iran

[4.]Advanced Diagnostic and Interventional Radiology Research Center (ADIR), Tehran University of Medical Sciences (TUMS), Tehran, Iran

[5.]School of Medicine, Iran University of Medical Sciences, Tehran, Iran

## Abstract

High normal blood pressure is characterized by a systolic pressure ranging from 130 to 139 mmHg and a diastolic pressure ranging from 85 to 89 mmHg. Within this study, the correlation between neurological and cardiovascular diseases in young individuals and children with infection and blood pressure has been explored from a pharmacological standpoint. The current investigation entailed a comprehensive examination of over 40 pertinent articles encompassing the subjects of "Neurological and Cardiovascular Diseases," "Infection," "Blood Pressure," and "Patients with Endoscopic Conditions and Evaluation of Wound Healing." By analyzing the findings of the current investigation, it can be asserted that in the presence of stress and anxious tension, certain hormones undergo an augmentation. These hormones elicit an elevation in heart rate and a constriction in blood vessels. One rationale for considering heart rate when selecting medications for blood pressure is the observation that an increased heart rate is a prevalent characteristic in individuals with elevated blood pressure, and furthermore, an augmented heart rate is linked to high blood pressure. The outcomes demonstrated that 15% of individuals with high blood pressure exhibited a resting heart rate of 85 beats per minute, while approximately 27% displayed a heart rate of 80 beats per minute. Moreover, a sustained escalation in heart rate serves as a robust predictor for elevated blood pressure necessitating medical intervention. Heart disease caused by high blood pressure can cause serious problems and is the leading cause of death from high blood pressure. In general, the heart problems caused by this can be divided into two main parts, which include diseases related to the blood vessels feeding the heart and diseases involving the heart pump muscles.

**Key words:** neurological and cardiovascular disease, infection, blood pressure, diabetes, health system.

## Introduction

The arteries that deliver blood to the heart muscle are called coronary arteries. These vessels can be narrowed due to high blood pressure [1]. As a result, blood flow to the heart will slow or stop. Doctors call these conditions coronary artery disease or coronary heart disease (abbreviated as CHD) [2-4]. Note that this condition can cause many problems for patients. As a result of this disease, it becomes difficult for the heart to work and deliver blood to the body [5]. As a result, the patient is exposed to a heart attack; Because this situation causes a blood clot to get stuck in one of these narrowed vessels and will lead to the interruption of blood flow to the heart and as a result, a heart attack [6]. The main goal of treating heart diseases caused by high blood pressure is to prevent the progression of the disease and its complications. Also, treatment strategies should be as much as possible in order to restore the changes that have happened to the heart. In this regard [7], you should know that the treatment of heart disease due to high blood pressure depends on the severity of the disease, age and medical history of the patient. It begins with drug therapy, and its main goals are to prevent blood clots, improve blood flow, and reduce cholesterol. Medicines prescribed by the doctor help the heart in different ways [8]. Also, it is considered very important to take all medicines regularly and accurately according to the doctor's prescription. Contributions of the Paper "Heart Rate and Blood Pressure [9]: Any Possible Implications for Management of Hypertension?"

- The paper explores the possible implications of heart rate and blood pressure on the management of hypertension.
- It discusses the relationship between heart rate and blood pressure and how they are interconnected in the context of hypertension [10].
- The authors provide insights into the potential use of heart rate and blood pressure measurements as indicators for the management of hypertension.

- ❖ The paper highlights the importance of considering heart rate and blood pressure in the overall management and treatment of hypertension.
- ❖ It offers a comprehensive review of existing literature and research on the topic, providing a valuable resource for healthcare professionals and researchers in the field of hypertension management [11].

**Search strategy and selection of articles**

The articles pertaining to the chosen keywords were obtained by conducting searches in Scopus, Google Scholar, and PubMed databases as well as employing the use of specific search terms such as "Governance Patterns," "Medical Services," and "Health System." In order to ensure the quality and relevance of the gathered literature, certain types of articles such as case reports, editorials, unpublished articles, articles with only introductions available, and summaries of congresses and meetings in languages other than English were excluded from consideration (see figure 1).

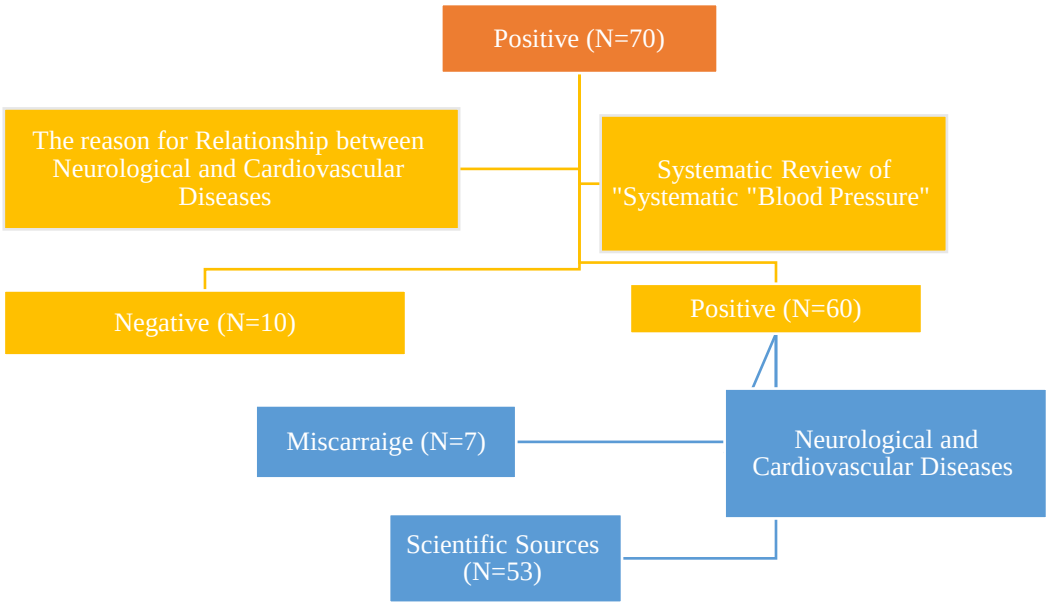


**Figure 1- Flow chart of included subjects**

**All types of cardiovascular diseases**

Coronary artery disease, one of the most prevalent and perilous cardiac disorders, arises when the arteries responsible for delivering blood to the myocardium become obstructed by plaque. The consequential hardening of the cardiac vessels ensues [12].

What gives rise to the obstruction of coronary arteries? When the inner wall of an artery sustains injury, fatty deposits, comprised of cholesterol and other cellular waste products, have a propensity to accumulate at the site of damage. This process, referred to as atherosclerosis, prompts the gathering of blood platelets at the site of a rupture or tear within the plaque, as an attempt to mend the vessels [13]. This assemblage has the potential to obstruct an artery, thus precipitating a heart attack or an analogous condition known as broken heart syndrome [14]. Broken heart syndrome, also known as Takatsubo cardiomyopathy, is a cardiac disorder characterized by impaired blood pumping in the terminal and middle segments of the left ventricle, which hampers the delivery of blood to the aorta. The accumulation of plaque can constrict these vessels and impede blood flow within the cardiac valves [15].

The heart valve's function can be described as their responsibility for regulating the blood flow within the veins [16]. In instances where these valves become damaged, individuals may be compelled to rely on artificial heart valves in order to maintain bodily function [17]. Ultimately, a reduction in blood flow can potentially result in the manifestation of symptoms such as chest pain (angina), difficulty breathing, and other indications of

coronary artery disease [18]. Coronary artery disease can be attributed to a variety of factors, including but not limited to smoking, high blood pressure, elevated cholesterol levels, insulin resistance, and diabetes, among others [19].

A range of medications are employed in the treatment of different heart conditions. These include aspirin, cholesterol-lowering drugs, beta blockers, calcium channel blockers, nitroglycerin, ACE inhibitors, and angiotensin II receptor blockers (ARBs) [20].

**Congenital heart disease (heart disease):** Congenital heart defects can be mentioned among the types of heart diseases. Many congenital heart defects cause few or no signs and symptoms. They are often not diagnosed until the child is older [21]. Severe heart defects are found during pregnancy or immediately after birth. Symptoms of congenital heart defects include rapid and consecutive breathing, cyanosis, fatigue, difficulty in feeding, low birth weight, chest pain, growth delay and poor blood circulation [22]. Among the risk factors for the occurrence of congenital heart defects, we can mention the following: genetic disorders in the fetus, measles [23], diabetes in the mother, alcohol consumption and smoking. Congenital heart diseases are diagnosed by examining and taking history [24], ECG, echocardiography, X-ray of the chest, angiography, CT scan of the heart, online heart disease test and MRI [25].

**Cardiac arrhythmia and various heart disorders in young individuals:** Arrhythmia denotes an irregular cardiac rhythm, which occurs when the electrical impulses responsible for coordinating the heartbeat fail to function appropriately [26]. Consequently, the heart may exhibit abnormal rates of beating, either too fast, too slow, or irregularly. This condition represents one of the categories of cardiac ailments observed in teenagers and young people. Multiple forms of arrhythmias exist [27], including tachycardia (rapid heartbeat), bradycardia (slow heartbeat), premature contractions (premature heartbeat), atrial fibrillation (irregular heartbeat) [28].

**Widening of the heart valve or dilated cardiomyopathy:** Dilated cardiomyopathy can be classified as a type of heart disorder. In this condition, the heart's chambers, particularly the left ventricle, undergo enlargement, causing the heart muscle to stretch and become thin [29]. Consequently, the heart weakens and fails to effectively pump blood. This can lead to arrhythmia, the formation of blood clots within the heart, and heart failure [30]. Dilated cardiomyopathy predominantly affects adults aged between 20 and 60 years. Many individuals with this condition remain asymptomatic, making it one of the heart diseases without noticeable symptoms [31]. Some people may experience only minor symptoms and lead a normal life [32]. Due to the accumulation of blood, blood clots may form within the heart [33]. If these clots dislodge, they can travel to cerebral vessels and provoke a stroke. Moreover, blood clots can obstruct blood flow to abdominal organs or the legs [34].

**Heart attack or myocardial infarction:** Stroke ranks among the most prevalent heart diseases. A heart attack, also referred to as a myocardial infarction, signifies the cessation of blood supply to a portion or the entirety of the heart. This can result in damage or destruction of a segment of the heart muscle [35]. The primary cause of heart attacks is the development of arterial plaques or blood clots within the coronary artery. Additionally, a heart attack may occur in cases where an artery abruptly narrows or goes into spasms [36]. Symptoms such as chest pain, upper body pain, sweating, nausea, fatigue, lightheadedness or dizziness, and difficulty breathing aid in the diagnosis of a heart attack [37]. Risk factors for heart attacks include age, family history of heart disease, hypertension, obesity, diabetes, race, smoking, high cholesterol, sedentary lifestyle, unhealthy diet, alcohol consumption, and stress [38].

**What is heart failure?** Among the various forms of heart disease, heart failure refers to a condition where the heart, although still operational, experiences a decrease in its proper functionality. This decline can stem from untreated coronary artery disease, elevated blood pressure, arrhythmia, and other underlying factors. Such conditions have the potential to impede the heart's ability to effectively pump blood [39]. It is important to note that heart failure has the potential to be life-threatening; however, early detection and treatment can be instrumental in averting complications. It is crucial to acknowledge that heart failure manifests in different variations. For instance, left heart failure can lead to the accumulation of fluid in the lungs, resulting in respiratory distress. On the other hand, right-sided heart failure can cause fluid buildup in the abdomen and legs, leading to swelling [40].

**Hypertrophic cardiomyopathy:** Hypertrophic cardiomyopathy, a hereditary ailment, is characterized by an abnormal thickening of the heart muscle, which subsequently hampers the heart's ability to contract efficiently. Consequently [41], this condition impairs the heart's capacity to collect and pump blood. In certain cases,

obstruction may also occur. If one parent has this disease, there is a 50% chance that each child will be affected. It is worth noting that diagnosis of hypertrophic cardiomyopathy is often challenging [6]. This stems from the fact that many individuals afflicted with this condition exhibit minimal symptoms, thus enabling them to lead a normal life without any notable hindrances [42]. According to the American Heart Association (AHA), hypertrophic cardiomyopathy stands as the leading cause of cardiac mortality among athletes and individuals below the age of 35. Unfortunately, there are no known preventive measures against hypertrophic cardiomyopathy [43]. However, early detection can significantly aid in the management and prevention of severe complications. Individuals with hypertrophic cardiomyopathy typically need to adopt certain lifestyle modifications, such as limiting physical activity, to effectively adapt to their condition [44].

**Mitral valve insufficiency:** This cardiac ailment arises when the mitral valve within the heart fails to close tightly enough, thereby allowing blood to flow back into the heart. Consequently, the heart becomes incapable of efficiently pumping blood throughout the body. Additionally, it is plausible for blood to enter the vessels leading to the lungs, resulting in the accumulation of fluid in the pulmonary region [5]. This accumulation, in turn, leads to the development of respiratory distress [45]. Over time, the heart undergoes enlargement, ultimately culminating in heart failure. Consequently, addressing the issue of heart enlargement becomes imperative. Mitral valve regurgitation generally progresses slowly and is often of a mild nature. It is not uncommon for individuals to exhibit no symptoms for an extended period, remaining oblivious to the presence of this ailment, while the condition itself may remain stagnant [46].

**Atherosclerosis:** Atherosclerosis is a disease that reduces blood supply to body organs. The first and main symptom of this disease is chest pain and shortness of breath [47]. A person may feel cold or numb in different parts of the body. Pain in atherosclerosis is unusual and the patient feels weak in the legs and arms [48].

**Heart infection:** In conditions such as endocarditis or myocarditis, the term heart infection is used. Cardiac infection is caused by the transfer of bacteria, fungi or other microbes from other parts of the body, such as the mouth, and their spread in the bloodstream. If the symptoms of a heart infection are not treated quickly [49], endocarditis can damage the heart valve. People who have damaged heart valves, or have other heart defects, are more exposed to this disease.

The various classifications of cardiac ailments elucidated in this exposition are also prevalent in the pediatric and young adult population. Regrettably, hypertension and hypercholesterolemia have experienced an upsurge among children, while physical inactivity and obesity have contributed to an augmented incidence of cardiac maladies in this age bracket [50]. It is imperative to acknowledge that an unhealthy lifestyle during childhood can exert a profound influence on the development of cardiac complications in adulthood. Congenital cardiac malformations and arrhythmias inflict suffering upon individuals by afflicting them with cardiac impairments. One of the rare afflictions primarily observed in children is known as Kawasaki disease. This condition elicits inflammation of the vasculature and manifests as heightened body temperature and lymph node swelling [51].

**What are the indications of cardiac disease?**

On occasion, cardiac disease may manifest without any discernible symptoms, and it is only when it progresses to the point of myocardial infarction, cardiac insufficiency, or arrhythmia that the symptoms become apparent. However, in general, the symptoms of cardiovascular disorders may include the following [52].

**1- Myocardial infarction:** thoracic pain or discomfort, discomfort in the upper back or neck, dyspepsia, heartburn, feelings of nausea or vomiting, excessive fatigue, dizziness, and dyspnea.

2- Arrhythmia: cardiac palpitations and the elicitation of peculiar sensations in the thoracic region [53].

**3- Cardiac insufficiency:** indications of dyspnea, fatigue, or edema in the lower extremities, ankles, legs, abdomen, or jugular veins.

**Symptoms of heart disease in men and women**

Unfortunately, heart diseases are more likely to occur in women than in men, and this causes many problems. On the other hand, usually women who have a heart attack have symptoms less similar to men. It may occur to you that heart diseases in men and women first show themselves with chest pain, but this is not the case in women [54]. It is interesting that heart attack in women shows itself more often with pains other than chest pain. Here are some symptoms of heart disease in women:

- ✓ Discomfort and discomfort in the neck, jaw, arms and upper parts of the abdomen.
- ✓ Usually, women who suffer from heart diseases have shortness of breath and this state shows itself more in activities [55].
- ✓ They feel pain in one or both arms. Heart pain and left hand are related.

- ✓ They may suffer from nausea and vomiting and this condition should be checked more carefully.
- ✓ Sweating is more common in women with heart disease [22].
- ✓ Excessive fatigue that is not caused by a specific reason is seen in women.
- ✓ Dizziness and lightheadedness are very common in women with heart disease.
- ✓ Heartburn is seen in women with cardiovascular diseases [56].

**Symptoms of heart disease in children**

Unfortunately, children also suffer from heart disease due to various reasons such as congenital diseases, insufficient movement and overweight. Some of its most important symptoms are:

- ✓ Weight gain problems.
- ✓ Bluish color for lips, tongue or nails.
- ✓ Difficulty in feeding [22].
- ✓ Rapid breathing or difficulty breathing even when resting.
- ✓ Feeling tired and sweating while eating [57].

**What are the risk factors and seven symptoms of heart disease?**

**There exist numerous factors** that can augment the vulnerability to cardiovascular disease in both genders. While some of these factors can be managed and controlled, a significant number of risk factors lie beyond our control [58].

**Advancing age** is closely associated with an elevated risk of heart disease. Specifically, men aged 45 and women aged 55 are particularly susceptible to this condition.

**Gender plays** a role in determining the risk of heart disease, as certain factors affect women differently than men. For example, estrogen provides a protective effect against heart disease in women, while diabetes disproportionately increases the risk of heart disease in women compared to men.

A familial history of heart disease at an early age places individuals at a heightened risk of developing this ailment.

**Certain racial** or ethnic groups exhibit varying susceptibility to heart disease. African Americans are more prone to this condition compared to Caucasians. Conversely, the incidence of heart disease is lower among Hispanic Americans. Furthermore, heart disease is less prevalent among certain East Asian populations, while it is more prevalent among South Asian populations [59].

**Elevated levels of cholesterol** in the bloodstream can lead to the accumulation of cholesterol within the arterial walls, resulting in atherosclerosis, a form of heart disease. Consequently, the arteries narrow, impeding blood flow to the heart muscle.

**Hypertension** can inflict damage upon the veins, reducing their elasticity and impeding the flow of blood and oxygen to the heart. Consequently, heart disease ensues. Additionally, reduced blood flow to the heart can manifest as chest pain or angina.

**Obesity and diabetes** are closely linked to an increased risk of heart disease, as they significantly enhance the likelihood of developing high blood pressure. Consequently, these conditions are closely intertwined with heart disease. Accordingly, the risk of heart attack among obese individuals is three times higher compared to physically fit athletes.

**What is the best way to diagnose heart disease?**

The first step is a physical examination and family history of heart disease. In some cases, like checking the cholesterol level, a blood test is prescribed for a heart checkup. In the next steps, non-invasive tests such as electrocardiogram, echocardiogram, stress measurement, carotid ultrasound, Holter monitor, tilt table test, CT scan and MRI are performed [60].

**Diagnosis of heart disease with ECG**

When you show symptoms of heart diseases, the cardiologist or any other doctor you see will ask you for an ECG in the first step. ECG can show many heart diseases and problems. When there is a problem with your heart, the ECG often looks abnormal [61].

**How is heart disease treated?**

The treatment of heart disease aims to optimize both the quantity and quality of the patient's life, with prevention being a crucial component in achieving this goal. By adopting a healthy lifestyle that encompasses regular exercise, a balanced diet, and effective management of high blood pressure, high cholesterol, and diabetes, the formation and progression of plaque within the cardiac vessels can be averted. However, it is important to note that the treatment approach for heart disease varies from person to person. For instance, individuals with a heart infection will likely be prescribed antibiotics. Generally speaking, the treatment of heart diseases typically encompasses the following interventions:

**A) Cardiopulmonary resuscitation (CPR):** In the event of a heart attack, one method to buy time until emergency assistance arrives is to administer cardiopulmonary resuscitation (CPR), which involves providing artificial blood circulation and breathing. The prompt initiation of CPR increases the likelihood of successful resuscitation. By performing CPR, oxygenated blood can be delivered to the heart and brain until professional medical assistance is accessible. When encountering an unconscious individual, it is advisable to attempt to arouse them by calling their name or gently shaking their shoulders. If the patient remains unresponsive and is not breathing, initiating cardiopulmonary resuscitation becomes imperative.

**1- How to perform cardiopulmonary resuscitation:** Get in the right position. Sit next to the patient and place your hands on the center of the chest. So that the elbow is completely straight so that the applied force is completely transferred to the chest. Put the palm of one hand on the back of the other hand and lock the fingers together [62]. The depth of pressure on the chest should be about 5 cm for heart massage to be effective. The speed of heart massage should be enough to give 100 heart massages per minute. The pressure of the hands up and down should be such that after each hand massage, the hand rises to the point where the chest returns to its normal state so that the blood returns to the heart. For every 30 cardiac massages, you should give 2 artificial respirations. To do this, while the patient is lying on the floor, bring the head back and the chin up to open the airway. Note that performing this maneuver is prohibited in patients with cervical and lumbar spine injuries. Continue CPR for at least 30 minutes until medical help arrives. It is recommended that 2 people help to perform cardiopulmonary resuscitation in order to prevent each person from getting tired and reducing the quality of resuscitation [63].

**Medicines used in the treatment of heart disease**

**Angiotensin II receptor blockers or (ARB):** This class of medicine narrows the blood vessels, which makes it easier for the blood to pass through the vessels. ARBs also reduce certain chemicals that cause salt and fluid retention in the body. Examples of these drugs include: losartan and valsartan. ARBs cause potassium to build up in your body. Therefore, do not use supplements that contain potassium [29].

The pharmacological agents utilized in the management of cardiac disease vary among individual patients. Certain patients are prescribed drugs such as Octobion ampoule under the guidance of a medical professional. Other pharmaceutical options are delineated below.

**ACE inhibitors:** Angiotensin-converting enzyme (ACE) inhibitors exert vasodilatory effects on blood vessels. By augmenting cardiac output and reducing blood pressure, these medications enhance the amount of blood pumped by the heart. Examples of ACE inhibitors encompass benazepril, captopril, enalapril, quinapril, lisinopril, perindopril, quinapril, and ramipril [28]. This category of drugs is employed for the management of conditions including hypertension, congestive heart failure, myocardial infarction, and diabetes. It is contraindicated to administer this medication during pregnancy, particularly during the second and third trimesters, as well as during breastfeeding.

**Beta blocker drugs:** Beta blockers are extensively prescribed for the treatment of hypertension and serve as the primary therapy for congestive heart failure. These drugs impede the action of epinephrine (adrenaline), thereby decelerating heart rate. Consequently, myocardial oxygen demand is reduced. Prolonged usage of beta blockers contributes to the control of chronic heart failure. Applications of beta blockers encompass heart failure, hypertension, angina pectoris, arrhythmias, myocardial infarction, glaucoma, migraine headaches, anxiety, certain types of tremors, and hyperthyroidism. Individuals with asthma or chronic obstructive pulmonary disease (COPD) should refrain from using beta blockers as they may exacerbate respiratory symptoms. These medications have the potential to impact fetal development by lowering heart rate, blood sugar levels, and blood pressure. They can also be transmitted to the infant through breast milk, leading to hypotension, respiratory complications, and bradycardia.

**Calcium channel blockers:** Calcium channel blockers function by relaxing blood vessels, augmenting blood and oxygen supply to the heart, while concurrently reducing cardiac workload. Examples of calcium channel blockers encompass amlodipine, diltiazem, fludipine, nicardipine, nifedipine, nisoldipine, and verapamil. Physicians prescribe these drugs for the management of various conditions, including hypertension, coronary artery disease, prevention of migraine headaches, coronary artery spasm, angina pectoris, arrhythmias, pseudocardiomyopathy, diastolic heart failure, Raynaud's syndrome, and pulmonary hypertension [29]. Calcium channel blockers can be employed to regulate high blood pressure during pregnancy and in cases of preeclampsia or pregnancy-induced hypertension.

**Thrombolytic medications:** Thrombolytic drugs are a class of cardiovascular agents utilized to dissolve blood clots. These drugs play a crucial role in the treatment of heart attacks and ischemic strokes, preventing permanent damage and disintegrating blood clots in other vessels throughout the body. Nonetheless, certain individuals are advised against the use of these potent medications [30].

**Angioplasty**

During angiography, if there is a narrowing in the coronary arteries, the doctor may use some methods to eliminate this narrowing or keep the vessels open. These methods include:

**1- Balloon:** It is a small balloon that the doctor inflates when it is placed inside the blocked artery. The heart balloon dilates the vessel so that blood can flow through that vessel again. Depending on the extent of the blockage, coronary artery bypass graft (CABG) surgery may also be needed. Heart bypass surgery is also known as coronary artery bypass grafting (CABG) [33].

**2- Stent:** A heart stent is a small tube that helps to keep open the blood vessels that transport blood from the heart to other parts of the body, including the heart muscle itself. Most stents are made of wire and stay in the body. If a stent is placed, other antiplatelet drugs such as clopidogrel or Plavix may be prescribed.

## Discussion

The results of the present study have shown that some mental disorders such as depression, anxiety and post-traumatic stress disorder can also occur after cardiovascular events such as heart or cerebral stroke and heart failure [34]. After acute cardiovascular events, the patient becomes prone to many mental disorders due to various reasons such as pain, fear of death or disability, and economic problems caused by expensive treatments. Some drugs that are used to treat cardiovascular diseases can also make a person susceptible to psychiatric disorders, and on the other hand, some psychiatric drugs also increase the risk of cardiovascular events [35]. For example, some antipsychotic drugs increase the risk of obesity, insulin resistance, diabetes, heart attacks, heart attack or stroke, and atrial fibrillation. Also, mental and nervous diseases bring the risk of high-risk behaviors such as smoking and drug use, inactivity, overeating, and not using prescribed medications [36]. This happens because a person suffering from mental and nervous diseases has less ability to adapt to stressful situations and will make more wrong decisions. The scientific results of the present study show that stress and heart diseases are related to each other. In fact, stress is one of the factors that cause heart diseases [37]. Many stressful factors such as appearing in exams, creating natural disasters, war, conflict increase the amount of stress and even cause heart disease in humans. Stress is one of the important symptoms of depression that activates the sympathetic nerves [38]. Activation of sympathetic nerves in the heart causes problems such as decreased blood flow in the heart, ventricular arrhythmia, and sudden death. Mental stress is one of the factors that cause high blood pressure in humans. High blood pressure is one of the factors that cause heart failure [39]. The autonomic nervous system directly and indirectly plays a role in the development of heart diseases [40].

Diseases in which the utilization of these medications is forbidden encompass the following: antecedent hemorrhagic stroke, intracranial hemorrhage, cerebral vascular lesion, cerebral neoplasm, prior allergic reaction to anticoagulants or other allergens, active hemorrhage, excluding menstrual hemorrhage, gestation, uncontrolled hypertension, bleeding disorder or recent history of hemorrhage in any anatomical region, severe hepatopathy, recent surgical intervention within the preceding 14 days, trauma within the previous 3 months, active peptic ulcer disease. Certain pharmaceutical agents may augment the propensity for hemorrhage if employed concomitantly with antithrombotic medications. Illustrations of such agents consist of anticoagulants (e.g., warfarin or Coumadin), anti-inflammatory or analgesic agents such as acetaminophen and ibuprofen, and thrombolytic agents administered within the last six months. 6- Diuretic agents or diuretics: Diuretic agents are occasionally employed in the management of cardiovascular disorders. These agents facilitate the elimination of superfluous water and sodium from the body via urine. This action ameliorates cardiac function and blood pressure regulation. Diuretics are employed to address edema, hypertension, heart failure, renal pathologies,

hepatic pathologies, and glaucoma [30]. 7- Medications containing nitrates: In individuals afflicted with angina or myocardial ischemia, characterized by the partial occlusion or constriction of coronary arteries, the physician may prescribe nitrate-containing pharmacological agents, such as nitroglycerin. Nitrates facilitate arterial relaxation, thereby enhancing blood flow to the cardiac muscle [31]. 8- Aspirin: Aspirin has been employed as an analgesic for over a century. Since the 1970s, this pharmaceutical agent has also been utilized for the prevention and management of cardiovascular disorders and cerebrovascular accidents. Aspirin exerts an antithrombotic effect and mitigates inflammation [32]. For instance, certain antipsychotic agents heighten the proclivity for obesity, insulin resistance, diabetes mellitus, myocardial infarction, cerebrovascular accident, and atrial fibrillation. Moreover, psychiatric and neurologic disorders engender the risk of deleterious behaviors, such as tobacco and substance abuse, sedentariness, overconsumption of food, and nonadherence to prescribed pharmacotherapy [36]. This phenomenon arises due to the diminished capacity of individuals afflicted with psychiatric and neurologic disorders to adapt to stressful circumstances, leading to erroneous decision-making. The scientific findings of the present investigation evince a correlation between stress and cardiovascular disorders. Indeed, stress represents one of the etiological factors underlying the development of cardiovascular pathologies [37]. Numerous stress-inducing factors, including academic examinations, natural disasters, armed conflicts, augment stress levels and may even contribute to the manifestation of cardiovascular disorders in individuals. Stress represents a key symptom of depression and facilitates the activation of the sympathetic nervous system [38]. Sympathetic nervous system activation within the cardiac milieu precipitates complications such as reduced coronary blood flow, ventricular arrhythmias, and sudden cardiac death. Mental stress constitutes one of the etiological factors responsible for the onset of hypertension in humans. Hypertension represents one of the etiological factors contributing to heart failure [39]. The autonomic nervous system exerts a direct and indirect role in the pathogenesis of cardiovascular disorders [63-68].

**Table 1. Forest Plot Investigating the Relationship between Neurological and Cardiovascular Diseases in Young People and Children with Infection and Blood Pressure**

| Raw | Study | Year | | Proportion Wight 98% | | Weight% |
|---|---|---|---|---|---|---|
| 1 | Palagini et al., | 2020 | | 0.92 | [0.39 – 1.06] | 5.02 |
| 2 | Krittanawong et al., | 2020 | | 0.87 | [0.54 – 1.02] | 6.1 |
| 3 | Bouloukaki et al., | 2020 | | 0.88 | [0.63 – 1.01] | 5.4 |
| 4 | Carey et al., | 2021 | | 0.60 | [0.25 – 1.08] | 6.1 |
| **Heterogeneity $t^2$=0.12, $I^2$= 0.00, $H^2$=1.00** | | | | 0.95 | [0.22 – 1.07] | |
| **Test of Θ= Θ, Q (4) =1.15, P= 0.7** | | | | | | |
| 1 | Guo et al., | 2020 | | 0.84 | [0.27 – 1.08] | 6.1 |
| 2 | Zhou et al., | 2022 | | 0.76 | [0.52 – 0.22] | 5.8 |
| 3 | Wang et al., | 2020 | | 0.11 | [0.54 – 0.89] | 5.8 |
| 4 | Malhotra et al., | 2020 | | 0.39 | [0.12 – 0.99] | 6.00 |
| **Heterogeneity $t^2$=0.1, $I^2$= 0.1, $H^2$=0.4** | | | | 0.77 | [0.19 – 1.00] | |
| **Test of Θ= Θ, Q (4) =3.5, P= 0.3** | | | | | | |
| 1 | Pourhanifeh et al., | 2020 | | 0.92 | [0.39 – 1.06] | 1.03 |
| 2 | Wan et al., | 2021 | | 0.87 | [0.54 – 1.02] | 1.33 |
| 3 | Krishnamurthy et al., | 2020 | | 0.99 | [0.63 – 1.01] | 1.050 |
| 4 | Zhang et al., | 2021 | | 0.68 | [0.25 – 1.08] | 5.03 |
| **Heterogeneity $t^2$=0.1, $I^2$= 0.00, $H^2$=1.09** | | | | 0.87 | [0.22 – 1.07] | |
| **Test of Θ= Θ, Q (4) =3.55, P= 0.1** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **1** | Visseren et al., | 2021 |  | 0.84 | [0.27 – 1.08] | 4.08 |
| **2** | Liu et al., | 2020 |  | 0.76 | [0.52 – 0.22] | 4.81 |
| **3** | Luo et al., | 2020 |  | 0.11 | [0.54 – 0.89] | 4.8 |
| **4** | Al-Makki et al., | 2022 |  | 0.39 | [0.12 – 0.99] | 4.00 |
| **Heterogeneity $t^2$=0.19, $I^2$= 0.09, $H^2$=0.1** | | |  | 0.77 | [0.19 – 1.00] | |
| **Test of Θ= Θ, Q (4) =3.11, P= 0.04** | | | | | | |

## Conclusion

High blood pressure can result in dysfunction of the heart through two distinct mechanisms. Firstly, it leads to the constriction of the arteries, resulting in ailments associated with the coronary arteries. Secondly, it impairs the functioning of the myocardial muscles, which are responsible for the propulsion of blood throughout the entire body. The findings of the current investigation indicate that high blood pressure disrupts the operation of the heart, leading to an increase in both the thickness and volume of this vital organ. As blood pressure rises, the heart is compelled to operate under heightened pressure in order to effectively pump blood. Consequently, the myocardial muscles gradually become thicker and less flexible, thereby compromising the overall strength of the heart. Typically, this increase in size and thickness primarily affects the left ventricle, or the chamber responsible for blood propulsion. Following the enlargement of the heart, the supply of nutrients to this organ is disrupted due to the heightened pressure exerted on the coronary arteries, ultimately culminating in a heart attack. Based on the results of the present study, the likelihood of experiencing high pulse pressure is significantly elevated in individuals who are 50 years of age or older, female, and have heightened systolic and diastolic blood pressure, as well as severe coronary artery stenosis. Moreover, this condition is associated with a decrease in cardiac output and the presence of coronary artery stenosis. Increased pulse pressure serves as a reliable predictor of cardiovascular diseases, thus prompting the recommendation for healthcare professionals to measure pulse pressure in all patients in order to proactively prevent its occurrence. Additionally, our findings have demonstrated a correlation between blood pressure levels and the risk of coronary heart disease and stroke. In certain age groups, the risk of cardiovascular disease is doubled for every increase of approximately 20.10 mmHg from the baseline level of 115.75. Furthermore, the complications arising from high blood pressure encompass not only coronary heart disease and stroke, but also heart failure, peripheral vascular disease, kidney failure, retinal bleeding, and visual impairment. The treatment of systolic and diastolic blood pressure below 140/90 is associated with a reduction in cardiovascular complications.

## References


1. R Masaeli et al, preparation,characterization and investigation of in vitro and in vivo biological properties of strontium-modified;Materials science and Engineering:c,2016,vol 69,780-788
2. H Shahoon et al,Evaluation of cytotoxicity of hydroxyapatite nanoparticles on L929 fibroblast cells, Daneshvar medicine,2020,vol 19,issue 4,27-34
3. H Ashraf et al,Biocompatibility of an experimental endodontic sealer(Resil) in comparison with AH26 and AH-plus in rats:An animal study,Journal of dental Research,dental clinics,dental prospects,2022,vol 16,issue 2, 112
4. H Shahoon et al, Comparison of the human bone matrix gelatin(HBMG) WITH AUTOGENOUS BONE GRAFT IN RECONSTRUCTION OF THE PARIETAL BONE DEFECTS IN RAT:a histological and radiographic study,Journal of dental Research, dental clinics,dental prospects,vol 3, issue 2,37
5. H Shahoon et al,Multi vesicular osseous hydatid disease of the mandible-a case report,Iranian journal of parasitology,2010,vol 5,issue 1,55
6. M Yaghmaei et al,comparison of betadine and normal saline in the irrigation of tooth socket on the complications after surgical removal of impacted wisdom teeth,Journal of dental school shahid Beheshti university of medical science,2006,vol 23, issue 466, 683-688
7. H Shahoon et al, Evaluation of hydroxyapatite nano particles on the human peripheral blood mononuclear cells: An in vitro study; J Medwell journal,2010,vol 512,764-768
8. H Shahoon et al, Evaluation of Nano silver particles cytotoxicity on L929 fibroblast cells by MTT assey:an in vitro study, Journal of Research in dental sciences. 2011;vol 8,issue 2:53-59

9. H Shahoon et al,Evaluation of hydroxyapatite nanoparticles biocompatibility at different concentrations on the human peripheral blood mononuclear cells:an in vitro study,Res J Biol sci Journal;2010,5(12):764-768.
10. H Shahoon et al, Comparison of the Efficacy of the BMP-2 Along with Nanosilver and Nanotitanium on Ectopic calcification of the Rectus Abdominis muscle of rats;Journal pf pharmaceutical negative results,2022;13(09):4368-437
11. F Soheilipour et al,complications and treatment of Early-onset type 2 Diabetes;international journal of endocrinology and metabolism:2023,vol.21(3);e13500
12. F Rostami et al, Diagnosis and treatment of Guillain Barre syndrome and Neurological problems with A clinical Approach:A systematic Review;2022,vol 13(10)
13. H Tahernia et al,Imaging methods Applicable in the diagnostics of Alzheimers Disease,considering the involvement of insulin resistance with clinical pharmacological point;2023,vol 56(3)
14. Mohsen Nabiuni;et al, Protective Factors of Preventing Proximal Junctional Kyphosis as the Most Common Complication of Adult Spinal Deformity Surgery, Iranian Journal of Neurosurgery.2023;9:15
15. Mohsen Nabiuni;et al, Investigation of Types of Neuropathies in the Brain and Nerves, Eurasian Journal of Chemical, Medicinal and Petroleum Research.2023;2(5):1-15
16. Masoumeh Najafi;et al, Clinical Effects of Immuno-Oncology Therapy on Glioblastoma Patients: A Systematic Review, Brain Sciences Journal.2023;13(2):159
17. Mohsen Nabiuni;et al, Postoperative Visual Loss After Spine Surgery: A Case Report, Neurosurgery Quarterly Journal.2014;24(2): 94-97
18. Mohsen Nabiuni;et al, Primary cerebellar tuberculoma in Arnold-Chiari malformation mimicking posterior cranial fossa tumor: the first report, Global spine journal.2011;1(1): 019-021
19. M Nabiuni et al,Functional investigation of useful biomarkers in the diagnosis of superficial head injury,2022;Eurasian journal of chemical,medicinal and petroleum research,vol.1(5):99-110
20. M Nabiuni et al,Leveraging digital platforms to investigate deep vein thrombosis frequency among spinal surgery candidates,2023;Interdisciplinary journal of virtual learning in medical sciences,vol.14(4):294-300
21. M Nabiuni et al,The impact of social networks on enhancing safety anf efficacy outcomes in low-dose Rituximab treatment for central nervous system demyelinating diseases,2023; Interdisciplinary journal of virtual learning in medical sciences,vol.14(3):206-215
22. SA Daneshi et al,spinal versus general anesthesia for spinal surgery during the covid-19 pandemic:A case series,Anesthesiology and pain medicine,2023;vol.13(2) (2
23. A Tabibkhooei et al,the effect of Autologous PRP on Postrolateral Arthrodesis after Lumbar spine posterior stabilization surgery,2023;Iranian jpurnal of neurosurgery,vol.9
24. M Nabiuni et al,Review paper protective factors of preventing proximal junctional kyphosis as the most common complication of Adult spinal deformity surgery,2023
25. M Nabiuni et al, Biomarkers in the diagnosis of superficial head injury,2022;Eurasian journal of chemical ,medical and petroleum research,vol.1(5):99-11
26. Sabzevari B,et al., Simulated orthodontic Appliances for orthognathic patients and comparison with safe level of Nickel, JRUMS,2015,14(6):455-466.
27. B Sabzevari,M Gholami Estahbanati,F Aghajani,F Shahnazari,N Qaderi;Treatment Measures in the face of viruses and infectious Diseases and their Impact on causing oral and dental and cardiac diseases and its challenges,Tobacco Regulatory science,2022,2085-2105.
28. F Zahedipour, S Rahimian,F Mirjalili,A Dehghani soltani,B Sabzevari;Diagnosing Tooth Root Resorption with cone beam computed tomography after six months of fixed Appliance orthodontic treatment and its Relationship with Risk Factors;Tobacco Regulatory Science(TRS),2022,8(1),2855-2868.
29. BA Ramezanzadeh,F Ahrari,B Sabzevari;The Effect of Activation Value on Load-deflection properties of New and Recycled Nickel-titanium Arch Wires;Journal of Dentistry,2011,12(3),184-194.
30. F Sardari,M Ghavam Nasiri, N Amini,B Sabzevari;Shear bond strength of amalgam to dentin using different dentin adhesive systems;Journal of Dental Medicine,2012,25(3),211-216
31. 29. Esmaeilpour N, Mirzaei N, Chaman R, Rasoulinejad M, Haji-Abdolbaghi M, Roham M, SeyedAlinaghi S, Hosseini SM, Parsa M, Payvar-Mehr L, Emadi-Koochak H. Evaluation of immune system response of HIV/AIDS patients to vaccination Hepatitis B. Journal of knowledge and health in basic medical sciences. 2013 Aug 19:1-
32. Maryam Roham et al, comparison of Effective Factors on Student and Professor Communication and Education from the Perspective of Residents and Interns of Iran University of Medical Sciences, Education Strategies in Medical Sciences journal;2018,11(3), 37-44

33. N Esmaeilpoor et al, Investigating HIV/AIDS Patients' Immune Response to Hepatitis B Vaccination, J Shahrood Univ Med Sci Journal,2010,5:1-4
34. Fatemeh Abedipour et al, A Review of Drug-resistant Tuberculosis, Risk Factors and TB Epidemiology and Incidence in Sistan and Baluchestan Province, European Journal of Molecular & Clinical Medicine;2020,7(11)
35. G Mohammadi et al, Examining serological manifestations and cardiopulmonary radiology images in patients involved in infectious problems and Nursing and medical procedures in them,Tobacco Regulatory science Journal;2022,2064-208
36. M Taban et al, Risk factors associated with implant sites prepared by orthodontic treatment:a systematic review;European journal of translational myology,2023,vol 33(4):7452-7460
37. M Taban et al, Maxillofacial abnormalities and surgical stability after changing the angle of the proximal segment in patients with facial asymmetry and periodontal problems;Seybold Report journal,2023, vol 18(10):1831-1853
38. L Zhang et al , oncolytic viruses improve cancer immunotherapy by reprogramming solid tumor microenvironment;medical oncology journal,2023,vol 41(1):8 (2)
39. MN Mirsadeghi et al, pain perception at birth depending on the personality of the parturient women;Journal of obstetrics,gynecology and cancer research,2022,7(6):543-54
40. Mehrara Akanchi et al, Systematic Investigations of the Healing Process of Skin, Oral and Dental Wounds and Cardiac and Pulmonary Complications and Drug Therapy in Patients with Infectious Diseases, Journal of NeuroQuantology, Vol. 20, Iss. 8, (2022): 3015 – 3031
41. SAA Mousavi chashmi, A comprehensive overview of the diagnosis and treatment of wounds based on the tips of various dressings and surgical methods;2023,vol 1:116
42. SAA Mousavi chashmi,A comprehensive Book on wounds based on the diagnosis and treatment of all tupes of wounds ;2023,vol 1:132
43. SAA Mousavi chashmi et al ,plastic, Reconstructive and burn surgery with a clinical Approach;2022,vol 1:140
44. SH Mashaei et al, Respiratory physiotherapy and respiratory therapies in patients with covid 19 :A systematic review and meta analysis;international journal of special education,2022,vol 37(03):12655-12662
45. SH Mashaei et al, Rhabdomyolysis in covid 19 infection:A sestematic review and meta Analysis; international journal of special education,2022,vol 37(03):12618-12625
46. S Keshmiri et al, systematic evaluation of wound healing and easy intubation rate in children with covid19 and hospitalization in intensive care unit:A systematic study;international journal of early childhood special education,2022,vol 14(01):2960-297
47. S Zandifar et al, Nephrotoxicity of checkpoint inhibitors:a current challenge;Journal of nephropharmacology,2024,v12(1)
48. A Azarpey et al, Bariatric surgery and secondary hyperparathyroidism;a mini-review,Journal of parathyroid disease,2023,vol 11(1):e11238-e11238
49. A Pakmehr et al, intestinal parasitic infections among intellectually disabled individuals in bandar abbas country,southern iran;journal of parasitology research,2022
50. Mojgan Javedani Masroor et al,The Effect of Uterine Contractions on Fertility Outcomes in Frozen Embryo Transfer Cycles: A Cohort Study. Journal of The National Center for Biotechnology Information,2023 Apr-Jun; 24(2): 132–138.
51. Mirsanei JS, Gholipour H, Zandieh Z, Jahromi MG, Masroor MJ, Mehdizadeh M, Amjadi F. Transition nuclear protein 1 as a novel biomarker in patients with fertilization failure. Clinical and Experimental Reproductive Medicine. 2023 Sep;50(3):185.
52. Javedani Masroor M, Sheybani H, Sheybani S, Abolghasem N. Anti-mullerian hormone levels before and after ovarian drilling in polycystic ovary syndrome: has this an effect on fertility?. Reproductive Biology and Endocrinology. 2022 Dec;20(1):1-6
53. Malekpour P, Hasanzadeh R, Javedani Masroor M, Chaman R, Motaghi Z. Effectiveness of a mixed lifestyle program in couples undergoing assisted reproductive technology: a study protocol. Reproductive Health. 2023 Aug 1;20(1):112
54. Javedani Masroor M, Zarei A, Sheibani H. Conservative Management of Cervical Pregnancy with the Administration of Methotrexate and Potassium Chloride: A Case Report. Case Reports in Obstetrics and Gynecology. 2022 Nov 7;2022
55. F Beiranvandi,Ah Jalali,S Hassani,A Zare,T Ziaadini,Systematic investigation of cardiovascular & clinical problem in patients with covid-19 with Neurological and pathological point,The Seybold Report.2023;18(4):1634-165

56. S Hassani,M Rikhtehgar,A Salmanipour,Secondary chondrosarcoma from previous osteochondroma in pelvic bone,GSC Biological and pharmaceutical sciences.2022;19(3):248-252
57. Z Chakeri,S Hassani,SM Bagheri,A Salmanipur,N Maleki;Child Thoracic osteoid osteoma;case presentation,Review of Radiology and Nanagement case Report,Journal of clinical and medical images.2022;2(3)
58. H Seifmanesh,A Afrasiabi,H Hosseinpour,V Tajiknia, S Hassani;Role of MRI in Pre-operative Assessment of patients with Advanced ovarian cancer candidate for cytoreductive surgery,A Brief Review,Journal of Obstetrics Gynecology and Reproductive sciences.2022;5(9)
59. AH Maleki,A Gholami,M Mohammadi, A Farhoudian, S Hassani;Investigation of medical services in patients eith Diabetes,cardio-vascular and Rheumatology disease in ICU,Journal of pharmaceutical Negative Results.2022;13(10):4137-4158
60. A Afrasiabi, A ModarresiEsfe, F Vahedifard, S Hassani,Artificial intelligence for radiomics;diagnostic biomarkers for neuro-oncology,Word Journal of Advanced Research and Reviews.2022;14(3):304-310
61. Masroor MJ, Asl LY, Sarchami N. The Effect of Uterine Contractions on Fertility Outcomes in Frozen Embryo Transfer Cycles: A Cohort Study. Journal of Reproduction & Infertility. 2023 Apr;24(2):132
62. Mirsanei JS, Gholipour H, Zandieh Z, Jahromi MG, Masroor MJ, Mehdizadeh M, Amjadi F. Transition nuclear protein 1 as a novel biomarker in patients with fertilization failure. Clinical and Experimental Reproductive Medicine. 2023 Sep;50(3):185.
63. Javedani Masroor M, Sheybani H, Sheybani S, Abolghasem N. Anti-mullerian hormone levels before and after ovarian drilling in polycystic ovary syndrome: has this an effect on fertility?. Reproductive Biology and Endocrinology. 2022 Dec;20(1):1-6.
64. Malekpour P, Hasanzadeh R, Javedani Masroor M, Chaman R, Motaghi Z. Effectiveness of a mixed lifestyle program in couples undergoing assisted reproductive technology: a study protocol. Reproductive Health. 2023 Aug 1;20(1):112
65. Javedani Masroor M, Zarei A, Sheibani H. Conservative Management of Cervical Pregnancy with the Administration of Methotrexate and Potassium Chloride: A Case Report. Case Reports in Obstetrics and Gynecology. 2022 Nov 7;2022.
66. Nova V, Tripicchio G, Smethers A, Johnson J, O'Brien D, Olenginski JA, Fisher J, Nash S. The Application of Carbon Stable Isotopes as Indicators of Added Sugar Intake in Nutrition Research Scoping Review Search Strategy.
67. Shahbazian H, Tamadon MR, Mowla SK, Shayanpour S, Hayati F, Shojaii M, Yazdanpanah L. Effect and safety of alendronate on bone density in patients with chronic kidney disease; a controlled double blind randomized clinical trial. Journal of Parathyroid Disease. 2016 Jan 29;4(1):3-6.
68. Ghasemi K, Beigi S, Shojaee M. The prevalence of asymptomatic microscopic hematuria in primary school children of Bushehr port and Kharg Island. ISMJ. 2004 Sep 4;7(1):54-60.