

The Significance of the Psychosocial Factors Influence in Pathogenesis of Cardiovascular Disease

Izet Masic, Jasmin Alajbegovic¹

Department of Family Medicine, Faculty of Medicine, University of Sarajevo, Sarajevo, Bosnia and Herzegovina, ¹Health Center Zenica, Emergency Rescue Service, Fra Ivana Jukica 6, Zenica, Bosnia and Herzegovina

Correspondence to:

Dr. Jasmin Alajbegovic
Faculty of Medicine, University of Sarajevo, Čekaluša 90, 71000 Sarajevo, Bosna i Hercegovina
E-mail: j.alajbegovic@gmail.com

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ABSTRACT

Background: Cardiovascular diseases (CVD) are the leading cause of death in the world today. Risk factors are those factors that influence the development of CVD. Risk factors can be divided into materialistic (genetic predisposition, smoking, alcohol) and non-materialistic (psychosocial factors). Our goal is to note the role of the health system, to emphasize the importance of psychosocial factors in the pathogenesis of CVD, explain the relationship between psychosocial factors and other risk factors, stress the importance of prevention through the provision of management of the cardiovascular system (CVS) diseases.

Methods: A descriptive analysis was performed on scientific studies in several published articles in journals on CVS: *Public Health Reviews*, *CVD*, *European Heart Journal*, *Materia Socio Medica* and other indexed journals that publish articles on CVS.

Results and Conclusions: The importance and role of the health system in the early detection, diagnosis, therapy and CVS disease prevention is presented through three thematic areas: (a) The incidence and prevalence of CVS diseases; (b) treatment of CVS diseases and (c) promotion of health in patients with CVS disease and those the risk of their occurrence. Health promotion is the most important aspect of the health system monitoring. Health promotion is adequately implemented if the management of CVD is proper. The main objectives of CVD management are: Preventing or delaying the occurrence of CVD, reducing the number and severity of worsening and complications of CVD. Management Includes: Individual and family, the health system and the community. Materialistic and non-materialistic risk factors together contribute to the development of CVD.

Keywords: Cardiovascular diseases, health promotion, prevention, psychosocial factors, stress

INTRODUCTION

Cardiovascular disease (CVD) is a disease of the heart and circulatory system.^[1-5] Clinical manifestations can be divided into those which affect: Heart and heart circulation system-coronary (ischemic) disease, brain and cerebral circulation

system-cerebrovascular disease, limbs-peripheral arterial occlusive disease.^[6-11] Atherosclerosis is usually the underlying CVD or narrowing of the vascular lumen due to local thickening of the inner layer of the wall of the vessel, which is called plaque or atheroma. Plaque is made up of a core made of fat, cholesterol and degraded cells, covered with calcium and a binder, so the wall of the vessel at this point is hard and inelastic. Atherosclerotic cluster narrows the arteries and consequently the tissue, which it supplies, gets less blood and because of reduced elasticity can lead to a disruption of the blood vessel, which is manifested by CVD. CVDs are the leading cause of death, with about 17 million deaths every year worldwide and an important cause of disability, which require a lot of socio-economic resources. It was noted that mortality from CVD is increasing in countries with medium and low income. Exposure to preventable risk factors (stress, smoking, alcohol consumption, inadequate nutrition, physical inactivity) greatly influences the development of CVD. In the European Union (15 countries before 2004), Coronary heart disease and stroke were the most common forms of CVD (37% and 25%). In the countries of Central and Eastern Europe, coronary heart disease and stroke were present in 49% and 32% of all deaths from CVD. The West-East difference suggests that coronary heart disease and stroke greatly contribute to mortality in the countries of Central and Eastern Europe. Economic transition, urbanization, industrialization and globalization carry with them a life-style that promotes CVD. CVD and their etiologies are complex socio-medical and clinical problem. CVD, in spite of preventable risk factors, accounting for 50% of all deaths world-wide and 80% of these deaths occur in developing countries. Risk factors are those factors that influence the development of CVD. They can be divided into variable (smoking, alcohol) and fixed (age, sex, genetic predisposition). In order to better understand the risk factors of this entity they will be divided into materialistic (genetic predisposition, smoking, alcohol) and non-materialistic (psychosocial factors). Stress experienced in adolescence may be an important factor in the development of CVD in older age. Scientists believe that early stress promotes systemic response of the body and the secretion of catecholamines and cortisol (sympathomimetic),

which results in an increase in blood pressure, which is an additional risk of CVD in old age. Specifically, the study was conducted on young rats. Scientists separated young rats, for a few hours a week, from their mothers. Young rats showed no signs of cardiovascular disorders. However, when they reached an older age, cardiovascular disorders were visible. Scientists point out that we need to learn to deal with the inevitable stress (stress management), because in this way we protect our health.^[1-6] So for example, in response to stressful situations involving aggression, hostility and anxiety, which is reason enough for many to practice bad habits such as smoking, unhealthy diet, physical inactivity, alcohol consumption, etc.^[12] If a person is exposed to the stressor around the clock, then the adrenaline response “fight or flight” is just the first step in a chain of events that Hans Selye (1976) called the general adaptation syndrome (GAS). Selye believed that the GAS takes place three stages. The first stage, alarm stage, consists of a sympathetic response “fight or flight,” which results in the release of hormones that prepare the body for the challenge. If the stressor continues, the second stage begins the stage of resistance. Now, the body mobilizes physical and emotional reserves to face the stressor. At this moment the body still resists, but with a lot of effort and energy used. If the stressor is constant, the person enters into the third stage, the stage of exhaustion. At this stage, a person is most susceptible to disease because of physiological reserves of the organism are used. A person becomes upset and this anxiety is manifested in various ways, such as tension headaches, anxiety, depression, abdominal pain and as arterial hypertension.^[13] The fact is that the physiological reserves of the organism are extremely high, at a time when the man make injustice to itself and turn to bad habits (drinking) breaks the ability to maintain homeostasis and disease occurs. The relationship between CVD and risk factors, such as high blood pressure, cholesterol, smoking, diabetes and physical inactivity are the subject of many studies.^[1-6] On the other hand, a much smaller number of studies are devoted to the psychosocial determinants, such as the conditions in which a person works, mobbing, social relationships and family life. Knowing the nature of the disease has been developed and prevention and treatment however, regional differences

remained pronounced. With this work we want to emphasize those psychosocial factors should not be subordinated to the materialistic risk factors, but with regard that man except a body also has a soul, give attention to interaction of psychosocial factors and material factors in a better understanding of CVD. Furthermore, this work should not be an exhaustive analysis of psychosocial factors, but an attempt to emphasize their differences, interactions and mechanisms of action on human health in the light of recent and prominent works.

GOALS

- Provide insight into modern CVD trends in Europe and Bosnia and Herzegovina
- Emphasize the role and task of the health system in the CVD early detection of CVD
- Highlight the importance of psychosocial factors in the pathogenesis of CVD
- Clarify the relationship between psychosocial and other risk factors
- Emphasize the importance of prevention through the CVD management
- Understand the role of the health system.

METHODS

We performed a descriptive analysis of recent and prominent studies on CVD from the several published studies on these diseases in major indexed journals in Europe and the world. Then we performed a comparison of the indicators mentioned in these articles, with the indices of these diseases in Bosnia and Herzegovina, officially published in the databases of the entity and cantonal public health institutes in B and H.

DISCUSSION

The health system plays an important role in the Understanding of CVD.^[1-3] The role of the health system is evaluated in three aspects: (a) The incidence and prevalence of CVD, (b) the diagnosis and treatment of CVD, and (c) promotion of health among people with risk of CVD and patients with CVD.

Incidence and prevalence

It was shown that in Western Europe there are fewer registered CVD patients compared to central

Europe, particularly in relation to Eastern Europe and parts of Asia.

According to data of the European Society of Cardiology in 2007 in developed countries is reduced the morbidity and mortality rate of CVDs and it is 2-5% per year. We assume that a better understanding of risk factors and paying more attention to preventive measures yielded positive impact on reduced rates of morbidity and mortality from CVD. Despite this, statistics showing that in EU zone 42% of people die from CVD.

Despite increasing knowledge about the determinants of CVD there are large differences in the health status of the population in the countries of Europe. Mortality from CVD in Ukraine is the highest and higher for about seven times than in France. Furthermore, there is a big difference in CVD mortality between the countries of the European Union before the 2004 and those who later joined the European Union. Mortality due to CVD in the countries of the European Union is higher among men than women. However, sexual differences in mortality within each country do not give a satisfactory explanation for the large differences in mortality due to CVD between the east and west. For example, Romania, countries with high mortality from CVD, has one of the lowest sex differences in mortality. Furthermore, Ukraine, the country with the highest rate of mortality due to CVD, has almost an equal ratio of mortality between men and women. In contrast, Finland, where the mortality from CVD is much lower than in Ukraine and Romania, the difference in mortality, between men and women is very high. Much like in Western Europe, the countries of Central and Eastern Europe differences between sexes in mortality are associated with secular changes. In early 1970, the differences between Eastern and Western Europe in mortality from CVD were expressed. Shortly after this period, mortality from CVD began to decline in Western Europe and this trend has continued until today, while the situation in the countries of Eastern Europe remained the same or even began to have increase mortality. In early, in 1990 CVD mortality in some countries of Eastern Europe (Poland, Hungary, Czech Republic) began to decrease, but without the precedent, while in the countries of the former Soviet Union it began to increase. Such mortality rate is maintained for several years and

has begun to decrease. After 1998, the mortality rate due to CVD again began to increase in some countries of the former Soviet Union (Russia and Ukraine) and in some mortality continued to decrease (Baltics). In Russia and Ukraine, the trend turned in 2004 and the death rate began to decrease. Understanding the determinants of these trends in CVD mortality could greatly contribute to the prevention strategies of CVD in Europe.

The leading cause of CVD in Bosnia and Herzegovina is atherosclerosis. On atherosclerosis occurrence have influence the improper diet, smoking, alcohol use and these mentioned risky behaviors may be driven by psychosocial determinants. Mortality in the Federation of Bosnia and Herzegovina is 10,468 and the mortality rate is more than 449/100,000 inhabitants. The morbidity rate is over 10,880/100,000.

Research of CVD presence in Bosnia and Herzegovina in relation to other diseases in 2009 shows a high number of patients with CVD, particularly at active age group from 19 to 64 years of age.

Diagnosis and therapy

To diagnose any disease we need to pay attention to detail approach to the patient. In the case of CVD history is of great importance for the diagnosis. During anamnesis, we should pay attention to the cardiovascular system (CVS) and issues characteristic for the CVS. The main symptom is pain, so pain characteristics should be clarified in detail. Location, quality, intensity, duration, provocation, propagation and mitigating factors are the main characteristics of the pain, by which we try to discern which pathology is in question. Pain is a subjective feeling that cannot be measured by instruments. However, in order to facilitate the use of data for the quantification of pain we use the visual analog scale. To estimate the risk of developing CVD various scores are used. One of the most famous is Framingham score, which is made in order to assess the 10-years cardiovascular risk. In consideration are taken the age, sex, cholesterol concentration, systolic blood pressure, use of medications and smoking. We can note that this score takes into account only the materialistic risk factors and psychosocial are ignored, so this score is in some cases imprecise and can give a false assessment. Since human being is not a piece of weathered material with animal looks, but a being

with a soul, it is necessary to take into account the materialistic and non-materialistic factors. Only in this way we have a chance to build a complete picture of the person. It is important to emphasize that there are scores that take into account, apart from materialistic also non-materialistic risk factors (psychosocial). Examples of this are the ASSIGN and QRISC Score. However, the two scores are only applicable in the United Kingdom (UK), because they take into account the psychosocial conditions of that space and time.

We in Bosnia and Herzegovina use Hearth Score that is applicable to countries with a high risk of cardiovascular incidents.^[1,2] Mentioned score takes into account arterial blood pressure, concentration of fat in the blood, smoking and sex. The result ranges from average risk to high risk. As Framingham score even this one does not take into account the psychosocial factors and the result of the average risk of cardiovascular incidents should be taken with care.

It has been noted, also, that the doctor patient relationship depends on the patient's level of education, so to educated patients are given more attention than to the less educated and they undergo more diagnostic procedures.

Health promotion

Health promotion is the most important segment of the health system interest. Health promotion is achieved by the proper management of diseases, in our case CVD. The main objectives of CVD management: (a) Preventing or delaying the occurrence of chronic diseases; (b) reducing the number and severity of worsening and complications of chronic disease.

Such goals should be directed to: The individual and family, the community and the health system. We all have a role in the management of CVD, such as physicians we directly affects the patient who is the general manager of his/hers illness and as part of a community that has its own standards of conduct and the behavior of individuals. Unfortunately, in today's world community does not understand the priorities of any individual or community, has significantly fallen morally and otherwise have a negative impact on the design of the proper conduct of the individual. However, there are bright points of the story and small groups who care about the spiritual and material

values of man and to such profit are association and not a disease.

To be more successful in prevention it is necessary to know the reality of interactions between materialistic and non-materialistic factors on person. Social determinants of health can be understood as an environment in which the individual lives and works and the psychological determinants of health can be understood as the experience of the changes that occur in the environment, but also in the individual. Description of the psychosocial determinants in this article does not aim to present only their impact on health, but also the mechanism through which they affect health. A good way to understand the psychosocial determinants of health is through a dynamic concept of interaction with the material factors. Psychosocial factors influencing exposure to CVD risk through smoking, alcohol use, unhealthy diet, but also a high body mass, physical inactivity, smoking, alcohol consumption affects individual behavior and its impact in the community.

Many people at work spend part of the day. During the work they are exposed to various stresses and react in different ways. In 2004 is conducted a large international case-control study in 52 countries, including about 25,000 persons. It is estimated that constant stress doubled the risk of myocardial infarction. Person under constant stress secreted hormone cortisol, but also adrenaline which results in increased blood pressure, heart rate, hearth output, speed of impulse conduction through the heart and the sensitivity of the heart to the incoming pulses. Prolonged exposure to these conditions leads to a gradual decrease of cardiovascular function and a greater risk of developing CVD. Constant tension is present due to short slightness of person and a sense of "uncertainty" for employment and fear of failure, lack of income and perhaps most important of all of this is "frustration." Unhappy person is one who knows to appreciate what he/she has, been plagued by a variety of fears, disturbs the perception of reality of the world in which he/she lives. In such a spiritual imbalance a person has a feeling that the whole world is dumped upon its shoulders, running around the world as the animals in the wild, but again does not make anything more compared with what it has, which has resulted in more and among

other also CVD. Those who have the capacity to penetrate into the essence of the problem know how to deal with the problem. They know that the ultimate goal in life is the realization of material goods; they know that the supply is determined so they get tired. They do not bother their mind and caring thoughts about supply, but still struggling. They are satisfied with what they have and their mind and body are rested. These persons regardless of exposure to risk factors have a lower incidence of CVD. It is necessary for each of us to build a proper stress management, proper experience of interaction with the environment.

Social isolation has an impact on CVD. Isolation achieves this effect when person feels like it is materially and psychosocially rejected. Fear of material isolation is manifested by a similar mechanism and consequences mentioned in the previous paragraph. For them, support is needed in the form of integration into society, emotional support in order to prevent CVD. The person who is psychologically rejected may be among other people and still be alone in their thoughts and actions. This form may be among those who do well and those who do evil. Those who do evil are also therefore isolated and often fail and do not even notice it. They are usually surprised by what they receive as a result of such conduct, including CVD. Furthermore, individuals can be isolated from society if they are not inclined to socially defined norms of behavior that do not need to be essentially good. These can be affected by the blindness of the community for what is good for them, such a decline affects the community as individuals are intoxicated by the false perception of reality and do not notice the menacing problem. However, those who understand this situation are relentlessly trying to improve the current situation, without expecting in return acceptance from the community; they are guided by the objectives of these more magnificent goals. Accordingly, management of stress is different as a result to health.

Geographical location of the individual also affects the development of CVD. It is not the same when someone lives in the middle of the city, crowds, pollution and when person is living in the countryside surrounded by meadows, trees, flowers, plains. Cohort study conducted in Canada demonstrated that exposure to environmental

pollutants at the very least has a stake in the development of changes in health status. Exposure to cold is also documented as a risk for provoking myocardial infarction. Possibility to heat the home and well regulated temperature also plays an important role in the prevention of CVD. A British study has proved that green areas have a positive impact on the protection of the CVS.

Discrimination and ethnicity in some cases can give a negative repercussion on CVD. In the UK has been noted that ethnic minorities have a high prevalence of CVD. In these cases there is an interaction of many risk factors such as social isolation, poverty and often present fear of embarrassing situations. In US are published several papers on the relationship of hypertension and racism. It would be desirable to carry out such studies in Europe, especially in the Balkans.

Traditional risk factors are broad and varied as they are associated with the time and place at which they occur. Of these it is important to mention that women 100 years ago were less affected by CVD than men. Today that ratio is different in many places so it is the women who often suffer from CVD. Offered is an attitude that explains it. Before women most of the time spent in their homes taking care of the family and working in and around the home. Despite the extremely greasy food that women were eating they less suffered from CVD. They were more physical active and thus eliminate harmful substances from the body. Today's woman are more in administration than before, less mobile and have lower elimination rate of toxins from the body. Many women are less busy about their families or have no family at all, which is also a factor that prompts many changes in the body and the psyche of women. Therefore, there is a reasonable suspicion that the women of this age rather than desired and unfairly impugned emancipation actually become a victim of exploitation. It is necessary to restore a high honor and position of women in society, because society as a whole could feel the effects of it or already feels it.

Proper interaction between patient and the doctor is of great importance for the regulation of hypertension, as Orth *et al.* in a study from 1987 proved that correct communication positively affects regulation of hypertension. A kind word opens iron gates, open and closed-minded patients

who later have the opportunity to have the right attitude about their illness. Active management of the patient of their own CVD is crucial.

In order to better understand the changes in the health of individuals and communities Geoffrey Rose offers dual level of the problem insight. He offers "high-risk strategy" and "Population Strategy". The first strategy is oriented towards the individual and its behavior and health. Individual is set in the center of attention and retreat moves to the primary and secondary prevention of CVD. This view, however, has shown results which by itself are not enough, because it was noted that the community, in which person lives can shape its behavior and habits. To act also in this segment is formed the second strategy, population strategy, which in the limelight puts the community and community behavior. Now there are attempts to affect the behavioral norms of society, in order to ensure a healthier environment, both for the individual and for the community.

At the recently held European Congress of Cardiology in Munich, which was attended by more than 31,000 scientists and experts from around the world are presented the new European guidelines on CVD prevention. Under the new guidelines from next year should act all doctors in Europe. Because the disease of the heart and blood vessels, especially myocardial infarction, coronary heart disease and stroke, die every second citizen of Europe, it is clear why to this public health problem is given so much importance.

The new division of cardiovascular risks differs from that of 2007. Divided into four levels, according to the score system: Very high, high, moderate, and low risk. Although the risk is something that can change over time, for practical reasons, it is needed to have some form of quantification of that risk. The new guidelines are applied to the system of grading the overall risk for CVD in four categories. Another important novelty is that many of the country's epidemiological data for the past 5 years has moved from those of higher cardiovascular risk in those low (for example, the UK, Ireland and Slovenia), while Bosnia and Herzegovina remained in the group of those at high risk. Countries of Eastern Europe remained in the group with a very high risk of developing CVD [Tables 1 and 2].

An important novelty in the new guidelines is paying much greater attention to psychosocial factors

Table 1: Leading cause of death in Europe

Leading cause of death in developed countries

4.3 millions in Europe dies from CVD (48% of all deaths) and in EU zone 42% dies from CVD
 54% females (F), 43% males (M)
 In the age <65 years. leading cause of death in Europe (31% M, 29% F)
 In EU zone (26% M, 19% F)

(Source: Masic I, Dilic M, Raljevic E, Vulic D, Mott D. Trends in cardiovascular diseases in Bosnia and Herzegovina and perspectives with Heart Score Programme. Med Arh 2010;64:260-3. [Last cited on 2013 Dec 02].)

Table 2: Federation of Bosnia and Herzegovina

Federation of Bosnia and Herzegovina (2,328,359)
 Overall CVD mortality 10,468
 Rate of mortality 449/100,000
 Overall CVD morbidity 253,367

(Source: Masic I, Dilic M, Raljevic E, Vulic D, Mott D. Trends in cardiovascular diseases in Bosnia and Herzegovina and perspectives with Heart Score Programme. Med Arh 2010;64:260-3. [Last cited on 2013 Dec 02].)

of cardiovascular risk (despite the new findings should not ignore materialistic risk factors such as disorders: High blood pressure, blood lipids, obesity, smoking, etc.). The psychosocial factors primarily include low socioeconomic status, unemployment and fear of job loss, poor education, work related stress and violence, depression and the like.

By the accumulation of knowledge Committee of the World Health Organization for the social determinants of health have proposed three principles of action: (a) To improve the condition of everyday life; (b) be against the unjust distribution of power, money and resources and (c) To measure and understand the problems and take appropriate action. It is obvious that in the future we should pay attention, not only to the involvement of the medical professionals in the management of CVD, but also politicians, economists and other structures active in everyday life and decision-making in certain areas of working and living conditions.

CONCLUSIONS

Materialistic and non-materialistic risk factors together contribute to the development of CVD. We know which are materialist and which are non-materialistic risk factors and are known to us

also many prevention strategies. However, progress still does not run as fast as expected. We need to be more efficient in translating theory into practice. Given that the problem of CVD multidisciplinary it must include politicians, economists and other social structures in the active management of CVD. Their role should be in the way of efforts to achieve equality between people in the approach: Basic food, water, health-care, establishing a state that respects justice and morality. In other words, it is necessary to provide adequate psychosocial determinants of health. On the other hand, to continue efforts on the progress of science and research and monitoring materialistic risk factors, in order to subcontractors which are also involved diagnosis, treatment and prevention as the most important. All this means that if we want to improve health it is necessary to act together: There must be a team of individuals, families, communities and health system (as the principal coordinator and body which should implement all this in practice).^[14]

Family and community make individuals and health system governing individuals and it is necessary to emphasize something that is fundamental to the feasibility of the goals. We need to pay attention to what makes us the people we are. It has been shown that different psychosocial conditions change even gene expression. We must devote ourselves to the spiritual aspect of man, because obviously there is interaction with everything that surrounds us. We must never neglect the proper upbringing of the person's soul.

Let us always remember, that joy, calmness and happiness in the satisfaction and safety and that dissatisfaction and suspicion produces sadness and discomfort. All those who look at the person only with one eye will hardly ever have the power to obtain knowledge about the man as those who watch with both eyes. From the two eyes one is for the external, phenomenal form or this side and the other is the inner, spiritual or beyond this vision. Attack on the knowledge that is now happening dazzles people internal vision and then they are blinded by its exterior and cannot identify the real essence of the person. Sometimes these deep stray and they did not even remotely aware of it. So observe a person with two eyes, because then we have the ability to recognize what in person is actually happening.

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