Baština Akademije nauka i umjetnosti Bosne i Hercegovine

Cardiovascular diseases and oral health – the impact of pregnant women’s oral health on children’s cardiovascular health

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2022-06-03

Academy of Sciences and Arts of Bosnia and Herzegovina

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Chapter I
CARDIOVASCULAR DISEASES

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Cardiovascular medicine is an area of clinical practice with a continually rapid expansion of knowledge, guidelines, best practices, and modern technology in both adult and pediatric cardiovascular medicine.

Cardiovascular diseases (CVD) are the leading cause of disability and premature deaths globally and substantially contributes to the rising cost of healthcare /1, 2, 3/.

The majority of CVD can be prevented by addressing behavioral risk factors such as tobacco use, unhealthy diets and obesity, physical inactivity, and harmful use of alcohol, through strategic approach aimed at entire population. Systematic approach to the control of cardiovascular diseases is necessary, with the aim of integrating into European and world medical trends, which would result in reducing morbidity and mortality rates from cardiovascular diseases.

Continuous monitoring of risk factors for the development of cardiovascular diseases is necessary, starting from fetal period to the period of adolescent and adult.

As a part of lifelong learning process for all professionals in cardiovascular medicine, the imperative is to have continuity of reviewing novelties, with results data from numerous research in order to treat patient according to best practices and evidence-based medicine.

The underlying pathology of cardiovascular diseases is atherosclerosis.

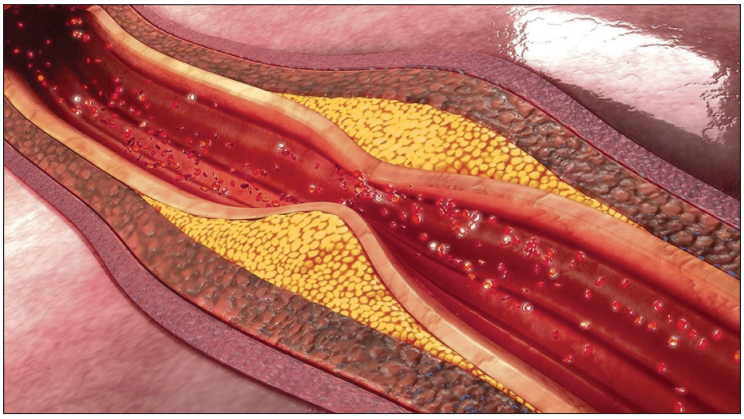


Figure 1. Blood vessel with fatty streak obstructing the lumen
Source: https://med.stanford.edu/news/all-news/2020/06/unregulated-artery-cell-growth-may-drive-atherosclerosis.html

Atherosclerosis is the most common arterial disease characterized by the reduction in the lumen of the blood vessel due to local plaque or atheroma thickening (2–4). It is one of the leading causes of mortality in developed countries. Of the ten most common causes of death, six are related to heart and blood vessels as a result of atherosclerosis. Atherosclerosis begins in childhood, but the patient is asymptomatic for a long time. Symptoms develop over many years, and at around 50 years of age health rapidly begins to deteriorate.

Cardiovascular disease, atherosclerosis is an interdisciplinary problem that is treated by: cardiologist, neurologist, epidemiologist, nutritionist and other specialists.

The most important *risk factors* for the development of atherosclerotic disease are:

- hyperlipidemia,
- hypertension,
- smoking,
- diabetes,
- high fibrinogen,
- male and younger sex,
- menopause in women taking oral contraceptives or hormonal therapy only in the presence of other risk factors,
- increased weight,
- elevated level homocysteine,

- lack of physical activity,
- inheritance and
- immune response in some diseases (5,6)

Consequences of atherosclerosis are:

- coronary or ischemic heart disease, in particular, myocardial infarction,
- cerebrovascular disease and
- cerebrovascular events (80% of all myocardial infarction and strokes occur due to atherosclerosis),
- narrowing or blocking of peripheral arteries, and carotid arteries, especially in legs, which can lead to gangrene (7,8).

Since there is no specific cure for atherosclerosis, the best way to avoid it is prevention. In the US and Western Europe, where risk factors have been preventively eliminated long time ago, mortality rate "fell" below 50%. Prevention includes avoiding risk factors: normal body weight in relation to sex, age and height is preferred instead of obesity, working out or speed walking at least half an hour a day because skeletal muscles designed for movement make up 40% of our bodies (5,6).

The aim of primary prevention is to prevent the occurrence of risk factors for atherosclerosis, and the secondary is to prevent the development of aggravation of the illness along with the reduction or control of existing risks.

Modification of risk factors has been shown to reduce mortality and morbidity in people with diagnosed or undiagnosed cardiovascular disease. Several forms of therapy can prevent coronary, cerebral and peripheral vascular events.

Decisions about whether to start specific preventive action, and with what degree of intensity, should be guided by estimation of the risk of any such vascular event. The risk prediction charts that accompany these guidelines allow treatment to be targeted according to simple predictions of absolute cardiovascular risk.

Due to CVD 17,5 million people die worldwide, which is 30% of all global deaths (9).

Around 1.5 billion lives are lost due to premature death and disability, and CVD is responsible for 10%.

The mortality rate in Europe region was 9,6 million, out of which cardiovascular diseases were responsible for 4.9 million or 51% of deaths. 34.4 million years of life is lost due to premature death and disability, which represents 30% of total number of years of life lost from all causes of death.

In the Balkan region in the last few years, mortality rate for cardiovascular diseases ranges from 48% to 57% of total number of deaths.

Extensive research studies of risk factors, morbidity and mortality of cardiovascular diseases and epidemiological research of other noncommunicable diseases strongly support multifactorial, socio-ecological paradigm.

Early detection and reduction of risk factors, which are included in the prevention and control of cardiovascular diseases program, can be accomplished if we shift the focus of the health care onto the primary level in order to stop morbidity and mortality rate with more rational measures (cheaper cost-effective health measures) (10).

According to the World Health Organization, over three quarters of CVD deaths can be prevented by appropriate lifestyle changes.

CVD prevention as a major challenge for the general population, politicians, and healthcare workers alike, is defined as a "coordinated set of actions, at public and individual level, aimed at eradicating, eliminating, or minimizing the impact of CVDs and their related disability". The bases of prevention is rooted in cardiovascular epidemiology and evidence-based medicine. (10,11).

A lifetime approach to cardiovascular risk is important since both risk and prevention are dynamic and continuous as *patients ages and/or accumulate co-morbidities*. That means, apart from improving lifestyle and reducing risk factor levels in patients with established cardiovascular disease (CVD) and those at increased risk of developing CVD, healthy people of all ages should be encouraged to adopt a healthy lifestyle. Healthcare professionals in their clinical practice, play an important role in helping patients to achieve this.

Coronary artery disease mortality has declined since the 1980s, particularly in high-income regions (16,17). Coronary artery disease rates are now less than half what they were in the early 1980s in many countries in Europe, due to *preventive measures including the success of anti-smoking laws.*

However, inequalities between countries persist and many risk factors, particularly obesity (18) and diabetes mellitus (DM), (19) have been increasing substantially. If prevention was practiced as instructed it would markedly reduce the prevalence of CVD.

Prevention should be delivered at the general population level by promoting healthy lifestyle behavior and at the individual level, i.e., in those subjects at moderate to high risk of CVD or patients with established CVD, *by tackling unhealthy lifestyles* (e.g., poor-quality diet, physical inactivity, smoking) and by *optimizing risk factors*.

Prevention is effective: the elimination of health risk behaviors would make it possible to prevent at least 80% of CVDs and even 40% of cancer (20, 21).

When to start prevention?

Ideally, prevention of cardiovascular diseases begins *during pregnancy and lasts for the rest of patient's life* /21, 22/.

All scientific evidence collected through studies in recent decades have confirmed that an increased cardiovascular risk begins to develop in the (very) early years of life. Even exposure to risk factors before birth can affect the risk of CVD during life.

Although children have a low absolute risk of developing CVDs, those with a relatively high risk compared to their peers, an increased risk of having cardiovascular events *later in life* remains due to *risk factors 'monitoring'* (those at the upper percentiles of the cardiovascular risk distribution early in life, have tendencies to stay there).

Healthy lifestyle is therefore crucial among young people, even though ethical and other reasons do not provide strong evidence according to randomized studies in favor of reducing CVD, *such as school health education programs or smoking cessation programs*.

Primary prevention should begin in early childhood by creating a healthy diet, banning smoking, regular physical exercise which will prevent or slow down the development of atherosclerosis.

There is a growing number of studies in modern medicine indicating that children nowadays are overweight, which is risk factor for many chronic diseases such as: cardiovascular diseases, type II diabetes, orthopedic and psychological illnesses.

The epidemic of obesity is one of the most important health problems facing the world today. Obesity prevalence has increased threefold in European countries in the last two decade.

A question is raised: what shall we do to prevent cardiovascular diseases?

Why should schools worry about heath?

As a society, we value good health. Good health is necessary for effective learning. Healthy students become healthy, productive citizens. School is the place where we spend most of our youth, therefore we need to initiate change. We need to work as a team on our environment, society and on introducing new policies.

Our priority should be creating a place for physical activity and proper nutrition in schools, developing funded prevention programs and systematic approach to the problem. We need to point out the problem of obesity in an adequate manner and create partnerships with local communities in creating healthy lifestyle. Schools can provide quality physical education classes, healthy nutrition campaigns, parenting education, psycho-social education/ intervention with nutrition strategies.

Prevention is the key!

It is necessary to establish dialogue in cardiovascular medicine!
Prevention of obesity consists of nutrition conducted according to modern guidelines in relation to the input of carbohydrates, fats, proteins, vitamins, and fluids. It is necessary to maintain regular physical activity, both in school and in free time (22). It is also necessary to promote continuous education about healthy eating and lifestyle (physical activity, negative effect of smoking) *in all primary and secondary schools in the country*, and to involve *teams of family doctors in monitoring the nutritional status of young children and youth.*

In order to further implement strategy of systematic risk prevention of CVD and develop health promotion concept, more efficient coordination and active participation of relevant institutions is needed, starting with the Ministry of Health and all level of healthcare system by paying special attention to primary healthcare teams, family medicine teams, all the way to educational institutions at all levels as well as patient associations.

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