

# The Impact of Potential Risk Factors of Cardiovascular Diseases among Patients of Different Age Groups

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## Abstract

The aim of this research is to investigate the influence of risk parameters for acute coronary syndrome present in the population of Tetovo and the surrounding area, with particular emphasis on the impact of diabetes mellitus type 2, dyslipidemia, obesity and malnutrition. In this prospective clinical and observational research, 106 patients were analyzed, 61 males and 45 females, with an average age 65.8 years, hospitalized in the Clinical Hospital in Tetovo in 2010. Each patient underwent Clinical-laboratory examinations: history and clinical status, electrocardiogram, determining the catalytic activity of enzymes CPK, CK-MB, Troponin I and Troponin T and T, determination of serum glucose concentration, determination of cholesterol, triglycerides, HDL, LDL and total lipids, and determination of BMI (body mass index). Of 106 patients screened, only 29% have normal glychemia, while the remaining, i.e., 71%, were diabetics. 47% of the screened patients have normal values of serum cholesterol, while 53% suffer from hipercholesterolemia. 48.5% of the screened patients are with normal values in serum triglycerides, while 51.5% suffer from hipertriglyceridemia. Only 2.5% of the screened patients have normal values of serum HDL, whereas 44.3% have HDL values with lower than 0.9 mmol / L (ie, that these patients have high risk for the appearance of cardiovascular diseases). Of the total number of the scanned patients, 27% are considered to have normal nutrition, while the rest suffer from obesity of various scales. Promoting health is a duty for the whole society, particularly for doctors, by orienting the population's way of living and nutrition, to avoid a sedantery way of life, to maintain glucose and lipids within referent values in order to prevent this form of acute coronary syndrome.

**Keywords:** Diabetes mellitus type 2, dislipidemias, obesity, acute coronary syndrome.

## Introduction

Contemporary trends of living, ways of nutrition, social factors, smoking, physical inactivity and many other factors could be potential causes of cardiovascular disease. Diseases of the heart and blood vessels make up 'the No. 1 killer' of contemporary man. According to the statistics of the World Health Organization, about 17 million people die each year from cardiovascular diseases worldwide, of whom 5 million die in Europe.

According *Lenegre School Regulation*, studies on heart and blood vessel diseases, conclude that these diseases have a multi-factorial etiology, viz. they depend on the influence of many risk factors:

1. Risk factors that are related to lifestyle such as: smoking, unhealthy food consumption, alcohol, lack of physical activity.
2. Biochemical and physiological factors, which include: hypertension, hiperlipoproteinemia, diabetes mellitus, obesity, homocisteina, C reactive protein.
3. Psychosocial stress and individual characteristics that do not change, such as: age, gender and heredity.<sup>1 2</sup>

Dislipids are an important risk factor in the appearance of CVD. Otherwise, dislipids are defined as a pathological condition, accompanied by high values of total cholesterol, triglycerides, pre- $\beta$  fraction and LDL cholesterol, subtract the value of the fraction of  $\alpha$  and HDL cholesterol. It has been proven that obese individuals have lower values of  $\alpha$  lipoproteins ( $p < 0.05$ ) compared to those with a normal body weight. Pre- $\beta$  fraction is correlated with BMI ( $r = 0.24$ ), whereas HDL cholesterol is negatively correlated with BMI ( $r = -0.22$ ).

According to the studies of Framingham, adult obesity is an independent risk factor for the appearance of diseases of the heart and blood vessels. However, the effect is much stronger if accompanied by other risk factors like arterial hypertension, hypercholesterolemia, and mellitus diabetes.<sup>3</sup>

Atherosclerotic changes of the coronary arteries among diabetics are more severe, more widespread, more frequent in small blood vessels and are unsuitable for dilation.<sup>4</sup> Hyperglycemia inhibits endothelial cell

<sup>1</sup> Puntaric D, Miskulin M. Javnozdravstveno znacenje bolesti cirkulacijskog sustava. Med Vjesnik. 2008, 40 (1-4): 53-8.

<sup>2</sup> Vorko-Jovic A, Heim I. Epidemiologija kardiovaskularnih bolesti. U: Vorko-Jovic A, Strnad M, Rudan I. Epidemiologija kronicnih nezaraznih bolesti. Zagreb: Laserplus; 2007. Pp.48-78.

<sup>3</sup> Herceg-Cavrak V. Debljina u djece-rizik za kardiovaskularne bolesti, *Pediatrics Croatica*, Vol.48, No 1, sjecanj-ozujak 2004.

<sup>4</sup> Pajuonen O, Taskinen Mr, Nieminen Ms, Syvanne M. Angiography severity and extent of coronary artery disease in patients with type 1 diabetes mellitus. *Am J Cardiol* 2000; 86: 1080-5.

proliferation, reduces the affinity of endothelium for renewal, increases adherence between non-enzymatic glycosylation collagen platelets and blood vessel walls, stimulates thrombocyte synthesis on platelets, and reduces endothelial prostacyclin synthesis. Hyperglycemia also accelerates the oxidation of LDL.<sup>5</sup>

### The Aim of The Study

The aim of this paper is to present research on the impact of parameters of potential risk for the occurrence of Acute coronary syndrome (NES) among the population of the Tetovo area, with particular emphasis on the impact of type 2 diabetes mellitus, dislipids, obesity and malnutrition.

### Material and Methods

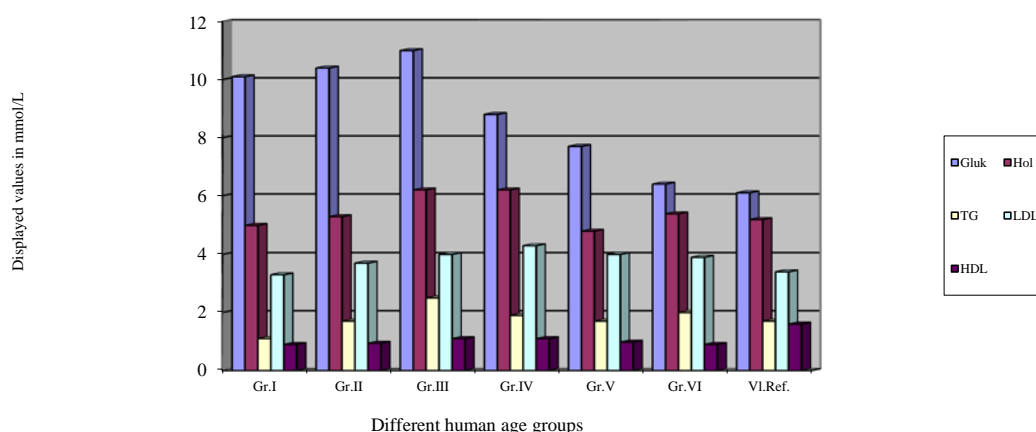
In this prospective, observational, comparative, randomized, (random selection) and controlled clinical study 106 patients were analyzed. There were 61 males and 45 females, with a mean age of 65.8 years. All had been hospitalized in the Tetovo Clinical Hospital, and admitted to the Coronary Unit of the Internal Diseases Department. This research was conducted during the period of June 2009 - June 2010.

In each patient these following clinical-laboratory examinations have been conducted:

- The recording of the patient's medical history and clinical status,
- Electrocardiogram,
- Measurement of catalytic activity of the following enzymes: CPK, CK-MB, Troponina I and Troponina T,
- Establishment of serum glucose concentration,
- Determination of cholesterol, triglycerides, HDL, LDL and total lipids, and
- Calculation of BMI (Body Mass Index)

### Results and Discussion

In Figure 1 lipid parameters and glucose levels are presented according to different age groups for males with acute coronary syndrome (ACS).



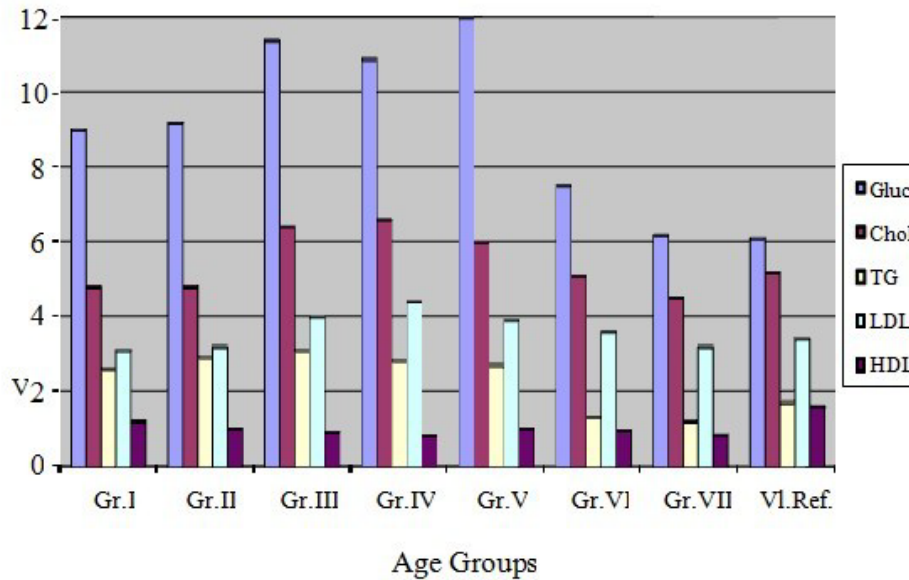
**Fig 1. Glucose and lipid parameters among all age groups of males with ACS**

*Gr. I (30-39 yrs); Gr. II (40-49 yrs); Gr. III (50-59 yrs); Gr. IV (60-69 yrs); Gr. V (70-79 yrs); Gr. VI (80-89 yrs); Gr. VII (> 90 yrs)*

From the figure 1 it is clear that younger age groups of males (I (30-39 yrs), II (40-49 yrs) and III (50-59 yrs)), the blood glucose levels are much higher in comparison with older age groups (IV (60-69), M (70-79 yrs) and VI (80-89 yrs)). As far as hyperlipidemia in males is concerned, it is much more pronounced in age groups III (50-59 yrs) and IV (60-69 yrs) than among younger (I and II) or older (V and VI) age groups. This situation indicates a greater tendency for it to be manifest in the middle-age groups (III and IV) and a predisposition to ACS (Acute Coronary Syndrome). Figure 2 presents lipid parameters and glucose levels

<sup>5</sup> O'brien T, Nguyen Td, Zimmerman Br. Hyperlipidemia and diabetes mellitus. Mayo Clin Proc 1998; 73: 969-74.

according to age groups of female patients.



**Fig 2. Glucose and lipid parameters among all age groups of females with ACS**

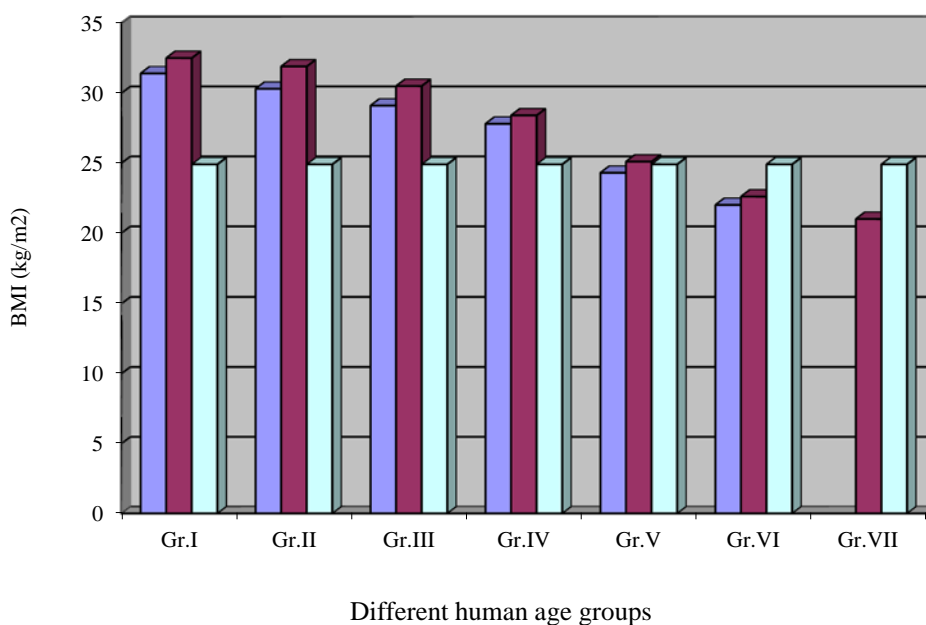
*Gr. I (30-39 yrs); Gr. II (40-49 yrs); Gr. III (50-59 yrs); Gr. IV (60-69 yrs); Gr. V (70-79 yrs); Gr. VI (80-89 yrs); Gr. VII (> 90 yrs)*

Figure 2 clearly shows that the early middle-age groups III (50-59 yrs), IV (60-69 yrs) and V (70-79 yrs), both the level of glucose as well as lipid status tend to increase rapidly as opposed to young age groups (I and II) and elderly age groups (VI and VII).

This trend of increase in these parameters has resulted in increased predisposition, so those females examined during the time of menopause have been assailed by Acute Coronary Syndrome.

From the total number of those examined 27% are classified as having normal nutrition, while the remaining percentage (73%) suffer from obesity to varying degrees.

From Figure 3 below we can see the comparison of BMI for male and female SAK patients by age group



**Figure 3. Graph comparing BMI for male and female SAK patients by age group**

*Gr. I. (30-39 yrs); Gr. II (40-49 yrs); Gr. III (50-59 yrs); Gr. IV (60-69 yrs); Gr. V (70-79 yrs); Gr. VI (80-89 yrs); Gr. VII (> 90 yrs)*

Figure 3 clearly shows that the body mass index (BMI) in male and female subjects falls gradually from the youngest age group I ((30-39 yrs)) to the oldest (VII (> 90 yrs)). Maximum values of body mass index for subjects of either sex are found in the youngest age group (30-39 yrs); for males, this value is 31.4 kg / m<sup>2</sup> whereas for females these values amount to 32.5 kg / m<sup>2</sup>.

In this research female subjects *Diabetes Mellitus* is the second greatest risk factor closely following hypertension, whereas for male subjects this factor ranked third behind smoking and hypertension. Hiperlipidemia ranked in fourth place as a risk factor for male subjects with ACS in the Coronary Unit in Tetovo, while it was the third greatest factor for female subjects.

According to research published in the XVII Congress of Cardiology Association hiperlipoproteinemia ranked second among risk factors for the occurrence of ACS behind hypertension, and diabetes mellitus ranked third.<sup>6</sup> Framingham in his study states that obesity is the third most important factor for the occurrence of coronary disease, with age and cholesterol concentration being more influential.<sup>7</sup>

In patients with ACS treated in the Coronary Unit in Tetovo, second degree obesity was calculated as one of the major risk factors for the occurrence of diseases of the heart and blood vessels.

## Conclusion

Cardiovascular diseases as leading causes of death in the civilized world, with a significant representation in premature deaths and population morbidity, are important public health problem globe. Promoting human health is a duty of the entire society, but particularly on medical and service personnel for orienting changes in the population's way of life and improving the environmental conditions including social and economic determiners. Risk factors that can be modified are smoking, obesity, lack of physical activity, control and treatment of Dislipids, HTA & DM. Health education and preventive measures that can change the way of life have a fundamental importance in reducing the scale of morbidity and mortality by ACS.

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<sup>6</sup> Fox CS, Larson MG, Leip EP, Meigs JB, Wilson PWF, Levy D. Glycemic status and development of kidney disease. The Framingham Heart Study. *Diabetes Care*. 2005; 28(10): 2436-2440.

<sup>7</sup> Herceg-Cavrak V. Debljina u djece-rizik za kardiovaskularne bolesti, *Pediatrics Croatica*, Vol.48, No 1, sjecanj-ozujak 2004.

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