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Hyperlipidemia as a Risk Factor for Persons in Specific Professions

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ABSTRACT

Introduction: The increase in lipid levels associated with other risk factors for the occurrence of ischemic heart disease and stroke is one of the most important health problems in the world. Risk for development of changes is greater for people of specific occupations such as police officers.

Material and methods: This prospective study included 300 police officers, 150 as experimental and 150 respondents as a control group. To both groups same methods have been applied: A detailed history, physical examination, complete laboratory evaluation, lipid electrophoresis targeted to hypercholesterolemia, ultrasound of the abdomen and Color Doppler of the neck vascular structures. **The results** obtained by statistical analysis of the data showed that there was a significant increase in levels of cholesterol and triglyceride levels in experimental compared to the control group. Ultrasound of the abdomen showed fatty infiltrated liver in 16% of respondents from the experimental and 2% of the respondents in the control group 2%. Color Doppler of the neck blood vessels in 14% of respondents from experimental group showed changes in blood vessels, which ranged from mild thickening of the intima of the vessel to a 50% decrease in circulation. For the control group, this percentage was 0.66%. Considering that this study involved young, active working population, hyperlipidemia becomes a bigger problem.

Key words: ischemic heart disease, stroke, hyperlipidemia.

1. INTRODUCTION

Previous studies have shown that elevated levels of low-density lipoprotein (LDL-cholesterol) are associated with the accelerated development of atherosclerosis and ischemic heart disease (IHD), while its reduction reduces the overall coronary vulnerability of patients with already diagnosed IHD, significantly reduces mortality and improves quality of life.

However, studies have also shown that more than 40% of the IHD patients do not have elevated levels of LDL-cholesterol (1).

All this raises many questions about the importance of other factors in the development of atherosclerosis. Until a few years ago, many researchers have argued that triglycerides are an independent risk factor of heart and blood vessels diseases, but they are only indirectly associated with an increased risk of developing these diseases.

Recent studies shed more light on the importance of triglycerides in IHD development (2). In Copenhagen epidemiological study (3) was demonstrated the association of triglycerides with heart disease. This study showed that the incidence of IHD is highest (approximately 14%) in patients with triglyceride levels at 2.5 mmol/l.

The association of triglycerides with the occurrence of the IHD also showed meta-analysis that by multivariate analysis

examined nearly 60,000 persons. The results provided by these studies show that in the case of an increase in the level of triglycerides by 1 mmol/l also increases the risk of IHD in men by 15% and in women by 37%. In the case of coexisting reduced HDL cholesterol level, the risk increases (4). Other epidemiological studies (5,6), confirmed these results and led to the inevitable conclusion that the need to treat hypertriglyceridemia exist regardless of the level of LDL and HDL. Very important is moderate triglyceridemia (2-5 mmol/l) for the development of atherosclerotic changes, while increasing levels of TG above 8 mmol/l represents danger for the development of pancreatitis.

2. GOAL

The goal of this study was to determine how lipid component behaves after a certain time distance after effects of multifactorial war stress, in the postwar period among the workers of specific professions, such as members of the police department.

One of the goals of this work is, if it proves the presence of hyperlipidemia in this group of working and young population, to emphasize the necessity for action in preventing hyperlipidemia by introducing among other things, mandatory periodic routine control of lipid levels, especially in high-risk populations.

3. MATERIAL AND METHODS

By its nature, this is a prospective study, which processed only healthy respondents by method of random sampling. In this research are used descriptive methods. Due to the ethical principles every respondents in both experimental and control group in which the hyperlipidemia is noticed was referred for further treatment, but these results are beyond the purpose of this study and are not taken into consideration.

The study included 300 employees of Ministry of Internal Affairs of Federation of Bosnia and Herzegovina belonging to the group of the working age population 39-56 years old. They all stayed during the war in Bosnia and Herzegovina and were military engaged. Due to the specifics of their work this is a young, physically active population. Participants in the study were divided into two groups: respondents (who lived during the war in Sarajevo) and control group (those who during the war stayed in other parts of the country).

All were treated in the same manner: a detailed history was taken, physical examination, complete laboratory evaluation with special reference to the lipid component, targeted at hypercholesterolemia lipid electrophoresis, ultrasound of the abdomen and Color Doppler of neck vascular structures in case of dyslipidemia. Statistical analysis of the data obtained was performed using the Student's t-test, F-test and ANOVA.

4. RESULTS

Statistical analysis of the data obtained showed significantly higher levels of cholesterol and triglycerides in experimental compared to the control group.

Recent studies in the world are increasingly dealing with issues of triglycerides as an independent risk factor for athero-

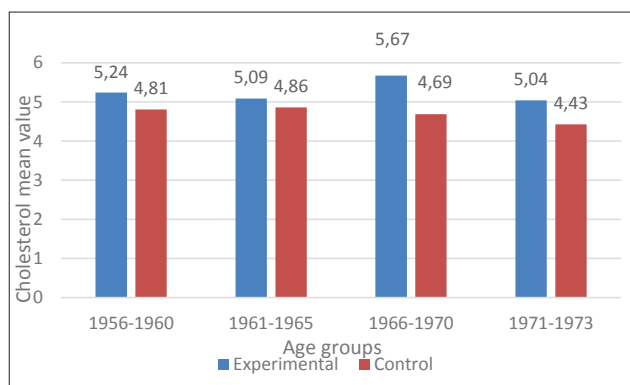


Figure 1. Mean blood cholesterol for experimental and the control group for each age group

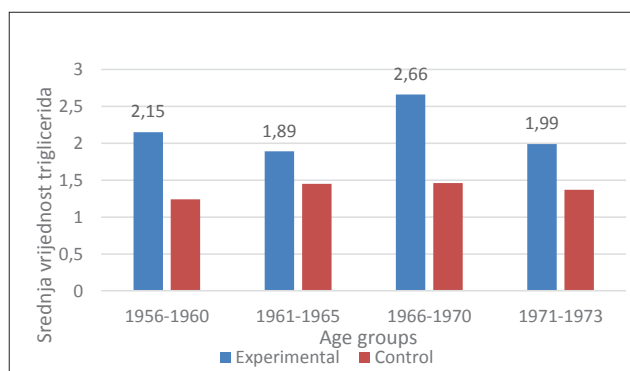


Figure 2. Mean triglyceride levels in the blood at experimental and control group for each age group

sclerosis and subsequent morbidity from ischemic heart disease and cerebrovascular insult. Associated with other risk factors, triglycerides increase the risk of these serious diseases, which in best case scenario lead to permanent disability (Figures 1,2,3,4,5,6,7,8,9).

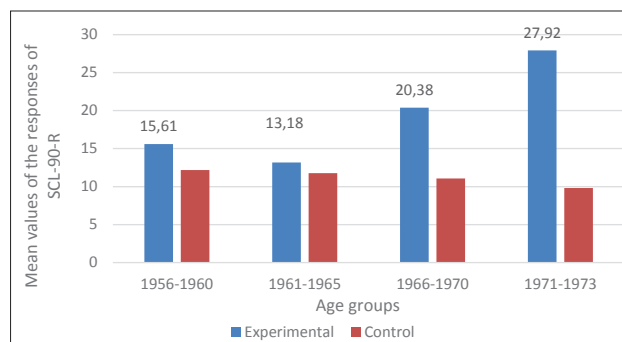


Figure 3. Mean total score on the SCL-90-R test for experimental and the control group for each age group.

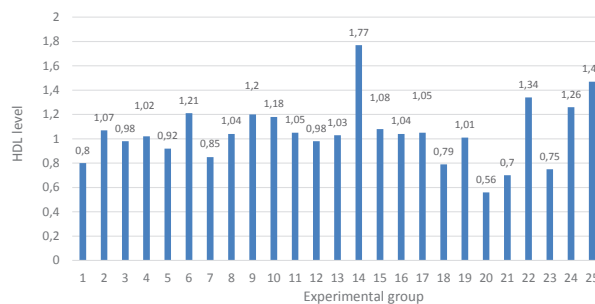


Figure 4. The individual levels of HDL in serum of 25 respondents from experimental group (baseline HDL in serum: 1.06 to 1.94 mmol/l, ideal up to 1.40 mmol/l)

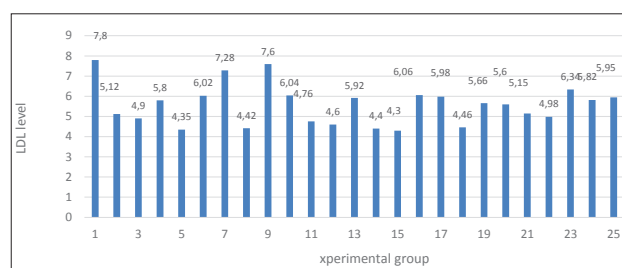
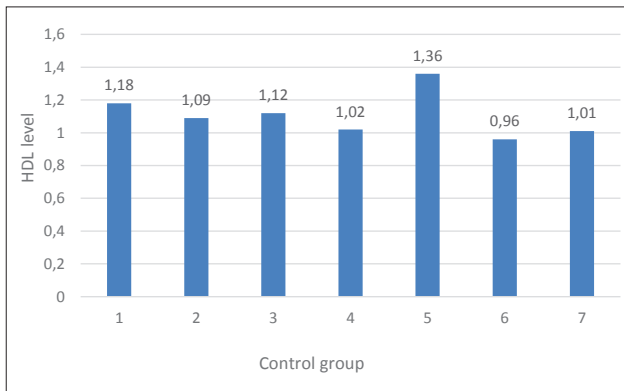


Figure 5. The individual display of LDL levels in the serum of 25 respondents from experimental group (baseline LDL in serum: 2.00 to 4.30 mmol/l, ideal up to 3.80 mmol/l)

Mean values for age subgroups of five years indicate that the largest deviations are recorded for those born in period 1966-1970 both for cholesterol and triglyceride. Both groups with elevated cholesterol underwent additional lipid electrophoresis, which revealed elevated levels of LDL levels in 24 (16%) respondents and decreased levels of HDL in 16 (10.6%) cases. In the control group, elevated LDL was found in 7 (4.66%), and decreased HDL in 3 (2%) members of this group.

Decreased HDL with increased triglyceride levels further increase the risk of ischemic heart disease. If we consider that in this research the respondents are relatively young working active male population, aged 39-56 years of life, dealing with specific profession, which means that they are under constant stress of work, the results of this study suggest the need for serious and effective care for people with these changes.



Figures 6. The individual display of HDL levels in serum for seven members of the control group (baseline HDL in serum: 1.06 to 1.94 mmol/l, ideal up to 1.40 mmol/l)

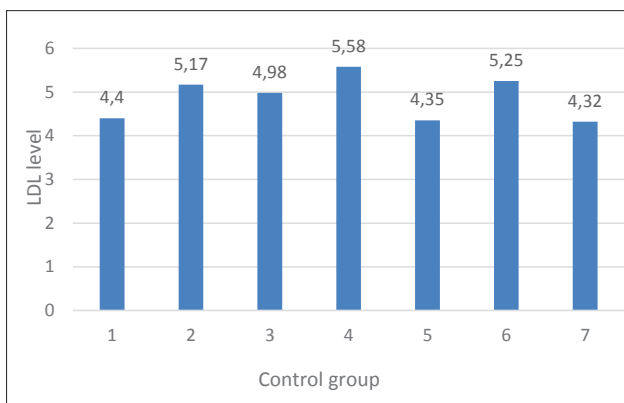


Figure 7. The individual display of LDL levels in the serum of seven members of the control group (baseline LDL in serum: 2.00 to 4.30 mmol/l, ideal to 3.80 mmol/l)

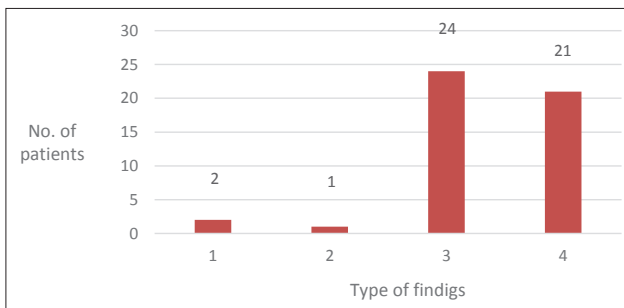


Figure 8. Display of the number of experimental group respondents who have been found abnormal clinical findings; 1-IHD, 2-stroke, 3-fat infiltrated liver, 4-changes in neck blood vessels

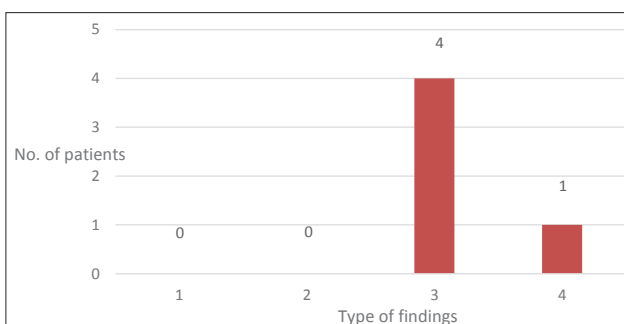


Figure 9. Display of the number of members of the control group respondents in which was found pathological clinical findings; 1-IHD, 2-stroke, 3-fat infiltrated liver, 4-changes in neck blood vessels

During data collection, the need for further testing of these persons arise, so are performed the ultrasound of the abdomen and Color Doppler of the neck blood vessels. In experimental group 21 (14% of respondents) have changes in the neck blood vessels, which ranged from mild thickening of the intima of the vessel to a decrease in circulation by 50%. Only one respondent in the control group (0.66%) have changes in the blood vessels. In the experimental group 24 cases (16%) had by ultrasound verified fatty liver, while this problem was present in 3 members of the control group (2%).

5. DISCUSSION

Evidently, the increase in the incidence of hyperlipidemia in a relatively young population of police officers and clinical features that are specific to the older age groups are phenomena that considering their consequences must be perceived as serious threat to health. Occurrence makes more serious also found in a number of respondents changes in the blood vessels with threatening of CVI and IHD. Using the control of two, for blood vessels diseases most essential components, cholesterol and triglycerides has been shown that the two components are a significantly higher and more frequent disorders in persons of the same profession that lived during the war in surrounded Sarajevo, in contrast to the control group of persons who in the same period lived in other cities of Bosnia and Herzegovina. Researches of LDH and lactate among students in the events of the war (7) confirmed that the stressors of the war initiated change which caused disturbances at the cellular level and completed by the destruction of its membrane. This further suggests that it has led to a series of changes in various places within the body including metabolic changes, changes of the lipid components metabolism. Metabolic disturbances must be linked to the closeness of morphofunctional units of the neuroendocrine system. This assertion is supported by a modification of diabetes mellitus during the war in Sarajevo (8). Studies of these authors have sought understanding of neuroendocrine components during stress.

Similar results as in our study with elevated hyperlipidemia were given by researchers from Croatia, Kadojic et al. (9) on a group of 120 people who survived the war and showed a greater risk of stroke in the war exposed group compared to the unexposed group.

Solter et al. in a group of veterans with PTSD also found significantly higher values of cholesterol, triglycerides, LDL cholesterol and HDL, as well as atherosclerotic index compared to the control group. This proves that patients with PTSD have a higher risk of atherosclerosis (10).

Maia DB et al. (11) in a survey conducted on 118 Brazilian police officers noticed that the values of cholesterol, triglycerides are higher, but not the LDL in a group of police officers exposed to potentially traumatic stress as compared to the control group of policemen. S. Coughlin in 2011 published a study which reported that people with PTSD, and the population of veterans are at increased risk of hypertension, hyperlipidemia, obesity and cardiovascular diseases. Increased activity of sympatho-adrenal axis may contribute to cardiovascular disease through the effects of catecholamines on the heart, blood vessels, and platelet function (12).

Recent research in the world for solving the problem of the origin and already formed atherosclerotic lesions involving in-

terdisciplinary teams of experts in different fields. Thus, modern engineering and mathematical methods can simulate blood flow through a blood vessel and determine the locus minoris for resistance and blood vessels on the basis of changes in blood viscosity and characteristics of the wall of the blood vessel as a highly elastic solid body. This method can calculate the velocity of the creation of atheromatous deposits (13).

Moving the pathological findings in biological mechanisms towards younger age groups indicate the need for serious scientific control of the health of all persons who are still in working age to prevent the acceleration of health damage. Finding the size of the damage and by moving the person from the stressful situation would preempt the emergence of early stroke and IHD.

6. CONCLUSION

- The war led to changes in lipid status of persons employed at risk professions, such as police officers.
- A significant increase in the level of cholesterol and triglycerides in the blood serum of the policemen who have spent the entire war in Sarajevo (experimental), compared to the police officers who spent the war in other areas of Bosnia and Herzegovina (control group) is noticed.
- Increased levels of cholesterol and triglyceride levels in experimental compared to the control group was found not only in general, but when the same age subgroups, of 5 years, are compared.
- Significantly higher levels of LDL and decreased HDL levels of respondents require urgent resolution of any hyperlipidemia.

CONFLICT OF INTEREST: NONE DECLARED.

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