

**DOIMIY QON DONORLARIDA LIPOPROTEIDLAR ALMASHINUVI HOLATI
VA UNING SALOMATLIKKA TA’SIRI**

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Annotatsiya: Ushbu ishning dolzarbligi doimiy donorlar qonida past zichlikdagi lipoproteidlarni aniqlash va o‘rganish qon aylanish tizimi va tarkibi bilan bog‘liq moddalar almashinuvining buzilish yog‘lar almashinuvi va xolesterin miqdorining o‘zgarishi bilan bog‘liq kasalliklar jumladan yurak-qon tomir tizimidagi kasalliklar: ateroskleroz, yurak ishemik kasalliklari, arterial gipertenziya, mikrosirkulyator tizim kasalliklari, periferik a‘zolarida tromboz, emboliya, ishemiya kabi o‘g‘ir asoratlarga olib keluvchi o‘zgarishlarning donor bo‘lmagan insonlarga nisbatan kam uchrashini ilmiy-amaliy jihatdan yoritib berishdir. Ateroskleroz va uning asoratlari jiddiy tibbiy-ijtimoiy muammo bo‘lib, bemorlar soni bo‘yicha u boshqa yurak qon tomir tizimi kasalliklarga nisbatan dunyoda birinchi o‘rinlardan birini egallaydi. PZL(past zichlikdagi lipoproteidlar) bilan bog‘liq patologiyalar birinchi marta klinik jihatdan eng mehnatga layoqatli yoshda (30-50 yosh) namoyon bo‘ladi va asorat berish tendentsiyasiga ega. So‘nggi yillarda yoshlik davrida ateroskleroz va uning asoratlari bilan bog‘liq yurak qon tomir kasalliklari o‘sishiga nisbatan barqaror tendentsiya kuzatilmoqda.

Kalit so‘zlar: ateroskleroz, qon donori, PZL(past zichlikdagi lipoproteidlar), YZL(yuqori zichlikdagi lipoproteidlar), xolesterin, trigletseridlar.

**АКТУАЛЬНОСТЬ ИЗУЧЕНИЯ МЕТАБОЛИЗМА ЛИПОПРОТЕИДОВ У
ПОСТОЯННЫХ ДОНОРОВ КРОВИ**

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Аннотация: Актуальность данной работы заключается в выявлении и изучении липопротеидов низкой плотности в крови регулярных доноров, в научном и практическом плане пролить свет на тот факт, что изменения в системе кровообращения и ее составе, нарушения обмена веществ, липидного обмена и изменения уровня холестерина, в том числе при заболеваниях сердечно-сосудистой системы: атеросклерозе, ишемической болезни сердца, артериальной гипертензии, заболеваниях микроциркуляторной системы, тромбозах, эмболиях, ишемии периферических органов, у недоноров встречаются реже, чем у недоноров. Атеросклероз и его осложнения представляют собой серьезную

медицинскую и социальную проблему, а по числу больных занимают первое место в мире среди других сердечно-сосудистых заболеваний. Патологии, связанные с липопротеинами низкой плотности (ЛПНП), впервые клинически проявляются у большинства людей трудоспособного возраста (30–50 лет) и, как правило, вызывают осложнения. В последние годы наблюдается устойчивая тенденция к росту сердечно-сосудистых заболеваний, связанных с атеросклерозом и его осложнениями, у лиц молодого возраста.

Ключевые слова: атеросклероз, донор крови, ЛПНП (липопротеины низкой плотности), ЛПВП (липопротеины высокой плотности), холестерин, триглицериды.

THE RELEVANCE OF STUDYING LIPOPROTEIN EXCHANGE IN REGULAR BLOOD DONORS

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Annotation: The relevance of this work is the identification and study of low-density lipoproteins in the blood of regular donors, which is associated with metabolic disorders related to the circulatory system and its composition, changes in lipid metabolism and cholesterol levels, including diseases of the cardiovascular system: atherosclerosis, ischemic heart disease, arterial hypertension, diseases of the microcirculatory system, changes leading to serious complications such as thrombosis, embolism, ischemia in peripheral organs, etc. is to shed light on the scientific and practical significance of atherosclerosis and its complications, which are less common in people without it. Atherosclerosis and its complications are a serious medical and social problem and rank first in the world in terms of the number of patients compared to other cardiovascular diseases. Pathologies associated with low-density lipoproteins (LDL) first manifest clinically at the most active age (30-50 years) and tend to cause complications. In recent years, a steady trend toward an increase in cardiovascular diseases associated with atherosclerosis and its complications among young people has been observed.

Keywords: atherosclerosis, blood donation, low-density lipoproteins (LDL), high-density lipoproteins (HDL), cholesterol, triglycerides.

Introduction: Several studies have shown that regular blood donation is associated with a decrease in lipid profile parameters. Lipid profile assessment is an accepted personality assessment method that helps determine the risk of coronary heart disease. Regular blood donation can reduce iron stores, which in turn reduces lipid peroxidation. This study is conducted to determine the impact of blood donation on the lipid profile.

Objective of the study: By studying lipid metabolism in the body of regular blood donors and assessing its state, it is necessary to scientifically substantiate the relatively low incidence of cardiovascular diseases and their complications (myocardial infarction, unstable

angina, ischemic and hemorrhagic strokes, hypertensive disease), atherosclerosis, dystrophic diseases of the liver and other parenchymal organs, metabolic disorders, circulatory disorders in the central nervous system, and musculoskeletal disorders (rheumatoid arthritis, polyarthritis, osteochondrosis, arthrosis) in regular donors, highlighting the importance of this activity in human health and the prevention of many diseases.

Materials and methods: 226 participants agreed to participate and registered, were included in the study, of which 154 were regular blood donors (study group) and 72 were non-donors (control group). Venous blood (10 ml) was collected from each subject into disposable plastic tubes with a new screw cap. This serum was used to determine total cholesterol, triglycerides, low-density lipoproteins, and high-density lipoproteins.

The study was conducted on a total of 226 subjects, including 154 permanent donors (study group) and 72 non-donors or first-time donors (control group).

- 21-58 years old with at least two blood donations
- within the last 12 months, four times within the last 24 months, or
- at least six times in the last 36 months. Exclusion criteria:

donors with a history of tobacco use, hypertension, diabetes mellitus, and cardiovascular diseases, as well as pregnant and breastfeeding women.

Commercial test kits manufactured by Roche Diagnostics (Basel, Switzerland) were used to determine HDL (HDL-cholesterol and the 3rd-generation set), total cholesterol (Chad-Pap Cholesterol set), LDL (LDL-cholesterol plus the 2nd-generation set), and triglycerides (triglyceride set).

All analyses were performed using a Hitachi 902 autoanalyzer (Hitachi Ltd, Tokyo, Japan).

Results:

A total of 226 subjects were included in the study, including 154 regular blood donors (the study group) and 72 first-time donors (the control group). As shown in Table 1, the age of the subjects ranged from 21 to 58 years. There was no significant difference in the mean age between the two groups (35.29 ± 7.94 years in the study group and 33.77 ± 9.15 years in the control group; $P = 0.461$).

Mean total cholesterol (4.66 ± 0.86 mmol/L), triglycerides (1.22 ± 0.64 mmol/L), and low-density lipoprotein (2.32 ± 0.73 mmol/L) were significantly lower in regular blood donors compared to the group of first-time donors (5.61 ± 1.26 mmol/L, 1.77 ± 2.9 mmol/L, and 3.06 ± 0.89 mmol/L), respectively; $P < 0.05$, in all cases). Furthermore, 42% of the study group had a low/high-density lipoprotein ratio of at least three, while approximately 57% of the control group had at least three ratios ($P = 0.21$).

Table 1. Age distribution of subjects

Age group	Regular blood donors	Donors donating blood	General

		for the first time	
Ages 20 - 29	39	23	62
Ages 30 - 39	55	24	79
Ages 40 - 49	43	15	58
Ages 50+	17	10	27
General	154	72	226
Average age	35.29 ± 7.94	33.77 ± 9.15	34.70 ± 8.4;

Note: P = 0.461.

In the group of regular blood donors, there were 144 men and 10 women, while in the group of first-time donors, there were 69 men and 3 women. There is no significant difference between the sexes in both groups.

(P = 0.281; Table 2.

Table 2. Distribution of subjects by gender

Genus	Regular blood donors	Donors donating blood for the first time	General
Men	144	69	213
Women	10	3.	13
General	154	72	226

Note: P = 0.281.

The mean body mass index (26.50 ± 4.20 kg/m²) in the group of regular blood donors did not differ significantly (26.30 ± 4.00 kg/m²) from the group of donors donating blood for the first time (P = 0.744). The comparison of the average serum lipid content in the study and the control groups is presented in Table 3. Total cholesterol (4.66 ± 0.86), triglycerides (1.22 ± 0.64), and LDL (2.32 ± 0.73) in the study group compared to 0.64) and LDL (0.73) in the control group (5.61 ± 1.26 , 1.77 ± 2.91 , and 3.06 ± 0.89 , respectively). However, only values for total cholesterol and LDL showed a statistical difference in both cases (P = 0.000). In the control group (1.00 ± 0.26 mm/L), serum HDL levels were significantly higher (P=0.016), compared to the study group (0.86 ± 0.24 mm/L). The LDL/HDL ratio was lower in the study group (2.90 ± 1.28 mm/L) compared to the control group (3.22 ± 1.04 mm/L), but not significant (P=0.247).

Table 3. Comparison of mean serum lipids (mmol/L) (n=44) between the study and control groups (n=32).

Plasma lipids	Regular blood	Donors	P-value
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	donors	donating blood for the first time	
Total cholesterol	4.66 ± 0.86.	5.61 ± 1.26	0.000
Triglycerides	1.22 ± 0.64	1.77 ± 2.91	0.119
HDL	0.86 ± 0.24	1.00 ± 0.26	0.016
LDL	2.32 ± 0.73;	3.06 ± 0.89.	0.000
HDL/LDL ratio	2.90 ± 1.28	3.22 ± 1.04	0.247

Abbreviations: HDL - high-density lipoprotein; LDL is a low-density lipoprotein.

Although there was no statistical difference, it was found that total cholesterol, triglycerides, and LDL were lower in the study group compared to the control group (Table 4). The average women in the study group had total cholesterol, triglycerides, and LDL levels (4.79 ± 0.75 mmol/L, 1.04 ± 0.43 mmol/L, and 2.40 ± 0.77 mmol/L, respectively) lower than the total cholesterol, triglycerides, and LDL levels of women in the control group (5.24 ± 0.98 mmol/L, 2.21 ± 0.43 mmol/L, and 2.84 ± 0.76 mmol/L, respectively). Similarly, these values were lower in men in the study group (4.59 ± 0.91 mmol/L, 1.15 ± 0.73 mmol/L, and 2.28 ± 0.71 mmol/L, respectively) than in the control group (5.94 ± 1.44 mmol/L, 1.39 ± 0.47 mmol/L, and 3.24 ± 0.98 mmol/L, respectively) (Table 4).

Table 4. Comparison of mean serum lipids (mmol/L) (n=44) between the studied and control groups (n=32) by gender.

Serum lipids	Regular blood donors			Donors donating blood for the first time			P-value			
	Women N=15;	Men N=9	General N=44	Women N=15;	Men N=17;	General N=32	*	**	***	***
Total cholesterol	4.79 ± 0.75	4.59 ± 0.91;	4.66 ± 0.86.	5.24 ± 0.98;	5.94 ± 1.41	5.61 ± 1.26	0.40	0.82	0.16	0.16
Triglycerides	1.04 ± 0.43;	1.15 ± 0.73;	1.11 ± 0.64	2.21 ± 4.27	1.39 ± 0.47	1.77 ± 2.91	0.49	0.48	0.31	0.16
HDL	0.89 ± 0.22	0.84 ± 0.25	0.86 ± 0.24	0.99 ± 0.28	1.00 ± 0.26	1.00 ± 0.26	0.46	0.92	0.29	0.04
LDL	2.40 ± 0.77;	2.28 ± 0.71	2.32 ± 0.73;	2.84 ± 0.76	3.24 ± 0.98;	3.06 ± 0.89.	0.58	0.21	0.11	0.00

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Notes: * Comparison of women and men in the group of regular blood donors; * * Comparison of women and men in the group of first-time blood donors; ** * Comparison of women in the regular blood donor group with women in the control group; * * * * Comparison of men in the group of regular blood donors with men in the group of first-time donors.

Abbreviations: HDL - high-density lipoprotein; LDL is a low-density lipoprotein.

Discussion:

It was found that regular blood donors have a lower risk of cardiovascular diseases compared to non-donors or first-time donors. This study examined a total of 226 subjects - 154 regular donors and 72 non-permanent or first-time donors. This study showed that total cholesterol (P=0.000) and LDL (P=0.000) were lower in the study group than in the control group. Triglyceride levels in the study group were also lower than in the control group (P = 0.119). The mean HDL level in the control group was significantly higher than in the study group (P = 0.016).

The available literature indicates that high LDL/HDL values are associated with an increased risk of cardiovascular diseases. In this study, no significant difference in serum lipid content was found between 57% of the control group and 42% of the study group. However, regular blood donation and a healthy lifestyle reduce the risk of developing cardiovascular pathologies [3, 6, 10, 11, 12, 13, 14, 15, 16, 17].

Conclusion: Regular blood donation can protect against cardiovascular diseases.

Regular blood donors are characterized by significantly lower levels of average total cholesterol and low-density lipoprotein compared to non-donors.

The blood bank is suffering from blood shortages worldwide due to limited donation. In general, blood donation has many health benefits. However, there are not enough scientific studies showing this [8, 9, 18].

Donation is dedication. In medical terms, donation is the transfer of a part of a tissue, such as blood or an organ, from one organism—the "donor"—to the receiving organism, the "recipient." Currently, donation is one of the developed areas of medicine. Donation is actually one of the examples of humanity. An example of a "angel of salvation" for patients with serious illnesses is healthy people who are constantly on the state list of donors.

The state has established rights and benefits for donors, through which donors monitor their health through annual medical examinations.

Today, the lack of popularity of donor activities in our country, the presence of negative opinions among the population about donor activities, and the high demand for this activity in medicine are of particular importance [1, 7].

Research has shown that average total cholesterol, triglycerides, and low-density lipoproteins in regular blood donors are significantly lower than in non-donors. Regular blood donation can protect against cardiovascular diseases, which means that average levels of total cholesterol and low-density lipoproteins in regular blood donors can be significantly lower than in non-donors.

Regular blood donation was found to be beneficial in many ways. This stimulates bone marrow activity and increases the production of blood-forming elements. In addition, it prevents the accumulation of iron in the body (hemosiderosis) and reduces the formation of iron-related free radicals in the body during pathologies [2, 4, 5, 19].

The effect of regular blood donation on cholesterol levels in the plasma prevents the development of atherosclerosis. Studies have shown that blood donation every 6 weeks reduces oxidative processes, reduces the formation of low-density lipoproteins (LDL), and reduces the risk of developing atherosclerosis.

Some studies suggest that high levels of iron may play a role in the oxidation process, which is an early sign of atherosclerosis. Other studies suggest that regular blood donation can help reduce such risk factors.

Accordingly, this study focused on assessing serum lipids in regular blood donors and with non-donors or first-time donors.

Regular blood donors have significantly lower levels of total cholesterol and LDL compared to first-time donors, indicating a lower risk of cardiovascular diseases.

Thus, regular blood donation leads to a decrease in serum lipids. However, more extensive research is needed to substantiate these conclusions.

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