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ABSTRACT

of the dissertation for the degree of Doctor of Science

MODERN APPROACH TO THE ASSESSMENT OF THE MEDICAL SOCIAL SIGNIFICANCE OF HYPERCHOLESTEROLEMIA FOR PUBLIC HEALTH AND THE SOCIAL-HYGIENE BASIS OF ITS PREVENTION AT THE POPULATION LEVEL

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GENERAL DESCRİPTİON OF THE WORK

The relevance of the topic and the degree of functioning. Currently, more than 70% of deaths worldwide are based on 4 groups of chronic non-infectious diseases (NCDs): cardiovascular diseases (CVDs), malignant tumors, diabetes, respiratory diseases. NCDs and their risk factors are associated not only with premature death and disability, but also with significant economic losses. It is also noted that the health status of the population depends to some extent on the economic growth or recession in the country.[1;2;3] The social and economic damage of NCDs will increase if effective measures are not taken to combat them. The Organization for Economic Co-operation and Development predicts that health care costs will double to 13% of GIP by 2050 due to the growing burden of NCDs. This is not only an explosion that will bring a serious burden to the health care system, but it will also threaten the socio-economic stability of countries. NCDs and their risk factors are associated with negative socio-economic consequences not only for the state and the region, but also for each person: the chances of unemployment, low-skilled work and temporary loss of working capacity increase.[4] Taking into account the serious situation related to NCDs in the whole world, the Global Action Plan for combating NCDs and their risk factors was developed by the WHO and its implementation was recommended to all countries of the world.[5] In the direction of the development and implementation of the Global Plan, the President of

[1] Бойцов С.А., Деев А.Д., Шальнова С.А. Смертность и факторы риска развития неинфекционных заболеваний в России: особенности, динамика, прогноз // Терапевтический архив, 2017, № 1, - с.5-13.

[2] WHO, Action plan for the prevention and control of noncommunicable diseases in the Who European Region, Copenhagen: Who Regional Office for Europe; 2016.

[3] Pearson-Stuttard J., Hootton W., Critchley J. et al. Cost-effectiveness analysis of eliminating industrial and all trans fats in England and Wales: model-ling study. // J.Public Health (Oxf). 2017 Sep. 1; 39(3), - p. 574-582.

[4] De la Maisonneuve C., Martins J.O. The future of health and long-term care M. OESD // J Econ Stud. 2015; 2014, - p. 61-96.

[5] Qlobal Recommendations on Physical Activity for Health. WHO Ceneva, 2010. Cited I Now 2013.

the Republic of Azerbaijan I. Aliyev prepared the "Strategy for the fight against NCDs in the Republic of Azesrbaijan in 2015-2020" in our republic.

One of the most important risk factors of NCDs is hypercholesterolemia (HCS). HCS is a widespread and socially important pathological condition, it has an aggravating effect on the body and is a dominant risk factor for the development of NCDs (CVD, type 2 diabetes mellitus (SD2), arterial hypertension (AH), etc.). HCS is also a leading risk factor for overweight (EBW) and obesity, which in turn play an important role in the development of NCDs, and their prevalence is epidemic worldwide.[6] The development of HCS is also associated with defects in nutritional behavior (NB). Thus, a lot of cholesterol (CS) enters the body and accumulates in the form of fat in the body against the background of low physical activity (PA).[7;8]

HCS varies from 25% to 37% (and more) all over the world and depends on the level of development of health care, socio-economic development of the country, national-ethnic composition of the population, food preferences of the population and, most importantly, socio-behavioral characteristics of the population.[9;10]

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[6] Дедов И.И., Шестакова М.В., Мельниченко Г.А. Междисциплинарные клинические рекомендации "Лечение ожирения и коморбидных заболеваний". Ожирение и метаболизм, 2021. Том 18, №1, ст.5-99.

[7] Schwarts G.G., Steg P.G., Szarek M. et al., ODYSSEY OUTCOMES Committees and İnvestigators. Alirocumab and cardiovascular outcomes after acute coronary syndrome // The New England Journal of Medisine, 2018, Now; 379(22), -p. 2097-107.

[8] Mente A., de Koning L., Shannon H.S., Anand S.S. A systematic review of the evidence supporting a causal link between dietary factors and coronary heart disease. // Arch Intern Med, 2019; 169, - p. 659-669.

[9] Ахимова Е.В., Фролова Е.Ю., Петелина Т.И.Ожирение и гиперхолестеринемия в открытой городской популяции // Международный журнал сердца и сосудистых заболеваний. 2019. Том 7, №24, - с.14-20.

[10] Cho G.Y, Yoo H.J, Hwang S.Y, et al. Differential relationship between waist circumference and mortality according to age, sex, and body mass index in Koreans with age of 30-90 years; a nationwide health insurance database study // BMC Med. 2018; 16(1), - p.131.

On the basis of many conducted studies, it was determined that positive results in the fight against CVDs, AH and SD2 are possible only during the correction of CVDs and obesity, as well as their co-existence. Therefore, the attention of experts is focused on the approval of drugs and non-drugs for the correction of HCS and obesity. Dozens of dietary therapies and PA-increasing methods have been developed, but they have not brought local success among critically ill patients and have not been widely disseminated at the population level. Only after the preparation of statins was it possible to correct HCS and obesity, which necessarily gave good results when carried out with lifestyle modification measures.[11;12]

As can be seen, the active role of the population in the fight against NCDs and their risk factors is significantly important, and in recent years, WHO has paid special attention to literacy issues from the perspective of people's health. Reviewing relevant publications, it is clear that 10 of the 194 WHO member countries have a separate national strategy (action plan/programme) for public health literacy (Australia, Germany, Ireland, Canada, China, New Zealand, Singapore, Great Britain and United Kingdom of Ireland, USA, Thailand) and in 9 countries (Australia, Austria, Bhutan, Ghana, China, Myanmar, Nepal, Switzerland, France) the topic of health literacy is prevention of NCDsincluded in the national strategy for Numerous studies devoted to the investigation of HCS as a leading risk factor for NCDs have been conducted mainly in ambulatory-inpatient settings.[13;14]

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[11] Карпов Ю.А. Эффективность и безопасность статинов // Новости кардиол. 2019, №1, - с.3-12.

[12] Catapano A.L., Graham I., De Basker G., Wiklund O., Charman M.J., Drexel H.,et al. ESC/EAS guidelines for the management of dyslipidaemias // European Heart Journal 2016; Oct; 37(39), - p. 2999-3058.

[13] Лопатина М.В, Дрыпкина О.М. Грамотность в вопросах здоровья выходит на передовые позиции повестки дня в профилактике и контроленеинфекционных заболеваний // Профилактическая медицина. 2018;21(3), -с. 31-37.

[14] Sorensen K. Health literaty interventions in policy. The WHO Global Coordination Mechanism on the Prevention and Control of Non- Communicable Diseases. Stakeholder hearing, WHO Headquarters in Geneva, 2017.

Thus, the diagnosis of HCS was possible only by biochemical examination in clinical and laboratory conditions. Therefore, at the population level, the spread of HCS depending on the socio-economic and behavioral-ethnic conditions of the regions, the detection and evaluation of the causes of the HCS, the nature of the HCS of the population and its personality-behavioral characteristics, the awareness of the prevention of HCS in the population and basic questions such as motivational state and other socio-hygienic aspects of HCS have been understudied. Based only on the results of these studies, it is possible to develop a rational complex for prevention, which can limit the spread of CVDs among the population and reduce the burden of CVDs. In recent years, the emergence of a portable test system on the market of laboratory equipment allows to determine the level of CS and its fractions in a minute in non-laboratory conditions by taking blood from a finger, which opened wide opportunities for studying the problem of HCS at the population level.

Object and subject of research. A representative group of the city population, patients of the 2 city polyclinics and republic endocrinological center, a fixed population group for long-term monitoring, socio-hygienic aspects of HCS, its diagnosis, fight against HCS and prevention.

Purpose of work. Studying the nature of the spread of HCS, the causes of its occurrence and the spectrum of impact on the health of the population, evaluating the role of HCS as a risk factor of NCDs (CVD, AH and SD2) and obesity, preparing measures for its correction at the population level

Job duties.

1. Comparative analysis of the results of diagnosis of HCS in outpatient-inpatient and non-laboratory conditions;

2. Characteristics of the distribution of the population in different age, social and gender groups and its commonality with HTG;

3. The spectrum of impact of HCS on the health and quality of life of the population, its social limitation and medical availability, preventive motivation;

4. Quantitative and qualitative evaluation of the role of nutritional behavior defects, low PA, OBW and obesity in the formation of HCS;

5. To determine the possibilities of using HCS for primary screening of masked forms of AH, SD2 in non-laboratory conditions;

6. Evaluation of the effectiveness of statins to reduce the level of CS in the body, prescribed to patients with AH and SD2 in medical institutions;

7. To determine the possibility of non-drug effectiveness of preventive measures (correction of energy value of food and PA) in lowering the level of CS in the body;

8. Development of parameters for evaluating the effectiveness of preventive measures;

9. Experimental approval of the set of preventive measures developed to limit the spread of HCS at the population level.

Research methods: sociological, epidemiological, prospective, clinical-laboratory, statistical, SF-36 international questionnaire, GPAQ, Moriski OYDM, DEBQ, Rider scale, Ketle index, tonometry, mobile lipidometry, glucometry.

The main provisions of defense.

1. HCS - as a modern medical and social problem;
2. Global spread of HCS;
3. Risk factors forming HCS;
4. Drug and non-drug means of correction of HCS;
5. Approaches to the rationalization of the fight against HCS and its prevention.

Scientific novelty of the work.

1. The effectiveness of commercial test systems in the diagnosis of HCS in non-laboratory conditions and the feasibility of investigating the problem of HCS at the population level have been determined;

2. The prevalence of HCS among different population groups and the frequency of its combinations with hypertriglyceridemia (HTG) and their role in the formation of general somatic diseases (GSD) are shown;

3. The social limitation of HCS, its aggravating effect on the health and quality of life of the population, the state of medical applications and preventive motivation have been revealed;

4. It has been established that NB (nutritional behavior) defects are the main cause of the formation of not only HCS, but also EBW and obesity, especially on the background of low PA;

5. The role of statins prescribed to AH and SD2 patients in medical institutions in reducing the level of CS in the body was evaluated;

6. The possibilities of HCS in detecting the hidden forms of AH and SD2 masked at the population level have been determined;

7. Parameters for evaluating the effectiveness of preventive measures are proposed;

8. Social and hygienic grounds for the complex of measures for the prevention of HCS at the population level have been developed.

The practical importance of the work. Recommendations for diagnosis of HCS and its fractions in mobile (non-laboratory) conditions; HCS prevalence, age and social risk groups, masked forms of AH, diagnosis algorithm of HCS as a marker for early screening of SD2; risk factors and personality-behavioral characteristics of the population that create conditions for the formation of HCS; Forming a food basket consisting of CS-reducing foods; organizational-informational approaches to increase the population's physical activity and medical requests and medical adherence to HCS control; Recommendations for drug and non-drug correction of HCS; a set of scientifically based measures for the prevention of HCS among the population at the population level; Proposals to fight and prevent NCDs within the framework of the decree of the President of the Republic of Azerbaijan.

Approval and application of research work: Department of Public health and health care organization of AMU, clinical laboratories of AMU, Republican endocrinological center, city polyclinics, children's institutions, commercial facilities and offices.

Approval of research results.

The main provisions of the dissertation were presented at the scientific and practical conference named "Actual problems of

medicine" (Baku, AMU, 2018) dedicated to the 100th anniversary of the Republic of Azerbaijan, at the speech held in Sochi named " Социально-значимые и особо опасные инфекционные заболеания (V Всероссийская междисциплинарная научно-практическая конференция, Сочи 30 окября-2 ноября, 2018), VII Ежегодная Международная научно-практическая конференция <<Актуальные вопросы медицины>> (Baku,2018), Российский национальный конгресс кардиологов (Москва, 2018), Всеукраінськоі науково-практичноі конференціі з межнародною участю <<Полтавськı днı громадського здоров'я>> (Украина, Полтава, 2018, speech), scientific-practical conference dedicated to the 75th anniversary of Azam Aghayev's birth (Baku, AMU, 2019), 31st Annual Cordiologists Conference (June 17-19, Rome, Italy, 2019), 26th World Nutrition Congress and 15th Euro Obesity and Endocrinology Congress (June 17-18,2019, London, UK, speech), VII Евразийский конгресс кардиологов (27-28 мая, 2020), / Collection of research papers of scientific and practical conference / (October 13, Kharkiv,2021), / European Academic Science and Research/ (December, 2021), // The second Eurosian conference the coronavirus pandemic: diagnosis, treatment and consequences/ (Baku, June 2-3, 2021), the international scientific and practical conference "Actual problems of medicine 2022" (Baku, AMU,2021) dedicated to the 100th anniversary of the honored scientist, professor Tamerlan Aziz oghlu Aliyev, international scientific and practical conference "Actual problems of medicine" dedicated to the "Year of Shusha" in the Republic of Azerbaijan (Baku, AMU, 2022), International Scientific Conference (Lviv. Ukraine. 27-28.10.2022).

The initial discussion of the dissertation was held at the inter-departmental meeting of the Department of Ecology and Nutritional Hygiene, the Department of Epidemiology, the Department of child-adolescent health and occupational Health of Azerbaijan Medical University (protocol №1; 11.04.2023). The work was reported and discussed at the scientific seminar of BED 1.03 Dissertation Council at the National Center of Ophthalmology named after Academician Zarifa Aliyeva (13.10.2023; protocol №13).

Publications. 35 works, including 17 articles (4 local, 13 foreign press) were published on the subject of the dissertation. Methodical recommendations called "Modern approaches to the prevention of hypercholesterolemia" were also published.

The structure and scope of the dissertation. Dissertation consists of 367466 signs (excluding table of contents, tables, figures, graphs, reference list): introduction (11683 signs), literature review (83782 signs), 7 chapters (22083+ 28207+ 55605+ 40335+ 39310+ 27817 signs), final (53812 signs), conclusions, practical recommendations (3704+1128 signs) and 287 reference lists, of which 8 Azerbaijani, 75 Russian and 204 English authors literature. The dissertation contains 33 tables, 23 graphs and 2 figures.

MATERIALS AND METHODS OF RESEARCH

The research work was carried out on the basis of the scientific program of the Department of Public Health and Health Care Organization in 2017-2021. Researches were conducted in the base of 3 city polyclinics (doctors, patients and visitors), 3 schools (teachers, parents) and 8 pre-school institutions (educators, parents) attached to them, 15 commercial facilities, firms and offices (colleagues, visitors). The main research method is sociological, the international standardized SF-36 questionnaire recommended by WHO (2013)[15], DEBQ[16], Morisky[17], GPAQ[18] was used.

"Accutrend Plus" portable device (Switzerland) was used to determine the lipidogram in non-laboratory conditions. Based on the principle of voluntariness, blood was taken from the fingers of those

[15] Ware J., Kosinski M., Keller S. SF-36 physical and mental health summary scales: a users manual. - Boston, MAAS: The Health İnstitute. - 1994, 217 p.

[16] Van Strien T., Jan E.R., Gerard P.A., et al. The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior, Eathing Disorders, 1986, vol.5(2), pp.295-315.

[17] Morisky D.E., Green L.W., Levine D.M. Concurrent and predictive validity of a self-reported measure of medication adherence. Med. Care 19864 24:67-74.

[18] Bull F.C, Maslin T.S., Armstrong T. Qlobal Physical Activity Questionnaire (GPAQ): Nine Country Reliability and Validity Study. /Journal of Physical Activity and Health,, 2009, 6, 790-804.

who participated in the survey, and a minute later, the relevant answer of the analysis was displayed on the screen of the device. At the same time, 2013 people were involved in both questionnaire and lipidogram examination. Volume, reporting and usage methods are provided by research groups.

In the first group of the study, information on the population patterns of HCS and HTG prevalence among the population was given. In the first stage, the effectiveness of the portable test system was evaluated in comparison with clinical biochemical laboratory diagnostic methods. In parallel with both methods, the blood of 78 patients was examined according to CS, and the blood of 164 patients was examined according to various components of the lipidogram in the Republican endocrinological center. The results of the survey of 2013 urban residents were analyzed depending on age and gender, the amount of CS and TG in the blood, the characteristics of the distribution of HCS and HTG at the population level and their interdependence.

In the second group of the study, based on the analysis of the results of the 2013 residents questionnaire, the following questions were studied: the nature and symptoms of the disease with GSD; assessment of residents' own health; limiting HCS to the social components of the residents' living environment; indicators of residents' quality of life and their adherence to treatment and prevention measures and medical applications; the level of residents' awareness of cluster systems; distribution of residents' CS levels by ABO blood group. The obtained results were calculated per resident. The algorithm of primary non-laboratory screening of HCS was developed.

In the third group of the study, the dominant risk factors of HCS were identified and evaluated. With the help of correctly filled 1386 DEBQ questionnaires, 3 types of disability of NB were determined: restricted type in 417 residents, emotional type in 458 residents, external type in 511 residents. 5 food baskets have been compiled with the caloric content of food products.

Using the international standardized GPAQ questionnaire, physical activity of 1386 residents was evaluated in 3 modes: <30

min/day in 176 people; 30-60 min/day in 362 people; >60 min/day was obtained in 348 people. The indicators were compared with the level of CS.

Calculations of the Ketle index among 2013 residents showed that 1032 people had normal body weight (<25,0 kg/m), 381 people had EBW(25,0-29,9 kg/m), and 600 people had I-III degree obesity (>30,0 kg/m). Also the role of HTG was evaluated in the development of EBW and obesity. 102 cases are the results of EBW and 451 cases are the results of obesity in residents with HTG (1,7 mmol/l).

In the fourth group of the study, the possibility of using HCS as a marker in the diagnosis of masked (hidden) forms of AH, SD2 was given. In relation to AH, the following amount of work was carried out. 318 of 583 people whose questionnaires mentioned GSD were diagnosed with AH in the polyclinic, and in all cases, CS was higher than normal (>5.0 mmol/l). During the measurement of AP 5 times during the day, MAH was detected in 19 people out of 138 residents who did not have GSD, in 14 of them the level of CS was >7.8 mmol/l.

In the fifth group of the study, the effectiveness of the treatment of HCS with drugs (statins) and non-drugs (lifestyle modification) was evaluated comparatively. Analysis of ambulatory cards in the primary institutions of the study on the use of statins for the treatment of patients with AH and SD2 showed that statins (atorvastatin, rosuvastatin, etc.) at a dose of 40 mg/day (1-2 years) have an CS-reducing effect. This effect is enhanced when statins are combined with lifestyle modification. Based on the principle of volunteering, 277 residents carried out measures to control the energy value of food and increase PA in different volumes within 6-8 months.

The approval of the sixth group prepared anticholesterol complex was carried out within 11-14 months. In order to increase the residents' awareness of the main questions related to the HCS problem and their motivation to implement the recommended preventive measures, information-explanatory work was conducted (2013 residents at the beginning of the work, 1386 residents at the

end of the work). All residents were given a memory book with 16 questions, 5 food baskets with the names of food products and their calorie content per 100 grams, and recommendations for increasing PA. Residents' awareness and motivation were periodically assessed with a 5-point cluster system. Efficacy was evaluated by the following parameters: medical consultation, GSD, quality of life, self-assessment of health, adherence to prevention. As a marker, the dynamics of the resident weight was used. A final assessment of the effectiveness of the CS-reducing measure was conducted among 1386 residents after 11-14 months. Of them, 442 people fulfilled the measures completely, 336 people fulfilled them incompletely, and 371 residents belonged to the control group. Also, 237 residents voluntarily took statins.

The statistical processing of the obtained results was carried out with the help of the Student's criterion, arithmetic mean weighted quantity, χ^2 criterion, correlation coefficient, Van-der-Waarden criterion.[19]

The results of the research work

Elevation of the level of CS or HCS is one of the top 3 leading risk factors for the development of CVDs. According to many experts, in the prevention and successful fight against diseases such as diabetes mellitus, hypertension, obesity, and other pathological conditions of the body, which cause the global high level of morbidity, disability, and death of the world population, and in which the disease plays a greater role in the formation, it is important to consider it as a serious risk factor. Diagnosis of HCS was possible only in laboratory conditions when the population sought medical help. Therefore, information on the population-level prevalence of HCS among the population was insufficient, which limited the possibilities of developing effective preventive measures. The advent of portable devices that allow non-laboratory quantification of CS has created the necessary conditions for conducting population-level studies on HCS among the general population.

It is very important and necessary to carry out extensive research on the spread of HCS in regions with different socio-

[19] Герасимов А.М. Медицинская статистика. - 2007, с.475.

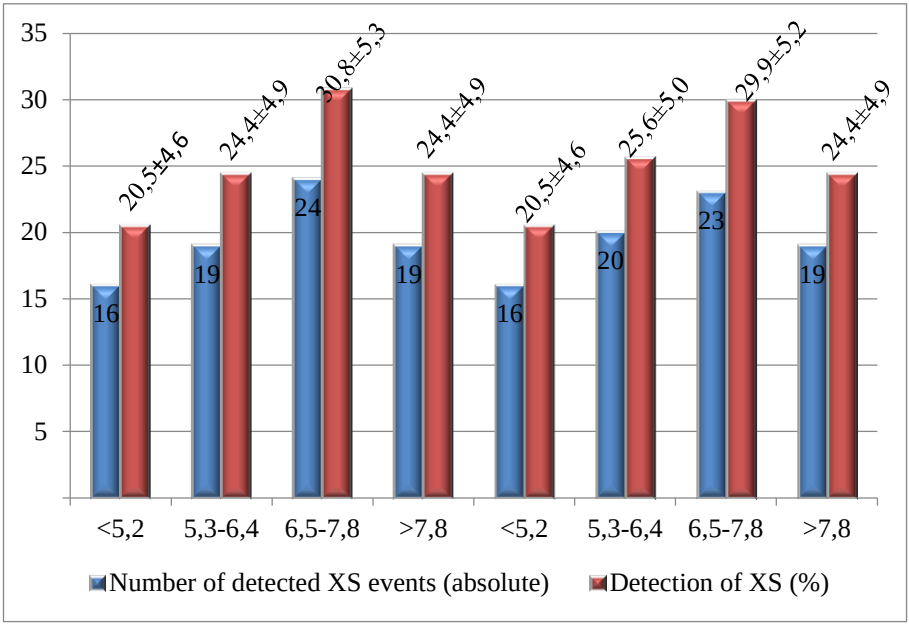
economic conditions and national-ethnic characteristics of the population, the identification and assessment of risk factors for HCS, the nature of the population's NB, its awareness and commitment to HCS and its it is very important and necessary for the correction of other socio-hygienic aspects. The results of these studies allow for the development of a complex of rational measures for the prevention of HCS, which will not only help to reduce the prevalence of HCS among the population, but also positively affect the problem of HCS, AD, SD2 and other socially important diseases will allow to increase the speed of the solution. In this regard, the purpose of our work is to study the nature of the spread of HCS and its spectrum of impact on the health of the population, to identify and evaluate the risk factors for the occurrence of HCS, to prepare measures for the correction of HCS at the population level.

POPULATION-LEVEL PREVALENCE OF HCS AND HTG AMONG URBAN POPULATION

In the 1st group of our study, the prevalence of HCS and HTG among the urban population at the population level was studied. First of all, it was necessary to determine the effectiveness of the portable test system in the diagnosis of HCS compared to classical biochemical methods. A comparative examination of blood taken from a finger by both methods showed that the indicator of CS <5.0mmol/l was found in 20.5±4.6% of patients by both methods, and 5.0-6.4mmol/l by the first method. in 24.4±4.9% of patients, and in 25.6±5.0% of patients during examination with the second method (t=0.17; P>0.05), 6.5- 7.8 mmol/l level in 30.8±5.3% and 29.2±5.2% of patients, respectively (t=0.22; P>0.05), CS >7.8mmol The /l level was detected in 24.4±4.9% of patients in the examination by both methods (Graph 1).

The effectiveness of the test-system was determined according to the diagnosis of lipidogram components. Thus, the manifestation of CS at the level of <5.0 mmol/l is 35.9±3.8%, HDL – 38.4±3.8%, LDL – 25.0±3.4%, VLDL – 17.1±2.9% organized. During the biochemical determination of these components of the lipidogram,

CS- 35.9±3.8% (t=0.00; P>0.05), HDL –39.6±3.8% (t=0.22; P >0.005), LDL – 23.1±3.3%, VLDL – 10.4±2.4% (t=1.78; P>0.05).



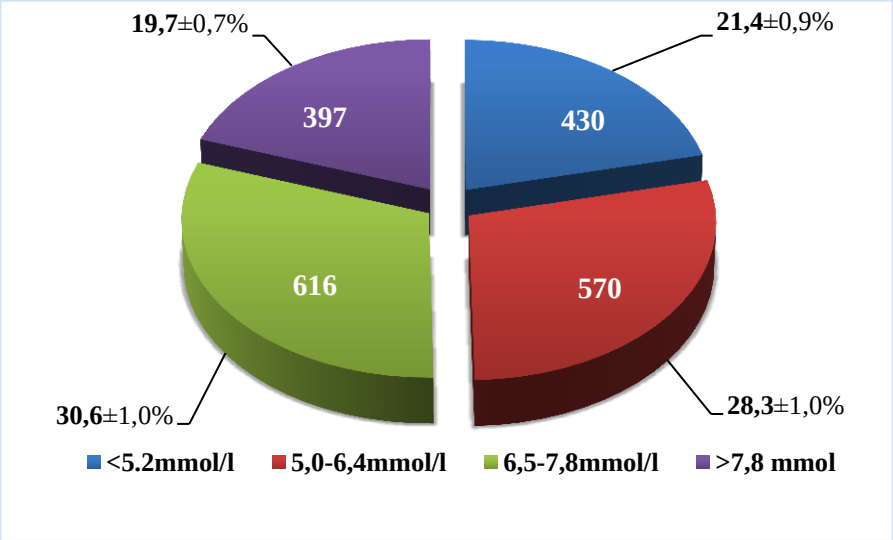
Graph 1. Side-by-side comparison of the results of different levels of CS detected by the biochemical method (left side) and the test system (right side)

At other levels of CS, the difference between the indicators obtained by both methods was invalid. It is very important that the test-system shows efficiency comparable to the biochemical method in the diagnosis of HTG at different levels. The high efficiency of the test-system allowed us to carry out large-scale diagnostics of HCS at the population level.

According to the results of CS-metry, the normal level of CS in 21.4±0.9% of the city population, the high level in 28.3±1.0%, respectively (t=5.04; P<0.001), the weak high level in 30.6±1.0% (t=1.63; P>0.05) and a very high level in 19.7±0.9% (t=8.07; P<0.01) was found (Graph 2).

A level of CS >6.2mmol/l is associated with a very high risk for the development of atherosclerosis and its complications. In our

observation, 1013 out of 2013 residents had a level of CS higher than 6.5mmol/l (50.3±1.1%), which indicates a high risk of CVDs and other diseases among the urban population.



Graph 2. Frequency of CS levels among examined urban residents

Data on the distribution of levels in different age groups of surveyed urban residents show that the distribution of CS levels has a clear age-related restriction. Thus, the indicators of the normal CS level decrease from 25.2±2.4% to 17.6±2.5% with a strong negative correlative dependence as the age of the examinees increases (t=2.19; P<0.05). At the same time, very high CS levels (>7.9mmol/l) also increase from 16.5±2.0% to 23.5±2.8% (t=2.03) with the same strong but positive correlation. ; P<0.05). The distribution of intermediate indicators of CS does not have an obvious age limit and varies at approximately the same level, that is, from 25.2±2.8% to 33.6±3.1% (t=8.98; P>0.05). Most likely, this is due to the fact that as the population ages, their physical activity decreases, they do not control their increased weight until obesity, which leads to an increase in the amount of CS in the body. This is especially true for women. Thus, 796 people (70.7±1.4%) of 1126 workers who participated in the survey did not work anywhere, or worked less hours a day, and their

working hours were characterized by not being physically active. However, out of 887 men, 747 people (84.2±1.2%) were engaged in various labor activities throughout the day, 338 of them were builders, drivers, laborers, etc., it was found that these professions are also related to physical work, in other words, the given data suggest that one of the main reasons for the widespread prevalence of CS among the urban population may be low PA and obesity.

The presence of an effective test system has also made it possible to study HTG at the population level, which has been given serious attention to this problem in recent years. HTG was detected in 679 people (33.7±1.1%) of 2013 respondents, and in 24.5±1.0% of cases, the level of TG was 1.8-2.2mmol/l, in 1.77±0.6%, respectively, 2,3-5.6 mmol/l and 5.7 mmol/l in 1.5±0.2% cases.

HTG is correlated with age. Thus, the frequency of HTG level of 1.8-2.2 mmol/l increased from 17.0±2.5% to 39 with correlative dependence (t=+0.94±0.05) as the age of the respondents increased (20-70 years). increases to .5±3.1% (t=4.40; P<0.001). With the same strong positive relationship (r=+0.88±0.09), the indicator of TG at the level of 2.3-5.6 mmol/l increases consistently from 26.1±1.1% to 10.5±2.0%. Among the respondents aged less than 20 and 20-29 years, the level of TG >5.7mmol/l was not detected. The frequency of detection of TG increases from 0.6-±0.3% to 3.4±1.2% with subsequent age increase (t=2.26; P<0.05). The age dependence of HTG is the same as that of HCS.

The same reasons also play a role in the gender characteristics of HTG, its frequency is higher among men than among women, 37.0±1.6% and 31.2±1.4%, respectively (t=2.72; P<0 ,01). At the same time, the frequency of high levels of HTG (>5.7mmol/l) is the same among them.

For the first time, the study of HTG at the population level made it possible to reveal a high level of its interdependence with HCS. It is also important to note that out of 1583 cases of HCS, 1015 cases were attributed to CVDs, AH and SD2 (64.1±1.2%), in other words, HCS is an important risk factor for the occurrence of these diseases. This can also be said about HTG. Thus, out of 679 cases of HTG detected, 589 cases were attributed to these diseases

(86.7±1.3%; t=7.12; P<0.001). Although HTG is 2 times less common than HCS, its role in the formation of CVDs, AH and SD2 is great. HCS and HTG are involved in the formation of mono or polydiseases freely and independently of each other. However, polymorbidity (co-morbidity) often results from the joint participation of these two risk factors. Thus, 68.9±3.5% CVDs, 56.5±3.3% AH (t=2.58; P<0.01) and 41.7±4, There was 0% incidence of SD2 (t=2.85; P<0.001). For the first time, the role of HTG in the occurrence of mono- and polymorbidity of CVDs, AH and SD2 and its interdependence with HCS have been proven.

Summarizing the results of the above-mentioned population studies, we can come to the conclusion that HCS and HTG are widespread among the population and are the leading risk factors for the occurrence of NCDs, whose important representatives are CVDs, AH and SD2, and this risk is especially high when they are combined.

SPECTRUM OF EFFECTS OF HCS ON POPULATION HEALTH

Spectrum of effects of HCS on population health has bee studied. Against the background of differet levels of CS, the frequency and nature of common somatic diseases, their impact on the quality of life and the level of self-assesment of the respondents' health were studied. The 2nd group of our studies is devoted to the spectrum of impact of HCS on population health and consists of 4 parts. In the first part, 1186 of the 2013 people who participated in the survey were diagnosed with various diseases (51.9±1.1%). According to the frequency of detection, nosoforms are divided into groups. More dental diseases (group I) were found in 47.9±1.1% of respondents. Also, AH was detected in 32.8±1.0% of respondents (t=10.20; P<0.001), but at the level of CS >7.8mmol/l, this indicator was 48.6±2.5 (t=0.26; P>0.01).

The frequency of the 2nd group of disease nosoforms was slightly lower (t=13.49; P<0.001). This group includes gastroenterological, endocrinological, neurological and allergic diseases, as well as respiratory and genitourinary diseases. The detection

frequency of disease nosoforms belonging to this group varied between 13.1±0.9% and 27.8±1.0% (t=6.44; P<0.001).

Cardiovascular, dermatological, rheumatological and other diseases belong to the 3rd group of disease nosoforms with a lower detection frequency (t=9.54; P<0.001). their frequency varies between 4.3±0.5% and 8.8±0.6% (t=5.77; P<0.001). It does not include oncological, infectious and parasitic diseases, because the respondents did not have objective information about them.

The mentioned nosoform diseases were found at all levels of CS, but their frequency differs significantly. 2.13±0.21 at the level of CS <5.0mmol/l, 2.27±0.18 at the level of CS 5.0-6.4mmol/l respectively in respondents (t=0.53; P>0.05), 2.73±0.17 nosoforms (t=1.84) at the level of 6.4-7.8 mmol/l of CS and 3.29±0.25 nosoforms at the level of >7.8 mmol/l of CS (t= 1.87; P>0.05) was recorded. In particular, AH was detected, its frequency increased from 23.5±2.0% to 48.6±2.5% depending on the increase in the level of CS (t=7.84; P<0.01). Also, the frequency of CVDs increased from 7.7±1.3% to 18.6±2.0% (t=4.56; P<0.001) and the frequency of endocrine diseases (especially SD) was 13.3±1.6 % to 32.0±1.3% (t=9.08; P<0.001).

On average, 2.58±0.14 cases of illness were reported to each of the participants in the questionnaire, including 2.13±0.21 cases at the level of CS <5.0 mmol/l, CS 5.0-6, 2.27±0.18 cases at the level of 4 mmol/l (t=0.61; P>0.05), 2.73±0.17 cases at the level of 6.5-7.8mmol/l of CS (t=1.84; P>0.05) and 3.29 cases (t=1.87; P>0.05) fell at the level of CS >7.8 mmol/l. Although the difference between the borderline indicators of CS is not statistically significant, it is equally clear that as the level of CS rises, the morbidity indicators consistently increase (Table).

A number of methods for calculating health indicators have been proposed, but they are very difficult, the comparison of individual indicators is associated with complexity, and the established integrated picture of health does not accurately reflect the situation.

The refore, many experts believe that in order to assess the health of the population in individual regions, it is more appropriate

to obtain information from the population itself, that is, to assess their own health.

Table. Frequency of nosoforms at different levels of CS

Disease groups	Frequency of nosoforms of morbidity at different levels of XS									
	<5,0mmol/l		5,0-6,4mmol/l		6,5-7,8mmol/l		>7,8mmol/l		total	
	n=430		n=570		n=616		n=397		n=2013	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Gastrointestinal	97	29,6±2,0	136	23,9±1,8	169	27,4±1,8	146	36,8±2,4	548	27,2±1,0
Cardiovascular	33	7.7±1.3	40	7,0±1,1	97	15,7±1,5	74	18,6±2,0	244	12,1±0,7
Arterial hipertension	101	23.5±2,0	142	24,9±1,8	225	36,6±1,9	193	48,6±2,5	661	32,8±1,0
Respiration	92	21,4±2.0	113	19,8±1,7	201	32,6±1,9	154	38,6±2,4	560	27,8±1,0
Urine-sex	79	18,4±1,9	118	20,7±1,7	113	18,3±1,6	75	18,9±2,0	385	19,1±0,9
Endocrine	57	13,3±1,6	117	23,1±1,8	206	33,4±1,9	127	32,0±2,3	507	25,2±1,0
Neurological	91	21,2±2,0	113	19,8±1,7	126	20,5±1,6	96	24,7±2,2	428	21,3±0,9
Allergic	97	22,6±2,0	128	22,4±1,8	133	21,6±1,6	131	33,0±2,2	489	24,2±1,0
Dermatological	34	7,9±1,3	53	9,3±1,2	54	8,8±1,1	36	9,1±1,4	177	8,8±0,6
Dental	184	42,8±2,4	268	47,0±2,1	287	46,6±2,0	225	56,7±2,5	964	47,9±1,1
Rheumatology	32	7,4±1,3	42	7,4±1,1	46	7,5±1,1	29	7,3±1,3	149	7,4±0,6
other	18	4,2±1,0	25	4,4±0,9	26	4,2±0,8	17	4,3±1,0	86	4,3±0,5
Total	230	53.5±2,4	311	54,5±2,1	373	60,6±1,8	272	68,5±2,3	1186	58,9±1,1
Total morbidity units	915		1295		1683		1305		5198	
Average number of morbidity units per person	2,13±0,21		2,27±0,18		2,73±0,17		3,29±0,25		2,58±0,14	

Note:the number of disease nosoforms in each group is greater than the number of respondents, since each of the respondents mentioned 2 or more nosoforms

Although such a standard international methodology has not been officially proposed yet, the work experience of assessing the population's own health in individual developed countries has allowed us to conduct a similar study. For this purpose, the following block of questions was included in the SF-36 questionnaire for the respondents to evaluate their health during the last year: "very bad", "bad", "satisfactory", "good", "very good" and "other". Thus, more "good" answers were received in assessing their own health, but respondents with a normal level of CS in their blood (<5.0mmol/l)

gave this answer (30.0±2.2%). Such "assessment of one's own health" is found in 18.8±1.6% of respondents with a decrease in the level of CS in the blood of 5.0-6.4 mmol/l ($t=4.12$; $P<0.001$). The "good" indicator of assessing one's own health was slightly lower, in 9.5±1.2% of the respondents it was recorded at the level of 6.5-7.8mmol/l of CS ($t=4.65$; $P<0.001$). At the level of CS >7.8 mmol/l, only 3.5±0.9% of respondents assessed their health as "good" ($t=4.00$; $P<0.001$). Such a picture is also typical for a "satisfactory" assessment of one's own health. Consistently with the decrease in the level of CS in the blood, this indicator also decreases from 37.9±2.3% to 19.4±1.8% ($t=6.34$; $P<0.001$). At the same time, the dynamics of the indicator of "unsatisfactory" assessment of one's health is reversed, that is, with the increase of CS, this indicator also increases from 9.8±1.4% to 35.0±2.4% ($t=9.06$; $P<0.001$). Self-assessment indicators of health decrease more when HCS and GSD are together.

Thus, for the first time, it was determined at the population level that the increase of CS in the blood is the leading risk factor in the rapid development of not only NCDs, but also GSD. Also, it was determined for the first time that HCS, when combined with GSD, has a significant impact on population health, and this is evidenced by the low self-assessment indicators of the majority of respondents. However, the same role is played by the HCS without the GSD. From here, a question arises: are there specific symptoms of HCS that have a systemic effect on the body? The answer to this question is given in the second part of the current research group. It is still practically unknown whether HCS, which is the most common pathological condition of the body and has systemic effects on health, has specific symptoms. It is impossible to study this issue in an outpatient setting, because people with HCS seek medical care only for combined HCS, so it is impossible to separate the existing symptoms in this case. The importance of solving this problem comes from the fact that it has its own symptoms. first, it will increase the medical and social importance of HCS, and second, it will be used as a marker for timely diagnosis of HCS. Undoubtedly, according to the results of the research in the previous section, for the

first time, HCS was determined to independently reduce the level of self-assessment of the respondents' health, this result predetermined the work on identifying the symptoms of HCS. The analysis was carried out among 827 respondents who did not have GSD.

A total of 18 symptoms were identified. If at the level of CS <5.0 mmol/l and at the level of CS 5.0-6.4 mmol/l, the indicators of symptoms were almost the same, on average 32.0±3.3% and 37.5±3 .0% (t=1.23; P>0.05), then at the level of CS 6.5-7.8 mmol/l these indicators increase to 47.7±3.2% (t =2.10; P<0.05) and 70.4±4.1% at the level of CS >7.8 mmol/l (t=4.37; P<0.01), that is, the symptomatology CS is more pronounced at higher levels of .

Moreover, the level of symptoms such as constipation, abdominal pain, shortness of breath, dry mouth, irritability, and sleepiness mentioned in the survey is higher. According to the calculated average indicator, no more than 0.65±0.15 symptoms occurred in one respondent at the level of CS >7.8 mmol/l, while at the level of CS >7.8 mmol/l, this indicator was 2.14 ±0.21 increases to symptoms (t=5.73; P<0.001).

Among the symptoms and pathological conditions of all diseases, HCS is more widespread. We remind you that we detected HCS in 1583 people out of 2013 (78.6±0.9%), in 1013 of them the amount of CS in the blood was higher than 6.4 mmol/l, and it is associated with many diseases, including NCDs and it was considered as a risk factor for the occurrence of diseases (50.3±1.5%). The reasons, as shown by our research, are the dependence of HCS on people's social environment. We identified 23 components of the social environment, the description of the influence of each of them on the formation of HCS would take up a lot of space in the text, so let's mention them in a short form. All 23 components can be divided into 3 groups: social housing of residents; personal-behavioral characteristics of residents; residents' attitudes to health and illness. Each resident had 7 or more of the 23 components. At the same time, all social components are controllable and they are modified by the relevant influence.

Assessment of health-related quality of life is gradually taking a stronger position in modern medicine, and indicates the increasing

role of the patient in the selection of diagnostic and treatment methods. Health-related quality of life describes how the patient experiences his or her illness and the impact of the illness on the most important aspects of life from the patient's perspective.

The study of health-related quality of life allows us to quantify the physical, mental, social and spiritual functioning of a group of people and society as a whole. The only way to study the quality of life is through a survey. According to the SF-36 international questionnaire, the quality of life was evaluated according to the following 10 positions: physical work capacity, physical condition, physical pain, general health, energy, social role, emotional state, mental health, family-household status, nutritional behavior.[20] All positions had available explanations. Each position is evaluated with 10 points. Quality of life is considered satisfactory if the score is greater than 70, and unsatisfactory if the total score is less than 30. Very unfavorable quality of life scores were obtained. Thus, in the control group, a satisfactory assessment of the quality of life was noted only in 41.4±2.3% of the residents, this assessment is even lower on the background of HCS - 26.9±1.9% ($t=4.87$: $P<0.001$), with HCS against the background of the combination of Average arithmetic indicators are more disappointing - 55.6±0.33 points, 45.7±1.28 points ($t=7.38$; $P<0.001$), 39.6±1.31 points ($t=3.24$; $P<0.001$), respectively. $P<0.001$).

As can be seen, the quality of life, as well as self-rated health, was found to be low among city dwellers, which is contributed to by HCS both alone and in combination with GSD. Only the development of effective anti-cholesterol measures and their widespread implementation will improve the quality of life of the population and thus its health.

In the 3rd part of this research group, the status of the medical requests of the respondents, their obligations and motivation

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[20] Вебер В.Р., Казымов М.С., Копина М.Н. и др. Особенности распространенности избыточной массы тела, артериальной гипертонии, гипергликемии и их сочетаний у лиц разного пола и возраста // Тер.архив. -2008,-№10. - с.76-78.

regarding the treatment and prevention of HCS were analyzed. It should be noted that WHO reports published annually show that there is an acute problem of the population not seeking a doctor on time all over the world, mainly in developing countries. According to the available information, many people, including in our republic, do not consult a doctor when they have debut symptoms, but take independent steps to eliminate them. They turn to the doctor only with a developed, clear picture of the disease, and often miss scheduled visits to doctors. The state of medical accessibility of the local residents in general, and especially in relation to HCS, is not satisfactory. Even residents with combinations of HCS and GSD made only 2.37±0.28 visits to the polyclinic per year, while those with HCS made 0.36±0.12 visits ($t=6.70$; $P<0.001$). It is based on 13 reasons, including financial constraints, carelessness of doctors, side effects of drugs, improper treatment and preventive measures, lack of information about preventive measures, etc. and their detection frequency is 30.2±2.0%.

Using the Morisky method, we calculated residents' adherence to treatment and prevention. Among residents with a normal level of CS in the blood at a normal ratio of 4 points, the indicators were on average 3.02±0.18 points, while during HCS its value was even lower, i.e. 2.14±0.13 points ($t=4.00$; $P< 0.001$). In this regard, it was necessary to determine the extent to which the residents were encouraged to increase their treatment-preventive motivation. To date, no methodology has been proposed to determine population motivation. We have used a number of studies on the use of clusters to address a number of medical-biological problems.

The cluster system developed by us for evaluating the respondents' motivation to implement treatment and preventive measures consists of the following 7 questions and they are evaluated with points: "Effect of HCS on health and the occurrence of diseases" - 1 point; "importance of timely medical consultation" - 2 points; "fulfilment of doctor's appointments" - 3 points; "self-assessment of health improvement" - 4 points; "Implementation of measures for the prevention of HCS" - 5 points.

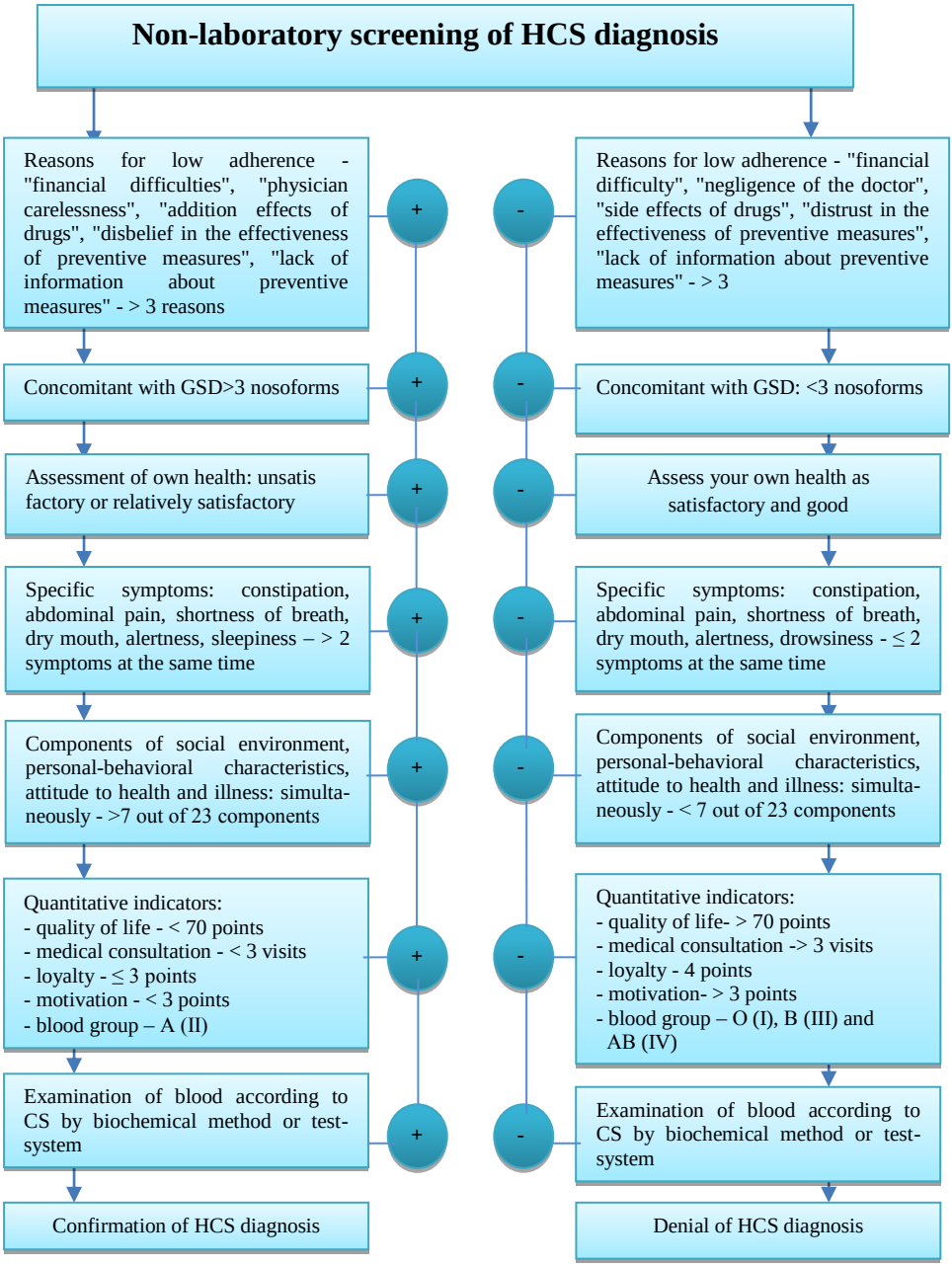


Figure. Algorithm of initial screening (diagnosis) of HCS in non-laboratory conditions

As a result, it was determined that the average motivation among residents with a normal CS level in the blood was 3.01±0.12 points, and among residents with HCS it was 2.37±0.11 points (t=4.01; P<0.001), that is, motivation 3 above point no increase in CS level occurs.

As a result of our observations, it was also found that A(II) blood group is more common among residents with HCS - 41.2±2.1%, which is significantly higher among residents with a normal level of CS in their blood - 34.4± 2.2% (t=2.24; P<0.05). A(II) blood group among donors is also low - 32.2±3.8 % (t=0.50; P>0.05).

In the 4th part of this research group, on the basis of the above-mentioned studies, we developed an algorithm for the initial screening (diagnosis) of HCS in non-laboratory conditions (Figure).

In order to evaluate the population (non-laboratory) efficiency of the developed algorithm, we performed the following comparative analysis. As we mentioned many times, we examined 2013 people with a portable test-system, HCS (>6.4 mmol/l) was detected in 1013 of them (50.3±1.1%). After a few years, we examined 1216 people out of 2013 people (68.4±1.1%) using the blind method, and HCS was detected in 622 of them (51.3±1.8%), which is practically the result of the test system was the same as (t=0.51; P>0.05).

Quantitative and qualitative evaluation of the reasons that facilitate the formation of HCS

Quantitative and qualitative evaluation of the reasons that facilitate the formation of HCS was carried out. In the 3rd group of the study, a quantitative and qualitative assessment of the reasons for the development of HCS was carried out. First of all, we considered the influence of the population's NB and the energy value of the food products consumed by them on the occurrence of HCS. 3 types of NB were determined based on the questionnaire. As can be seen, the restrictive, emotional and external types of NB are almost equally prevalent among the local population and range from 30.1±1.2% to 36.9±1.3% (t=3.84; P<0.001).However, they do not pay attention to the amount of food they consume daily and their caloric content.

These data were additionally obtained through a questionnaire designed by us, which allowed us to determine the daily caloric value of the food consumed by the respondents.

First, let's look at the name of the food products consumed by the local population. Although there are many food products consumed, they can be divided into 4 food baskets depending on the frequency of use: 1) used every day; 2) used every 1-2 days; 3) used 2-3 times a week; 4) used once a week or less. 338 respondents to the first basket (25.4±1.2%), 445 respondents to the second basket (32.1±1.3%; t=3.79; P<0.001), 386 residents to the third basket (27.8±1.2%; t =2.43; P<0.05) and 217 residents (15.7±1.0%; t=7.42; P<0.001) were eligible for the fourth basket. The results of the survey made it possible to assess the food preferences of city residents. Most of them, i.e. 813 out of 1386 people (58.7±1.3%) prefer second dishes for lunch, mostly potatoes, and less often pasta and cutlets. As is known, the frequent use of only second meals has a negative effect on the function of the gastrointestinal tract, causes poor absorption of food and energy accumulation. Of the study participants, 412 people (29.7±1.2%; P<0.001) ate first meals, and a total of 161 people (11.6±0.9%; P<0.001) ate both first and second meals (11.6±0 .9%; P<0.001). Individual food preferences of the respondents (taste and quality of food, material accessibility of the product, various components of food, its aesthetics) play a role in creating a food basket. In the normal energy supply of the body, the energy value of each of them is important, not the amount and frequency of harvesting this or that food product, their use in cooking. In this regard, we calculated the caloric value of food products consumed daily. Information on the calorie content of food products is taken from the Russian "Big Guide to Food Products and Meals". Here are the caloric values of about 5000 food products. In addition, calorie information is available on the labels of many products advertised in the commercial network. Based on 1386 completed questionnaires, calculations were made on the calorie content of food and their comparison with different CS levels.

They grouped the participants in the survey depending on the energy value of the food products consumed daily (it varied between

1756 kcal/day and 3000 kcal/day). The energy value of food did not exceed 2500 kcal/day in 233 (76.4±2.4%) of the 305 respondents with a normal level of CS. At higher indicators of the caloric value of food, the indicators of CS also increase consistently, in other words, there is only a positive correlation between calories and HCS (r=+0.82±0.11). Basically, in the average caloric indicator of food (2066.8±74.6 kcal/day), a normal level of XS was found in 22.0±1.1% of respondents. On average, 2137.7±68.2 kcal/day (P>0.05) indicator of food caloric content was found in 29.8±1.2% of respondents with 5.0-6.4 mmol/l level of HCS. The level of 6.5-7.8 mmol/l of HCS was found in 27.5±1.2% of respondents at the average food caloric value of 2407.8 kcal/day (P<0.01) (P>0.04). All respondents with a level of CS >7.8 mmol/l make up 20.7±1.1% (P<0.001), the caloric content of their food is slightly higher and is equal to 2894.2±86.3 kcal/day. As we have seen, the excess energy value of consumed food products causes energy accumulation in the body. This causes HCS in the population against a background of low PA, which is a leading risk factor for EBW, obesity, CVDs and other socially important diseases. In this regard, the modification of NB becomes important. Contacts with respondents show that acceptance of food restriction recommendations, different diets, etc. it is difficult to implement and has a short-term nature. At the same time, the availability of information on the caloric content of basic food products allows everyone to create a daily diet with a rational total energy value, which may be different for different ethnic groups of the population. For example, for the population of Baku, this is about 2500 kcal/day. Therefore, every food product should have information about its calorie content. Thus, the population's irrational NB leads to the accumulation of energy in the body, which creates real initial conditions for the emergence of various diseases. Insufficient awareness of the population about the energy value of certain types of food products, the use of foods with high energy intensity in the daily diet causes the total energy value of the diet to exceed 2000 kcal/day.

It is known that abuse of table salt seriously worsens people's health. Salt is included in all foods, and salt is also used during

cooking. According to WHO recommendations, the maximum intake of table salt should not exceed 6 grams per day. However, it is not known how much salt abuse can affect the body's daily energy value.

Unfortunately, it is possible to determine the amount of NaCl used daily by examining freshly excreted urine with a special device. It is quite clear that such a study is difficult. Taking into account that the local population is very inclined to use salty products and marinades (cucumber, eggplant, tomato, onion, garlic, etc.) and they are prepared in practically all families, we considered it appropriate to indirectly determine the level of tendency of residents to use them. For this purpose, we included in the questionnaire questions expressing the frequency of use of salty products and marinades by residents. We conducted the survey in the families mainly among 812 women out of 1386 people we observed (58.6±1.3%), because they mainly prepare salty products and marinades. Based on the answers received, the mode of use among 1386 people examined was as follows: 238 residents (17.2±1.0%) twice a day (at lunch and dinner); 269 residents (19.4±1.1%; t=1.14; P>0.05) 1 time per day respectively; 351 residents (25.3±1.2%; t=3.62; P<0,001)) used it 3-5 times a week.

In general, there is information about the dependence of HCS on the frequency of intake of pickles and marinades, and the finding emphasizes this. Therefore, to make the picture clearer, we will analyze only the extreme indicators. Thus, with frequent use of salty and marinades (2 times a day), only 4.3±1.2% of residents a normal level (<5.0 mmol/l) of CS, and 7.0±1.3% of residents In % (t=1.53; P>0.05) CS was slightly higher than normal (5.0-6.4 mmol/l). With the increase of CS level to 6.5-7.8 mmol/L, the number of residents increased to 23.4±2.2% (t=6.41; P<0.001). The number of residents at the level of CS >7.8 mmol/l increased further and reached 37.3±2.9% (t=3.82; P<0.001).

The opposite picture is observed during the rare use of salty products and marinades (3-5 times a month). Thus, the number of residents whose blood level of CS is <5.0 mmol/ is very high - 38.7±2.8%. At the level of 5.0-6.4 mmol/l CS in blood, the number of residents decreases to 15.3±1.8% (t=7.03; P<0.001). At the level

of CS of 6.5-7.8 mmol/l, the number of residents decreases to 5.8±1.2% (t=4.77; P<0.05). And the number of residents with a level of CS >7.8 mmol/l increases to the maximum indicator - 2.4±0.9% (t=2.27; P<0.05). In other words. the more salt a person consumes, the higher the amount of CS in the blood.

The conducted observations once again show that there is a great need for extensive educational work on the modification of NB among the population in order to strengthen health and prevent diseases. Estimating the caloric value of food products consumed by the population at the population level is a labor-intensive task and often wastes time, so HCS can act as an effective evaluative marker in the detection of NB defects in the population. The availability of a portable diagnostic test-system allows to determine the concentration of CS in the blood in a few minutes in non-laboratory conditions and to comment on the NB status of the population in a more accessible way. It is necessary to pay special attention to the correction of the use of salt, which is harmful to health and creates conditions for the occurrence of HCS.

Defects in the NB of the population are often accompanied by low PA, as the modern intensive rhythm of the life of the elderly population in hyperurban conditions (work, family and ensuring its development, education and upbringing of children, etc.) is not only for active sports training, but also for normal rest. and does not allow time for sleep. For example, in our observations, 133 people out of 1386 respondents engaged in special physical exercises (9.6±0.7%), and most of them were under 35 years old. The only physical activity of the rest was walking (to work, kindergarten, shopping facilities). According to international recommendations, the minimum energy consumption should correspond to 150 kcal/day, which can be achieved by walking at a moderate speed for >30 min/day (2-2.5 km) per day, which is accessible to every person. However, recent observations show that many people walk at a slow pace rather than at a moderate pace, so experts believe that it is important to walk at a moderate pace for 60 minutes instead of 30 minutes to get the physical activity the body needs. For example, in our observation, 344 of 654 men (52.6±2.0%), 347 of 792 women (43.8±1.8%;

t=3.27; P<0.01) <30 min/day, respectively, 164 men (25.1±1.7%) and 194 women (26.5±1.6%; t=0.60; P>0.01) walked at an average speed of 30-60 min/day .

We analyzed the relationship of PA with age. A very clear picture emerges. Walking for less than 30 minutes/day is mainly shared by respondents aged less than 20, which is 6.4±0.9%. Subsequently, as the age increases, the specific weight of the respondents increases consistently with such PA and reaches 20.6±1.6% in the >70 age group (t=7.72; P<0.001, that is, the share of respondents' age and PA at this level there is a very strong correlative dependence (r=+0.94±0.05).

There is no such relationship between the age of the respondents and the share of people who walk 30-60 minutes per day. The frequency of specific gravity of respondents of different ages varies between 12.7±1.8% and 16.0±1.9% (t=1.26; P>0.05). Also, a very strong but negative correlation is observed between the respondents' age and specific gravity at the level of >60 min/day walking (r=-0.88±0.09). Thus, less specific weight is found in respondents <20 years old and is 19.0±2.1%. As the age of the respondents increases, this indicator consistently decreases to 7.5±1.4% in the >70 age group (t=4.56; P<0.001).

Low PA often coexists with HCS and NB defects. It is no coincidence that WHO has called on all countries to take immediate measures to reduce the harmful effects of PA on public health. In our study, low PA (60 min/day) was determined in 1038 of 1386 respondents and was 74.9±1.2%. Violation of blood sugar (>2500 kcal/day) in 487 of 1386 respondents (35.3±1.3), and a high level of CS (>6.4 mmol/l) in 668 people (48.2±1, 3%) were detected, and in 415 people (29.9±1.2%) these two risk factors were observed together. However, the frequency of low PA in residents is higher than the frequency of NB disorder and HCS even in their combined form. PA significantly reduces the quality of life of residents. The average quality of life at the value of PA <30 min/day is 36.0±1.8 points, at the value of PA 30-60 min/day this indicator increases to 63.9±4.1 points (t=2, 84; P<0.01), and at the value of PA >60 min/day, this indicator increases further and makes 63.8±4.1 (t=4.58;

P<0.001). In other words, the higher the PA, the higher the quality of life indicator. However, the quality of life does not reach a satisfactory level (>70 points).

Quality of life is further reduced when low PA coexists with HCS. So, if the value of PA is <30 min/day and HCS is present, the quality of life indicator decreases to 31.3±1.7 points on average, which is 36.0±1 recorded at this value of PA but without HCS. It is reliably lower than 8 points (t=2.48; P<0.05). Such a reliable difference is observed when the value of PA 30-60 min/day is combined with HCS and independent and is 27.6±1.5 and 42.6±2.2 points, respectively (t=5.64; P< 0.001). When PA >60 min/day, the difference in the indicator increases with HCS and without HCS and is 30.6±2.2 and 63.9±4.1 points, respectively (t=7.16; P<0.001) .

An increase in PA can lead not only to the normative physical load of the body, but also to the correction of HCS. On the other hand, the correction of HCS also leads to the elimination of disturbances in NB. Therefore, it is important to develop comprehensive integrative measures for correction of PA, HCS and NB and their trial approval among a fixed population group. EBW and obesity are common in indigenous populations and are epidemic worldwide. Normal body weight (<25.0 kg/m²) in 51.3±1.1% of residents, EBW(25.0-30.0 kg/m²) in 18.9±0.9% of residents, various obesity (>30.0 kg/m²) was observed in 29.8±0.9%. A strong relationship between EBW, obesity, and HCS was found. For example, obesity was found in only 43 residents (7.2±1.1) with a normal indicator of CS, and in 163 residents with an indicator of CS of 5.0-6.4 mmol/l (27.2±1.82; t= 9.48; P<0.001), in 127 residents (21.7±1.7; t=2.22; P<0.05) at 6.5-7.8 mmol/l of CS >7.8 mmol/l indicator showed obesity in 267 residents (44.5±2.9%; t=6.79; P<0.001). That is, as the level of CS increases, obesity indicators also increase consistently. The loss from the above indicators of obesity at the CS level within 6.5-7.8 mmol/l is likely to be coincidental, since the frequency of III degree obesity at this CS level was very high, 39.5±5.6%.

In the questionnaire and in personal contact, the residents indicated many objective and subjective reasons that led to EBW and

obesity. Such reasons were mentioned even by respondents with normal body weight. We have identified 13 causes that may play both primary and secondary roles in the development of EBW and obesity. The most commonly mentioned reasons are low PA, unhealthy diet, taste habits, difficulty in dieting and co-morbidities. Their recorded frequency varies between 44.3±2.0% and 60.6±2.0% (t=5.76; P<0.001). However, during the survey period, it was determined that the majority of residents are indifferent to their body weight, even with varying degrees of obesity. The majority of the residents attach cosmetic importance to EBW and obesity (48.5±1.1%), another 32.9±1.0% think that it does not affect health (t=10.47; P<0.001) and only 18, 6±0.9% accept that diabetes and obesity have an aggravating effect on the body (t=10.59; P<0.001). In this regard, their attitude towards the correction of EBW and obesity is not the same. Only 25.0±1.0% of residents consider these measures important, while 32.7±1.0% think it is difficult to implement them (t=5.46; P<0.001), 45.1± 1.2% of women consider these measures meaningless (t=7.95; P<0.001). Therefore, no serious measures are taken to correct body weight at the population level. Moreover, they are important given the co-occurrence of obesity and low PA (<30 min/day) in 71.8±2.3% of the population.

For the first time, the important role of HTG at the population level was determined. All cases of obesity were detected in respondents with blood TG levels >2.3 mmol/l, whereas no cases of grade III obesity were detected in respondents with blood TG levels <2.3 mmol/l. The table also shows the dependence of body mass on the concentration of TG in the body. For example, at the level of 1.7-2.3 mmol/l of TG, normal body weight was observed in 11.6±1.0% of all respondents, at this level of HTG more - 25.1±2.2% of cases of OBW were observed (P<0.01). done, especially I and II degree obesity is 51.8±2.8% (P<0.001) and 54.5±3.4% cases (P>0.05), respectively. At HTG level of 2.3-5.6 mmol/l, these indicators increase from 0.6±0.2 to 81.6±4.5% of cases (P<0.001).

These data suggest that HTG plays an important role in the development of EBW and obesity, together with low PA and inadequate dietary fiber.

In the 4th group of the study, the question of the role of HCS as a marker in detecting hidden forms of AH and SD2 was considered. Non-communicable diseases (NCDs) are an actual problem of all countries of the world. In 2012, WHO adopted a program to combat NCDs, which was adopted and implemented at the state level in many countries. Also, in our country, in 2015, such a program was approved by the President of the Republic of Azerbaijan. The more important representatives of these diseases, called "diseases of civilization", are AH and SD2. The situation of AH and SD2 is aggravated by the fact that in recent years the number of hidden (masked) forms of these diseases is increasing, and they are also characterized by sudden onset and complications.

AH is the most common disease, its prevalence is epidemic and it is on average 30% all over the world, including our country[21] . AH causes serious damage to the health of the population, reduces work capacity and quality of life, causes disability and death. In addition, AH is a generally accepted risk factor in the formation of CVDs. Despite extensive antihypertensive measures, it is not possible to limit the spread of AH. Here the share of MAH is not small. A relatively effective method of diagnosis of MAH - 5 times a day monitoring of AP (DMAP) is not very useful for practical application. So, visiting the doctor 5 times a day (even in the evening) is difficult. This method can be used only by people who have a personal tonometer and know how to use it. 2 groups were created from people without history of AH: 1) 375 people with high level of CS in blood; 2) 186 people with normal CS level in blood; among them, without any initial signs of AH and without risk factors (smoking, alcohol, obesity, hypodynamia) - control group.

The average level of CS in group I of the examined was 6.16±0.22 mmol/l, and in the control group it was normal - 4.69±0.18 mmol\l. In group I, 216 people with a tonometer were taught how to use tonometry and were offered daily DMAP 3 times a day with 10-day intervals, 138 people did it. The same study was

[21] Ağayev A.Ə.Bakı şəhəri əhalisi arasında arterial hipertoniyanın populyasion xarakteristikası, onun aparıcı risk amilləri və profilaktikasına sosial-gigiyenik yanaşmalar. Avtoreferat, Bakı-2016

conducted among 133 people belonging to the control group, and 56 people performed DMAP. In the first group, 19 out of 138 people were positive for DMAP (13.8±2.9%), average systolic pressure was 152.6±4.3 mm Hg, diastolic pressure was 97.6±3.7 mm Hg, and among them, 14 people had a blood level of CS higher than 7.5 mmol/l, 3 people were addicted to tobacco, 4 people had EBW together with low PA, that is, these cases can be classified as MAH. Polyclinic doctors prescribed appropriate treatment to all patients with MAH. DMAP was negative in the control group.

Thus, a high level of CS can serve as a fairly reliable marker for MAH. The use of modern devices makes it possible to detect MAH in population studies and take appropriate measures.

SD2 is a widely studied laboratory-clinical disease, but the complexity of the problem is that at least 25% of people with diabetes do not know their disease, and during this period, the body is gradually damaged. Based on the survey, 468 cases of SD2 were detected among 2013 residents, 264 of them had controlled SD2, and 204 had uncontrolled SD2. Thus, weak symptoms characteristic of this disease were observed in them, and as a result, the diagnosis was confirmed with the help of glucometry (>140 mg/dl). It should be noted immediately that HCS was observed in 433 (92.5±1.2%) of 468 analyzed SD2 cases, of which 131 cases were in free form (30.3±2.2%), and 302 cases were low PA. or was combined with EBW or obesity (69.7±2.2%). The number of SD2 cases without HCS was only 35 (7.5±1.2%).

Such regularity is observed in various forms of SD2. For example, during the analysis of outpatient cards in polyclinics and endocrinology dispensary, 239 of 264 residents with SD2 were monitored (90.5±1.8%), of which 65 cases were free HCS (27.2±2.9%), 174 and in the case, HCS was accompanied by low PA or EBW, or obesity (72.8±2.9%). Only 25 cases without HCS were recorded (9.5±1.8%). 166 cases of uncontrolled SD2 that we identified were also associated with HCS. 55 cases (33.1±3.7%) of free HCS were accounted for, and 101 cases (60.83.8%) of its combination with low PA, or EBW, or obesity, respectively. There were only 16 cases without HCS involvement (6.0±1.8%).

In particular, the latent (hidden) form of SD2 is associated with HCS. We detected in 38 residents and all these cases were observed with HCS, and in 14 cases HCS was free form or combined with risk factors such as low PA, EBW, or obesity.

Thus, HCS can be a completely reliable marker for the primary screening of SD2 in non-laboratory settings. Detection of uncontrolled and latent SD2 allows to start timely treatment and at the same time to prevent complications or chronicity of this disease. The use of a portable test-system allows to carry out a mass preventive examination of the population on HCS and, in parallel, to detect the mentioned forms of SD2.

In conclusion, we should note that the use of HCS as an initial non-laboratory marker will not only play a role in the detection of hidden forms of AH and SD2, but will also reduce the burden of large-scale diagnostic examinations of laboratories. Timely treatment of hidden forms of AH and SD2 is more effective and prevents them from becoming chronic.

Comparative assessment of the effectiveness of modern means of correction of HCS

Comparative assessment of the effectiveness of modern means of correction of HCS was carried out. At the 5th stage of the study, the possibilities of correction of HCS with modern medicinal and non-medicinal means were comparatively evaluated at the population level. HCS is the main risk factor for CVDs especially atherosclerosis. For their primary and secondary prevention, a new class of drugs - statins - has been synthesized. Their main purpose is to lower the level of CS. These preparations are widely used all over the world, as well as in our republic. Doctors mostly prescribe these drugs to patients with CVDs and AH, and some people use them to limit the increase in body mass. The pharmacy market contains a large group of statins and their generics. Atorvastatin and sucrastatin are more common, but atorvastatin is preferred. The drug is prescribed once a day in a dose of 10, 20, 40, 80 grams. The course of treatment is permanent. However, their evaluation on the correction of HCS at the population level has not been carried out so

far. For this purpose, we have conducted a number of studies. We conducted the main first group research at the base of 3 city polyclinics and an endocrinological dispensary, where a lipidogram blood analysis was performed, and outpatient cards of patients with AH were selected, 846 patients' outpatient cards were analyzed, 582 of them were treated by doctors mainly prescribed atorvastatin or rosuvastatin at a dose of 10-80 mg/day. Patients were examined from 7 months to 4 years and 5 months. The control group consisted of 264 patients who were not prescribed statins. Doctors also advise all patients to take measures to eliminate lifestyle defects, such as rational nutrition, increasing PA, etc. have been advised.

Better results were obtained in the patient group receiving atorvastatin and razuvastatin at a dose of 40 mg. For example, SAT from 175.6±8.5 mm Hg to 143.3±6.1 mm Hg ($t=5.00$; $P<0.001$), DAT from 117.1±6.4 mm Hg to 88.6±5, 6 mm of mercury milk. decreased to ($t=3.35$; $P<0.001$). CS decreased from 3.2±0.8 to 5.3±0.5 mmol/l ($t=4.15$; $P<0.01$). The effectiveness of rosuvastatin at a dose of 40 mg was also similar: SAT from 202.2±9.1 to 137.3±7.1 mmHg ($t=5.68$; $P<0.001$), DAT from 123.3±6.4, respectively. to 84.2±6.8 mmHg ($t=4.19$; $P<0.001$), CS from 8.9±0.8 to 5.4±0.5 mmol/l ($t =3.72$; $P<0.001$) decreased. It is necessary to clarify these indicators. First, a number of scientific reports confirm that statins have a beneficial effect on the clinical course of AH and contribute to its effective treatment. Second, statins can reduce the level of CS in the body up to 6.4 mmol/l at a dose of 40 mg/day, and we note that the level of CS in the body <6.4 mmol/l can be considered normal. Antihypertensive treatment also helps to reduce SAT and DAT indicators and reduce blood pressure to the border of the target level (140/90) by prescribing atorvastatin and razuvastatin at a dose of 40 mg/day, which should be considered as an achievement of outpatient doctors. However, the above-mentioned data show that reducing AP to the optimal level (120/70) is not possible. Reduction of CS to the optimal level (<5.0 mmol/l) is also not possible. We thought that one of the reasons for this is the duration of statins. The analysis of patients' outpatient cards showed that during 1-2 years of prescription of the drugs: during the prescription of atorvastatin at a dose of 40

mg/day, SAT decreased from 227.4±10.3 mm Hg to 144.2±6.8 mm Hg. (t=6.74; P<0.001), DAT from 125.3±7.0 mm c.w. to 88.3±6.1 mm w.c. (t=3.99; P<0.001), CS decreases from 8.8±1.0 mmol/l to 5.9±0.7 mmol/l (t=2.42; P<0.05). During the appointment of rosuvastatin, SAT decreased from 221.5±10.4 mm c.m. to 133.7±7.6 mm c.m.c. (t=6.82; P<0.001), DAT from 125.3±7.0 mm c.w. to 88.3±6.1 mm w.c. (t=3.99; P<0.001), CS decreases from 9.6±0.9 mmol/l to 6.0±0.6 mmol/l (t=3.33; P<0.001). Longer administration of drugs does not affect the effectiveness, that is, reduction of AP and CS to the target level does not occur.

According to the analysis of the ambulatory card of 88 patients under control, the reduction of AP and CS to the target level is possible with the prescription of antihypertensive drugs and statins, along with the correction of lifestyle defects. Thus, in the group of patients who fully implemented the recommended measures during the observation period, SAT decreased from 208.5±9.7 mm Hg to 124.4±6.6 mm Hg on the background of taking atorvastatin 40 mg/day. (t=7.17; P<0.001), DAT from 153.6±7.2 mm c.w. to 81.7±5.8 mm c.w., respectively. (t=7.77; P<0.001), CS decreases from 10.2±1.1 mmol/l to 5.3±0.6 mmol/l (t=3.92; P<0.001). A similar decrease was observed during the appointment of rosuvastatin: SAT from 226.3±9.8 mm c. milk to 138.6±7.8 mm c. milk. (t=7.16; P<0.001), DAT from 164.7±7.3 mm c.w. to 80.5±5.6 mm w.c., respectively. (t=9.15; P<0.001), CS decreased from 9.6±1.0 mmol/l to 4.7±0.5 mmol/l (t=3.77; P<0.001).

As we have seen, statins are effective in reducing body weight and have gained wide popularity among the population. 81 of the 2,013 people who participated in our survey used statins to reduce body weight and prevent CVDs. A better effect was obtained in patients who implemented lifestyle correction measures along with taking these drugs. Mainly CS indicators from 10.6±1.4 mmol/l to 4.4±0.5mmol/l (t=4.16), EBW from 29.4±2.2 kg/m² to 21.5±1.1kg /m² decreases to (t=3.51; P<0.05). Sufficiently effective treatment was also observed among patients with obesity, as CS decreased from 9.7±1.0 mmol/l to 5.2±0.5 mmol/l (t=4.02; P<0.001, obesity 36.8It decreases from ±3.2kg/m² to 25.2±1.8 kg/m² (t=3.16; P<0.01).

Also, the analysis of the ambulatory card of 111 patients with type 2 diabetes shows that taking statins along with correcting lifestyle defects is effective in reducing the level of CS in the body. So, on the background of this joint antidiabetic treatment, in patients who monitor the food ration daily and fulfill the PA requirements, the level of CS decreased on average from 9.8±0.6 mmol/l to 4.7±0.5 mmol/l within 4-5 months. allowed to decrease to l ($t=6.54$; $P<0.001$). At the same time, the amount of sugar in the blood decreased from 190.6±4.4 mg/dl to 124.5±3.5 mg/dl ($t=11.44$; $P<0.001$).

Evaluation of the complex of scientifically based measures to limit the spread of HCS at the population level and its effectiveness among a fixed population group

Evaluation of the complex of scientifically based measures to limit the spread of HCS at the population level and its effectiveness among a fixed population group was carried out. HCS is social hanging pathology process. Therefore, its formation is related to defects in NB and often this process occurs against the background of low physical activity. Numerous studies have proven the aggravating effect of HCS on human health, its dominant role in the development of serious diseases such as CVDs, AH and SD2. The development of atherosclerosis is most often associated with HCS. Most importantly, HCS is the main cause of the widespread and "epidemic" EBW and obesity, which further contributes to the development of CVDs, AH and SD2. A large number of studies are devoted to the treatment of HCS, which are systematically published in peer-reviewed journals everry year. Based on these publications of the European Society of Cardiology and the European Society for the study of Atherosclerosis, all comprehensive reccomendations for the treatment of dyslipidemia have been compiled ("lipid modification to reduce cardiovascular risk"). The recommendations summarized body weight and PA modification, avoidance of trans-fats, reduction of food fiber and carbohydrates, smoking cessation, reduction of alcohol consumption (10g/day). The subsequent recommendations of the European Society of Cardiology in 2021 indicated that these

corrective measures lead to a decrease in the level of CS. The analysis of the ambulatory cards of patients with AH and SD2 shows that non-pharmacological measures for the correction of lifestyle defects alone, when combined with statins, do not lead to a decrease in the level of CS in the body. The possibility of this method to reduce the level of CS at the population level was considered in the 6th group of our study. Based on various published materials, the European Society of Cardiology and the European Society for the Study of Atherosclerosis have developed specific recommendations on "Treatment of dyslipidemias: modification of lipids to reduce cardiovascular risk"[22]. The recommendations summarized body weight and PA modification, avoidance of trans-fats, reduction of food fiber and carbohydrates, smoking cessation, reduction of alcohol consumption (10g/day). The subsequent recommendations of the European Society of Cardiology in 2021 indicated that these corrective measures lead to a decrease in the level of CS in the body[23]. However, these recommendations were made based on the observation of patients with CVDs, AH, SD2, as well as patients with obesity. However, sometimes patients do not follow these recommendations after being discharged home. Especially in this matter, there is a serious need for inpatient and outpatient care One should not forget the large number of people with high CS levels in their blood for no reason. Therefore, it is necessary to look for new approaches, more easily accepted by people, to correct the defects in the lifestyle of the population. HCS is the most significant consequence of these defects, but it also shows NB defects, low PA, EBW, and susceptibility to many diseases. Our research has confirmed that, based on the current situation, there is very poor knowledge in the population about the systemic effect of HCS not only on the increase of body weight, but also on health. To fill this gap, we have designed a 16-question questionnaire that addresses

[22] ESC/EAS Guidelines for themanagement of dyslipidaemias: lipid modification to reduce. *EuropeanHeartJournal* 2020;41:111-188.

[23] ESC/EAS Dislipidemia: overwiev of the ESC/EAS 2019 Recommendations for diagnostics and treatment. Journal of the Grodno State Medical University 2021, 19(2)^236-241.

sufficient information content on the problem of HCS and its prevention. To evaluate the level of awareness, we have developed a cluster system consisting of 5 clusters, each of which is evaluated between 1-5 points according to its importance. This system was tested among 1386 people of a fixed population group.

Before the start of educational work, the level of awareness of the population was on average 2.68±0.7 points (norm 4 points). The work lasted 11-14 months. The comprehensive use of the cluster system showed that the formation of this group not only rose to a sufficient level, averaging 4.13±0.9 points, but was even maintained for such a long time.

Comprehensive accessible awareness of the population is important for its activation and motivation to implement the recommended preventive measures. Therefore, it is necessary to assess the level of motivation of the population. For this purpose, we have developed a cluster system consisting of 5 clusters, and each of them has been given 1-5 points. At the beginning of the work, the residents' motivation increased to 3.87±0.4 points (normally 4 points), after 11-14 months it increased to 4.13±0.4 points.

In accordance with the recommendations for the normalization of CS in the body, we have repeatedly held conversations with parents at parent meetings held in schools, with patients and visitors at the polyclinic, as well as with families, employees of various institutions, and residents about the issues of health maintenance and the negative impact of HCS on health. This work, in which medical workers also participated, was conducted among 1386 residents for 11-14 months. During this period, 442 people followed these recommendations completely, 336 people followed them incompletely, 237 residents voluntarily took statins, and 371 residents belonged to the control group.

As a result, positive results were obtained on the main problems of population health, especially the number of medical requests from 1.24±0.11 to 3.88±0.16 (norm >4), adherence to prevention and treatment from 3.16±0.15 to 4.52±0.14 points (norm >5), the frequency of general somatic symptoms increased from 35.1±2.8 to 22.6±1.4% ($t= 3.93$; $P<0.001$) and the frequency of

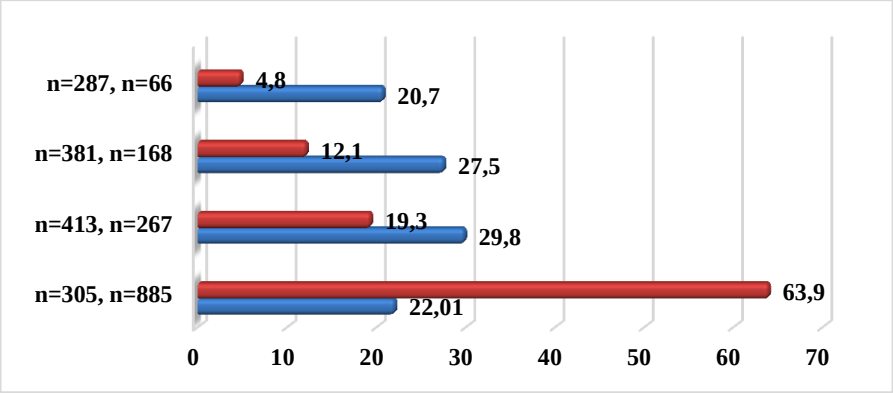
morbidity from 62.4±2.6 decreased to 49.2±2.6% (t=3.59; P<0.001), quality of life from 38.5±1.3 to 61.0±1.8 points (norm >70 points) (t=3.59; P<0.001) increased. The frequency of self-rated health as "good" increased significantly from 15.4±0.8 to 61.5±2.4% (t=18.22; P<0.001). Body weight indicators decreased: EBW – from 20.4±1.9 to 14.7±1.7% (t=2.24; P<0.05) and obesity from 29.0±2.2 to 24.9 It decreased to ±2.1% (t=1.68; P>0.05).

In order to reduce the level of CS in the body, special attention is paid to explaining to the population the implementation of two more important recommendations. One of them is efficient nutrition. 5 food baskets were prepared with the caloric value of the food products in the content (per 100 grams): the first basket contains daily consumed food products (15 items); food products consumed for 1-2 days in the second basket (17 names); food products consumed 2-3 times a week in the third basket (12 names); food products consumed once a week or less (15 names) in the fourth basket; the fifth basket includes daily consumed fruits and vegetables (25 names). Residents were told that they could eat any food for breakfast, lunch and dinner, as long as the total daily calorie intake did not exceed 2500 kcal. It should be noted that the residents accepted these recommendations with great enthusiasm and already after 13-17 days they started to form the food basket according to their taste preferences and financial possibilities.

The second important recommendation was how important PA plays in promoting health, even more so in lowering CS levels in the body, as well as normalizing body weight. Residents were told to walk at least 60 minutes a day in order to meet the body's need for physical activity.

The evaluation of the effectiveness of the above-mentioned recommendations showed the following. At the beginning of the preventive work, the number of residents whose blood level of CS was normal (<5.0 mmol/l) was 22.0±1.1%, and at the end of the work, that is, after 11-14 months, their number was 63.9±1.3% up to , i.e. increased 2.9 times. A reliable reduction of various high levels of CS in the body has been observed. Thus, if at the beginning of the study, the number of residents with a blood level of CS of 5.0-6.4

mmol/l was 29.8±1.2%, at the end of the study, this indicator decreased to 19.3±1.1% (t=6, 44; P<0.001). The same ratio was observed at the level of CS 6.5-7.8 mmol/l, it was 27.5±1.2% and 12.1±0.9%, respectively (t=10.27; P<0.001). Similarly, at the level of CS >7.8 mmol/l, this decrease was 29.7±1.1% and 4.8±0.6% (t=12.72; P<0.001) (qraph 3).



Graph 3. Dynamics of CS indicators among residents at the beginning and end of preventive work 1. Start; 2. Finish

The same success was achieved in group I of patients, that is, representatives of this group constantly performed a complex of preventive measures, and at the end of the study, only 5 out of 442 residents had a level of CS >7.8 mmol/l (1.1±0.4%). This level of CS was not observed in the group of residents taking additional statins. What is also interesting is that in the III group of residents, i.e., in the group of residents who performed preventive measures incompletely and partially, a decrease in the level of CS was observed in some residents.

Thus, for the first time, a complex of non-pharmacological measures to reduce the level of CS in the body at the population level during the experimental tests developed on the basis of socio-hygienic research showed high efficiency.

RESULTS

1. The prevalence of HCS (>6.5mmol/l) is 50.3±1.1% on average. As age increases (<20->70), the level of HCS increases consistently from 43.9±3.3% to 57.1±3.2%, its level is lower among men than among women - 42.4±1.7% and 56.6±1.5%. The prevalence of HTG (>1.8 mmol/l) is 33.7±1.1% on average, 80.6±2.9% of cases have HCS and HTG together. Such a joint manifestation is 68.9±3.5% of the case of CVDs, 56.5±3.3% of the case of AH and 41.7±4.0% of the case of SD2 (4,5,6,16,28,20).

2. 63.7±1.5% of total morbidity was found against the background of HCS, so that 36.4±1.4% of residents assessed their health as insufficient and 39.8±1.5% as relative insufficient, of which 55, General somatic diseases were observed in 4±2.6% (5,7,13,27,19,26,33).

3. Despite the high level of morbidity and low quality of life (on average 45.7±1.28 points, the norm is >70 points), the average number of visits to the polyclinic for medical requests is 0.36±0.12, and treatment-prophylaxis compliance is 2.14±0, is 13 points (normally 4 points). Residents' motivation for implementing treatment-preventive measures is 2.37±0.11 points (normally <3 points) (5).

4. It was determined that the formation of HCS occurs when the energy value of daily food intake is above 2500 kcal/day and physical activity is below 60 min/day. In parallel, these risk factors lead to an increase in body mass: EBW (25-30 kg/m²) - 66.1±2.4%, obesity (>30kg/m²) - 29.8±1.9%. In 65.7±1.9% cases, HTG also joins this partnership (8,9,24,29,35).

5. Comparative parallel studies using laboratory-diagnostic methods have shown that HCS can be used as a marker for early screening of masked AH and SD2. 13.8±2.9% of masked AH and 14.7±2.2% of SD2 cases were detected in non-laboratory conditions in persons with HCS (13,21,23).

6. During the analysis of outpatient cards in the main medical institutions, it was determined that statins are currently considered more effective and safer means in the treatment of HCS. Constant use of statins (atorvastatin, rosuvastatin) at a dose of 40 mg/day for

1-2 years in the treatment of AH, SD2 diseases reduces the level of CS in the body by 1.43-2.04 times. This effectiveness is further enhanced by the simultaneous implementation of lifestyle modification measures. Also, EBW decreases from 23.4±2.2 to 21.5±1.1kg/m², obesity from 36.8±3.2 to 25.2±1.8kg/m² (14).

7. A continuous reduction of the level of CS in the body is achieved by the use of non-drug cholesterol-reducing means (observation period 6-8 months): limiting the energy value of daily food to 2500 kcal/day and with PA of 60 min/day and more, CS its level decreased on average from 10.4±1.1mmol/l to 6.3±1.1mmol/l. In addition, the appointment of statins accelerates the achievement of this result (15,30).

8. Experimental trials of a set of measures designed to limit the spread of HCS at the population level for 11-14 months gave the following results:

a) Thanks to the informative and explanatory work conducted using cluster systems, the awareness of the fixed population group about the main problems of HCS increased from 2.68±0.7 points to 4.13±0.9 points (normally >4 points), implementation of preventive measures the motivation for conducting increased from 3.27±0.4 points to 4.13±0.4 points (>4 points in the norm).

b) A positive dynamic was achieved in the parameters of the evaluation of the effectiveness of measures: the number of visits for medical applications during the year increased from 2.31±0.12 to 3.86±0.16, preventive adherence increased from 3.08±0.16 to 4, Increased to 52±0.14 points, general somatic symptoms of HCS from 55.4±3.6 points to 31.7±1.8 points, general somatic morbidity from 62.4±2.6 points to 53.6±2.7 decreased to points, the quality of life increased from 38.5 ± 1.3 points to 61.0 ± 1.8 points.

c) In a fixed population group that implemented measures of rational nutrition (energy value no more than 2500 kcal) and PA increase (>60 min/day) for 12-14 months, the indicator of normalization of the level of CS in the body was 22.0±1.1 % increased to 63.9±1.3%. In addition, as a result of using statins, the indicator of normalization of body mass increased from 15.2±2.3% to 54.9±3.2% (9).

PRACTICAL RECOMMENDATIONS

1. A portable test system can be used for non-laboratory diagnosis of HCS.

2. A 5-point cluster system was developed to assess the population's motivation for the implementation of treatment and prevention measures (detailed in the Appendix). Motivation is considered sufficient in the indicator of >3 points.

3. An algorithm for early screening of HCS in non-laboratory conditions is proposed (see figure).

4. A set of informative-explanatory questions consisting of 21 questions has been prepared, which allows to increase the awareness of the population on the problem of HCS and the motivation for treatment and prevention measures (see chart).

5. 5 food baskets were proposed indicating the caloric value of food products, which were prepared for the energy value of daily food intake of 2500 kcal/day.

6. In order to provide the body with the necessary physical load, it is recommended to walk briskly for no less than 60 minutes a day.

7. The HCS indicator can be used for non-laboratory early screening of the masked form of AH, hidden forms of SD2.

8. The use of statins (atorvastatin, rosuvastatin) at a dose of 40 mg/day for 6-8 months allows the normalization of body mass.

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LIST OF CONVENTIONAL ABBREVIATIONS:

EBW- excess body weight
AH - arterial hypertension
LDL- low density lipoproteins
VLDL - very low density lipoproteins
PA - physical activity
HCS - hypercholesterolemia
HTG- hypertriglyceridemia
CS - cholesterol
NB-nutritional behavior
NCDs - non-infectious diseases
MS - metabolic syndrome
SD2 - type 2 diabetes
TG- triglycerides
CVDs- cardiovascular diseases
GSD- general somatic diseases
HDL- high density lipoproteins
AP - arterial pressure
GSS - general somatic symptoms
RCT - randomized clinical trials
MAH - masked AH
CVD - cardiovascular diseases
LM - lifestyle modification

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